VR Storytelling: Potentials and Limitations of Virtual Reality Narratives[*]

Simone Arcagni[** a]   Adriano D'Aloia[† b]

[a]   University of Palermo (Italy)
[b]   University of Bergamo (Italy)

1   Introduction

The monographic section of this issue of *Cinergie* arises from a need that has becoming increasingly acute in the past few years, namely that of closely examining the modes, practices, strategies, and forms of storytelling used in the various forms and experiences of Virtual Reality (VR) entertainment.

The question that we asked ourselves, and thus also the field of analysis that we wanted to open focuses primarily on two elements: first, on if and how cinematic narration can exist in VR; second, on what paths the development of a form of storytelling not directly tied to cinematic language might take.

The question of cinematic VR production has been on the table for several years. This is due to the peculiarity of VR language which, even if it is defined by an image that surrounds and immerses the viewer rather than placing them, as in the classic cinematic situation, in front of a screen, relies decisively on an audiovisual basis that cannot help but refer to cinematic practices of constructing visual and auditory experience. Despite this, it would be extremely reductive to consider VR as the mere transposition of elements of cinematic language. The VR medium is endowed with its own specificity, which inevitably impacts its forms of narration. We thus need to investigate the narrative forms it uses that are probably related to cinematic language, and draw their strength from the same basis, drink from the same well, but develop according to different trajectories, thus displaying different links and affinities.

In this introduction we will aim to outline some of the principal transformations that VR is imparting to audiovisual language and experience, with a particular focus on the impact of these innovations on storytelling. The essays of the section span a variety of theoretical approaches and backgrounds, argumentative styles and

---

[*]   This introduction is the product of work carried out in common by two authors, and the result of a single shared process of reflection. As far as the writing of the individual sections of the text is concerned, sections 1 and 6 can be attributed to Simone Arcagni; sections 2, 3, and 5 to Adriano D'Aloia; section 4 to both authors.

[**]   ✉ simone.arcagni@unipa.it

[†]   ✉ adriano.daloia@unibg.it

case studies (e.g. documentaries, games, art), but all of them share a similar rhetorical attitude: underscoring the potential and novelty of VR but, at the same time, identifying a series of remediations and limitations. In particular, they will show that most of the contemporary discourses on VR need to be reframed critically in order to reflect more objectively on complex notions and dynamics such as screen, interactivity, immersion, presence, embodiment, illusion and empathy.

2   From frame to field

The main argument of VR directors concerns the "freedom" that VR technology allows against the constraints of conventional cinematography. For example, the fundamental idea of the multimedia installation (including a VR experience) *Carne y Arena* (2017) — one of the most debated works in the last years — is, according to its creator director Alejandro Gonzalez Iñarritu, "to experiment with VR technology in order to explore the human condition in an attempt to break the dictatorship of the frame."[1] In fact, the screen — which is the emblem of the traditional film experience — seems to vanish in VR. The expansion of the visual horizon to 360 degrees disrupts the edges of the frame; and the viewer's activity becomes more engaging, according to the specific type of VR and technological apparatus (from 360° videos to full immersive experiences, from Google cardboards to the most advanced head-mounted display). So what about the formal solutions that visually and narratively organize the spectator's experience? What about audiovisual "grammar" — shot angle and size, visual composition, editing, transitions, camera movements, lighting, continuity, point of view, and other means — that construct the viewer's perspective and guide her attention in the narrative development of the story?

Traditional cinematic techniques seem to be only partially replicable in VR. Unlike rectangular screens, a head-mounted display in fact covers a wider field of view, more similar to what we have in reality, that is, with many elements in the peripheral portion of the visual *field*. The screen turns from a rectangle into a sphere, and while in traditional cinematic viewing the screen limits the *peripheral area*, in VR the relationship between on-screen and off-screen is dynamic and more dependent on the observer's behaviour: it changes as our head or body changes its orientation. In this sense, the "point of interest," which is usually focused in the centre of the visual field (the so-called "fixation point") may be located even outside the temporary peripheral area, creating a possible loss of information for the user. This has an impact on the way in which the story attracts, predicts, and directs the user's attention, given that the latter may risk to ignore the salient visual elements or narrative events since he is attracted by a "navigational" form of exploration of the contents, instead of being guided through it. Consequently, when a story is told in VR, the user's freedom may turn into disorientation.

These "limitations", however, can offer creative tools to VR creators. VR directors are more and more aware that images and stories have to be constructed through a strategic use of linguistic elements such as sound, eyeline match cuts, or graphic elements, with the aim of directing the user's attention towards the desired area, according to a new kind of editing that adopts solutions more functional to the specificity of the medium (see Bodini 2017; Dolley 2017; Mateer 2017; Bucher 2018; Williams, Love & Love 2021). In other words, the seeming narrative *disaffordances* of VR may turn into advantages. The temporary out-of-sight area (technically called the "zone of curiosity"), for example, can be used in the horror genre to place an unexpected presence behind the user and to surprise or terrorize him.

More generally, as Blandine Joret argues in her contribution, the user's experience takes place in a sort of forensic framework that requires both a witnessing and an investigative activity in which he is involved in a progressive discover of evidence. Joret also helps us to understand that VR is not as much of a "post-cinema" as it seems, "at least if one is willing to acknowledge that there has always been an off-screen, exilic and embodied nature to film studies," as theorists such as Rudolf Arnheim, André Bazin, and Dudley Andrew demonstrate.

A converse perspective is offered by Christopher Maraffi, who discusses the capacity of some room-scale VR experiences to provide the illusion of a believable world build with the same principles of the magic theatre

---

1. "Alejandro G. Iñárritu presents 'Carne y Arena'," press release, http://www.fondazioneprada.org/wp-content/uploads/1-Carne-y-Arena_Fondazione-Prada_press-release.pdf.

typical of the early cinema age. This interface produces the "twin effects of simulation and dissimulation through misdirection," that is, directing the spectator's attention far from the mechanics of the trick.

As these and other articles, the tensions between the direction and misdirection of attention, simulation and dissimulation, awareness and unawareness of mediation, transparency and opacity of technology are very specific of VR and of its expansion from the frame (as a stable support of images and story) to a broader and changeable *field* that calls the user to a new kind of *spectatorial agency* which includes her activity in the real-time construction of visuals and development of narration.

3   From screen to scape

The passage from frame to field corresponds to the turn from the idea of screen as a surface of representation to that of the field as an environment that surrounds the user and within which the latter can actively dwell. It was in fact one of the originators of VR, Jaron Lanier (2017), who pointed in a precise direction, casting VR as a technology capable of creating alternate inhabitable worlds with their own specific expanded sensoriality. This seems to its true specificity, that which defines the ontology of this technology: "to live in the environment," an experience that can then take on different forms (360° VR, interactive VR, varying in the different "degrees of freedom" and movement in space that the apparatus allows).

Virtual scenarios lose their iconic and representational nature and become "an-icons" (Pinotti 2017) or "medi-ascapes" (Casetti 2019), that is, experiential environments that host environmental experience. This is one of most critical aspects of VR as a new storytelling medium: the irresistible tendency to offer explorable worlds as they were "environmental stories," without a narrative organization of content — or, in other words, "non-intentional" narrations lacking in a clear or canonical teleology.

Notwithstanding — or maybe thanks to — this "navigational" mode of narrative experience, VR stories are not pre-determined but rather seem to emerge directly and exclusively from the reciprocal interactivity of the agent and the possibilities offered by the environment. In this sense, the narrative emerges from the user's behaviour and her confrontation with the potentialities and the constraints of the spatiotemporal dimensions of narration.

Adopting an *enactive* approach, Elisabetta Modena and Francesco Parisi analyse a series of walking simulators and emphasize both the spatialization of narration and the actual motoric nature of the user's *action* (and not merely the sensorimotor activity typical of conventional film experiences). Their analysis shows that VR allows "a creative and transformative process where both agents and audiovisual products change and modify each other" and describe this process as "zone of becoming." Similarly, Sofia Pirandello analyses augmented reality and mixed reality "walking artworks" installed in urban spaces. These installations involve the visitors/pedestrians in a creative performance that completes the artwork and reconfigures the meaning of places.

The analyses of VR games and AR installations proposed in these articles also show that narration and the user's bodily performance are deeply connected. As Szylvia Ruszev argues in her contribution, VR can be described as an embodied, spatial and interactive experience that is focused on the user's body as the very origins of *storyfication*: "The body, through the senses of kinesthesia and proprioception, becomes a sensitive storytelling device." Accordingly, although developed in film studies, theories and methodologies on the dynamics of spectatorial attention (cognitive psychology), on the embodied nature of simulation (social neuroscience), and on the tactile aesthetics of audiovisual experience (phenomenological philosophy) find in VR a terrain of radical relevance and application.

As many of the essays underline, literal embodiment of technology is possible with the prosthetic integration of VR devices and the human body. The head-mounted display encapsulated in the VR headset brings the image directly to the user's eyes and forms a sort of *camera obscura* with her head. The more we extend our body and our mind in the virtual world, the more technology is physically close or even incorporated into our body. The new composite dispositive that arises from such a "syncretic unity" between technology and the body makes clear that VR is an elective terrain for reflection on the nature of contemporary media experience.

4   From absence to presence

Further tensions arise here between immersion and emersion, presence and absence, flow and fragment, embodiment and disembodiment, as sites of reflection on the nature of VR experience. Many articles deal with different notions of *immersion* and *presence* that the debate on the psychological characteristics of VR usually takes up. The various accounts of immersion and presence provided by a number of scholars in different fields — from philosophy to psychology, from ludology to narratology, from cognitive science to computer science (see for example Hillis 1999; Ryan 2001; Slater 2009; Noë 2012; Popat 2016; Raz 2019) — converge in their need to provide conceptual tools to explain VR's specific capacity to situate the user in a vivid spatial and social system that is alternative to the real world. Among these theoretical attempts, Gordon Calleja's notion of "incorporation" — elaborated in the field of game studies — seems to offer the most comprehensive and precise description of the phenomenon: "the player incorporates (in the sense of internalizing or assimilating) the game environment into consciousness while simultaneously being incorporated through the avatar into that environment" (Calleja 2011: 169). The pre-designed nature of the experience (and the scripted nature of the storyline) and the player's cognitive activity (and the emergent stories) are coupled in a narrative tactic that characterizes ludic strategies of involvement. Adopting Calleja's account of incorporation, Giancarlo Grossi argues in his comparison between installation art environments and dreaming, that "in virtual worlds too the story arises from the negotiation between pre-designed narrative elements and the free associations and paths created and followed by the user." For this reason, Grossi prefers to use Céline Tricart's (the creator of acclaimed VR experience *The Key* [2019]) concept of "story-living" instead of storytelling to emphasize the user's personal experience and emotions in their interaction with — and thus contribution to creating — the narrative.

A critical point, however, concerns the nature of the user's active participation promoted in the most advanced forms of VR. Federico Biggio's essay reflects on the nature of interactivity (traditionally considered as the opposite of both narrative and immersion) relying on Pietro Montani's (2014) discussion of "anaesthetization of sensibility" as the negative aspect of media immersion and the user's relative passivity, i.e. the lack of critical distance due to subjection to the subtle influence of technology. Against the "apocalyptic" account and the phobia of "embodied media", Emilio Garroni's notion of "meta-operativity" and Montani's "interactive imagination" helps Biggio to rethink VR and AR as occasions for the user to develop a creative attitude and "technical empowerment" through new forms of narrative.

VR games are exemplary of these dynamics for their ergodicity, that is, an extra-noematic effort that goes beyond the mere decoding or interpretation of narration. In his article Nicolas Bilchi offers a paradigmatic example of a VR game in which the illusionistic mimetic potential of VR is confronted with its tendency to bring "consciousness about the impalpable and disembodied essence of the virtual body during the (simulated) physical interaction with the environment". This "disillusion" or "break of presence" contributes to the inadequate sense of body ownership that the VR apparatus is unable to overcome. In this sense, Bilchi concludes that rather than emphasizing its immersion potential, VR should be thought of and experimented with as a tool to for fostering critical and reflexive attitudes.

Indeed, this attitude is one of the specificities of VR art projects. The world of the arts plays a fundamental role due to its ability to experiment with languages and cognitive models. From a more overtly dreamlike (if not psychedelic) direction (that is, free from causal relations and an explicitly realistic dimension) to an intrinsic relation with performativity, the paths proposed by the world of art (which among other things is free of the hindrances of film and television production and can base itself in a network of galleries and museum initiatives that already have familiarity with technology, at least through video art) offer concrete proposals and above all a high level of aesthetic experimentation.

As Valentino Catricalà and Francesco Spampinato highlight in their article, "contemporary artists are less interested in exploring VR's illusionistic and immersive dynamics than deconstructing the VR medium itself." In the VR artworks they analyse, the immersive and multi-sensory experiences offered by VR are not emphasized for their own sake, but rather as means that "make users aware of the alienating and desensitizing impact of digital technologies."

In short, to be in a three-dimensional environment, to move within it, explore it, and see it change is already

in itself an amplification that definitively transforms the spectator (etymologically, the one who sits before the spectacle) into an *agent*. This introduces the issue of interactivity and its capacity to pose the question of the usage of a new narrative dimension. Interactive storytelling finds in immersive storytelling a point of intersection that heralds a wide range of possibilities. This opens up a vast field for observation and analysis, which entails examining not only CGI and sensors, but also the acquisition of data and how they enable in real time, with the support of AI, machine and deep learning and generative algorithms. The technological question thus becomes central, not only and not so much in terms of its functioning, but rather as a way to investigate the dynamics and modalities in which the functions are enabled and impacts are generated (and consequently, form and aesthetics), but also to interpret the sociocultural context in which all this occurs, identifying a post-media horizon that would be better defined as "post-digital". Raffaele Pavoni's article on spatial sound in VR and in cinema — approached with theoretical tools borrowed from both sound studies and software studies — follows this direction.

5   From identification to empathy

As most of the case studies chosen by the authors demonstrate, the cinematic "genre" from which VR takes the most is that of documentary. Whether it be naturalistic, scientific, journalistic, poetic, social, or auteurist, non-fiction narration seems to be the site at which the potential of immersive language bursts forth: to be directly in the environment that is being visited, to be in the real situation that is being dealt with.

The mainstream rhetoric in contemporary discourse promotes the idea of VR as "the ultimate empathy machine" (Milk 2017) for its capacity to create a vivid impression of being with others (even if the latter are images or avatars) and thus offer an effective form of compassionate understanding. It should be noted that, if empathy is a way to deeply understand the condition of the other, paradoxically, when technologically mediated, it can also be the most obvious way to keep at a safe distance from tragedies that we would never want to experience first-hand. As Neta Alexander explains in her essay on VR documentaries on the Shoah, the illusion of co-presence or co-witnessing does not guarantee automatically an empathetic response or a deeper understanding. VR risks putting the user at an "improper distance" (too close) to a sensitive topic and to conflate attention and learning with "slacktivism" (the support a social cause through social media or online petitions, with very little commitment) or "identity tourism" (putting oneself in the other's shoes as a leisure activity) and thus fetishizes the other. As Paul Bloom (2016) argues, empathy generates pleasure for its ability to make us feel involved with others, but it is far from a valid moral and decision-making guide: "VR doesn't actually help you appreciate what it's like to be a refugee [...] In fact, it can be dangerously misleading" (2017).

Along the same lines, Dirk Eitzen adopts a cognitivist account of empathy and clarifies that a "moral ambivalence" arises in the case of VR documentaries on migration or similar topics. Given that we can *imagine* being in the other's shoes, the strong and literal subjectification of experience promoted by VR (the shift from third and second person to first person) is not the best way to genuinely share the experience of the other: "We may *think* we are imagining somebody else's experience but [...] our self-absorption tends to eclipse genuine understanding." Paradoxically, Eitzen concludes, conventional (documentary) cinema and third-person storytelling remains the most effective medium to open a window into the life, thoughts and feelings of somebody else.

In regard to the subjectification of the point of view in VR storytelling, Joseph Fischer's analysis of theme parks as narrative spaces is based on the idea that diegetic worlds "actively involve the spectator and position them as if they are the frame of a camera exploring and creating their own stories within the multi-acre diegesis."

6   Extended VR

Even in the light of the interesting questions and significant case studies that will emerge from the reading of the various contributions, we are today faced with an indisputable fact: despite the predictions made some years ago, from both the production and technological sectors, VR apparatuses have not broken into the market; there has been no diffusion of VR arcades, let alone a market that would produce and distribute content. VR as an entertainment medium is not experiencing success (not even in the more vibrant field of gaming). On

the other hand, VR represents a fundamental component in the field of "extended" immersive technologies (so-called XR). XR - and thus VR - play a primary role in the creation of next-generation immersive and interactive environments that have been developed in various industrial sectors (from the automobile industry to aeronautics), in simulation contexts (military usages as well as medical, surgical, and scientific ones), in a museal and didactic context (with immersive classrooms or galleries), in the implementation of architectural and urbanist projects, and finally in communications, with the development of immersive platforms and social media.

It is this "extension" of VR language that seems to offer the most interesting suggestions as to the possible narrative usages of the medium. Every VR experience is, in its way, experimental (hence the fundamental importance of the realm of arts inclined to work creatively on their languages), thus a little laboratory in itself for discoveries and practical applications, even for narrative works.

We are probably still at the beginning of a path of the affirmation and refinement of a medium that, if it manages to survive, will have to develop a greater awareness of its own means and articulate a new language.

References

Bloom, Paul (2016). *Against Empathy: The Case for Rational Compassion.* New York: Ecco.

Bloom, Paul (2017). "It's Ridiculous to Use Virtual Reality to Empathize with Refugees." *The Atlantic.* https://www.theatlantic.com/technology/archive/2017/02/virtual-reality-wont-make-you-more-empathetic/515511/.

Bodini, Aimone (2017). *Narrative Language of Virtual Reality*. Geneva: World VR Forum.

Bucher, John K. (2018). *Storytelling for Virtual Reality: Methods and Principles for Crafting Immersive Narratives*. New York: Routledge.

Calleja, Gordon (2011). *In-Game. From Immersion to Incorporation*. Cambridge, MA - London: The MIT Press.

Casetti, Francesco (2019). "Mediascapes: A Decalogue." *Perspecta* 51: 21-33.

Dooley, Kath (2017). "Storytelling with virtual reality in 360-degrees: a new screen grammar." *Studies in Australasian Cinema* 11(3): 161-171. https://doi.org/10.1080/17503175.2017.1387357.

Hillis, Ken (1999). *Digital Sensations. Space, Identity and Embodiment in Virtual Reality*. Minneapolis - London: University of Minnesota Press.

Lanier, Jaron (2017). *Dawn of the New Everything: Encounters with Reality and Virtual Reality*. New York: Henry Holt and Co.

Mateer John (2017). "Directing for Cinematic Virtual Reality: how the traditional film director's craft applies to immersive environments and notions of presence." *Journal of Media Practice* 18(1): 14-25.

Milk, Chris (2015). "How virtual reality can create the ultimate empathy machine", TED Talk. https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine.

Montani, Pietro (2014). *Tecnologie della sensibilità*. Milano: Raffaello Cortina.

Noë, Alva (2012). *Varieties of Presence*. Cambridge, MA: Harvard University Press.

Pinotti, Andrea (2017). "Self-Negating Images: Towards An-Iconology." *Proceedings* 1(9): 856. https://doi.org/10.3390/proceedings1090856.

Popat, Sita (2016). "Missing in Action: Embodied Experience and Virtual Reality." *Theatre Journal* 68(3): 357-378. https://doi.org/10.1353/tj.2016.0071.

Raz, Gal (2019). "Virtual Reality as an Emerging Art Medium and Its Immersive Affordances." In *The Palgrave Handbook of the Philosophy of Film and Motion Pictures*, edited by Noël Carroll et al., 995-1013. London: Springer International Publishing.

Ryan Marie-Laurie (2001). *Narrative as Virtual Reality. Immersion and Interactivity in Literature and Electronic Media*. Baltimore - London: The Johns Hopkins University Press.

Williams Eric R., Carrie Love & Matt Love (2021). *Virtual Reality Cinema: Narrative Tips and Techniques*. Abingdon - New York: Taylor & Francis.

Simone Arcagni — University of Palermo (Italy)

✉ simone.arcagni@unipa.it

Simone Arcagni is an Associate professor at the University of Palermo, Italy. He is a scholar, consultant, curator and disseminator of new media and new technologies. He collaborates with «Nòva-Il Sole24Ore», «FilmTV», «Segnocinema», «Che Fare», «Impactscool Magazine» and other magazines and newspapers. He founded and directs the scientific magazine *EmergentSeries Journal* and curates "VR Stories", an international virtual reality festival and market. Recently, as curator, he signed the exhibition "Futuri passati" (Biennale Democrazia / Polo del '900) and "#FacceEmozioni" (with Donata Pesenti Campagnoni for the Museo Nazionale del Cinema). Among his publications, *Visioni digitali. Video, web e nuove tecnologie* (Einaudi, 2016), *L'occhio della macchina* (Einaudi, 2018), *Immersi nel futuro. La Realtà Virtuale*, nuova frontiera del cinema e della TV (Palermo University Press, 2020), and *Cinema Futuro* (Nero, 2021).

Adriano D'Aloia — University of Bergamo (Italy)

✉ adriano.daloia@unibg.it

Adriano D'Aloia, Phd, is an Associate professor of Visual culture at the University of Bergamo, Italy. He the author of *Neurofilmology of the Moving Image. Gravity and Vertigo in Contemporary Film Experience* (Amsterdam University Press, 2021) and the editor of the Italian edition of DN Rodowick's The *Virtual Life of Film* (*Il cinema nell'era del virtuale*, Olivares 2008). He is the co-curator, with Ruggero Eugeni, of a reader of contemporary film theories (*Teorie del cinema. Il dibattito contemporaneo*, Cortina, 2017) and of *Cinéma&Cie* special issues *Neurofilmology. Audiovisual Studies and the Challenge of Neuroscience* (2014). His essays on the aesthetics of film and media experience has been published in *Sense of Cinema*, *Necsus*, *Screening the Past*, *Bianco e Nero* and other international academic journals.

Tracing Embodied Narrative in VR experiences

Szilvia Ruszev*

University of Southern California (US)

Abstract

In this article, I will consider the specificity of narrative in VR from the perspective of its embodied, spatial, and participatory nature. For this purpose, I will look at storytelling in VR from a neurofilmological perspective that accounts for both the cognitive and phenomenological and conceptualizes the viewer as an organism, applying an integrative view. I will probe several ideas from cognitive sciences and phenomenological cinema and media studies in order to support the above understanding of narrative in VR. I will apply these theories and ideas to specific VR case studies: *Book of Distance* (Randall Okita, 2019), *Heterotopias* (Noa Kaplan and Szilvia Ruszev, 2018), and *Carne y Arena* (Alejandro Iñárritu, 2017). Finally, this article will discuss the terms "ambient storytelling" (Stein and Fisher 2013), "somatic montage" (Waite 2016), and "embodied narrative" (a term used in cognitive sciences) and their relevance concerning narrative in VR.

Keywords: Embodied narrative; Somatic montage; Ambient storytelling; Event segmentation; Neurofilmology.

Szilvia Ruszev: University of Southern California (US)

✉ ruszev@usc.edu

Szilvia Ruszev is a film editor, media artist and scholar working across different media formats. Her broader research interest focuses on sensuous knowledge, montage theories and politics of post cinema. Her own artistic work relates to very personal moments, certain states of emotional solitude in relation to the Other, both in its particular and abstract notion. As editor, she collaborated with internationally acclaimed directors such as Peter Greenaway, Anders Østergaard, and János Szász. Her award-winning work has been part of numerous international film festivals and exhibitions such as Karlovy Vary IFF, TIFF Toronto, Berlin IFF, Siggraph and Codame. Between 2010-2016, she was a faculty member of the Editing Department at the Film University Babelsberg Konrad Wolf. Currently, she is an Annenberg Fellow, pursuing a Ph. D. degree in Media Arts + Practice in the School of Cinematic Arts at the University of Southern California.

∗   ✉ ruszev@usc.edu

1   Introduction

The medium of Virtual Reality (VR) has been swiftly expanding in the field of entertainment as the technology behind it becomes more affordable and comfortable to wear. This medium has been sustained by the great expectation of total immersion in an expanded reality, articulated by VR guru Jaron Lanier in an electrifying way:

> VR is one of the scientific, philosophical, and technological frontiers of our era. It is a means for creating complete illusions that you're in a different place, perhaps a fantastical, alien environment, perhaps with a body that is far from human. And yet, it's also the farthest-reaching apparatus for researching what a human being is in terms of cognition and perception (Lanier 2017: 1).

Yet immersion and presence, the desires most often expected from VR, are not new desires. Humans have created illusory visual spaces since the beginnings of human culture (Grau 1999). Physical spaces have been visually altered to create enclosed spaces of ritual, private or public political action, as Oliver Grau has pointed out in his article "Into the Belly of the Image." These experiences, he argues, "nestle into viewers' senses" and create a totality of immersion (Grau 1999: 365). The intensity of this artificially created sensual sheath aids the fundamental human activity of storytelling through which we make sense of the world.

Investigating VR as a narrative medium, we must consider its specific affordances that shape how narrative can be conceptualized. VR has been discussed as an embodied, interactive, and user-oriented medium (Blach 2008). In other words, a VR experience is centered around the viewer and their body and it unfolds through the interaction with or exploration of the narrative by the viewer, who physically shares the time and space of the narrative (Aylett and Louchard 2003: 3).

In this article, I will consider the specificity of narrative in VR from the perspective of its embodied, spatial, and participatory nature. For this purpose, I will look at storytelling in VR from a multidisciplinary perspective that accounts for both the cognitive (*viewer-as-mind*) and phenomenological (*viewer-as-body*). "Neurofilmology," as described by Adriano D'Aloia and Ruggero Eugeni (2014), conceptualizes the viewer as an organism, applying an integrative view.

I am proposing an understanding of VR as a multisensory, embodied, and spatial medium of virtuality. The viewer-organism becomes an explorer in a spatial narrative experience in which they actively encounter compositional elements and charter a unique, multisensory, and embodied constellation. The body, through the senses of kinesthesia and proprioception, becomes a sensitive storytelling device. Therefore, narrative in VR must be viewed as an embodied, spatial and participatory process that unfolds through the viewer's exploration (Aylett and Louchard 2003: 1). For the purposes of this article, I will probe several ideas from cognitive sciences and phenomenological cinema and media studies in order to support the above understanding of narrative in VR.

On the cognitive side, I will look at Tim J. Smith's (2012) "attentional theory of cinematic continuity," through which he discusses how visual attention plays a role in the perception of continuity across cuts in movies. I argue that this theory can be applied equally well to VR as visual attention plays a crucial role in guiding the viewer's exploration toward a continuous narrative experience. Further, I will discuss the so-called "event segmentation theory" (Zacks, Speer et al. 2007), which I argue is at the basis of "storifying" an experience. The theory of "embodied simulation" discusses how "part of the neural resources that are normally employed to interact with the world around us, shaping our relationships and relations, are reused for perception and imagination" (Gallese and Guerra 2015: 1). This theory of embodied simulation has been applied in the field of cinema studies as a way to make sense of the perceptual processes used while watching movies and can be expanded to understand VR. Alongside mental simulation processes, body-related senses such as kinesthesia and proprioception play a significant role in exploring and shaping the VR narrative.

On the phenomenological side, I will look at the embodied character of formal cinematic elements such as color, movement, camera angle, mise-en-scène, sound, and editing and how they impact the viewer on an affective, bodily level. Scholars such as Vivian Sobchack (2010) and Tarja Laine (2018) have extensively written about the reciprocal relationship between the material character of the film and the viewer. This kind of

affective reciprocity can be applied in the case of VR and plays a significant role in the active "storification" process fulfilled by the viewer. I will apply these theories and ideas to specific VR case studies. I will focus on three VR experiences: *Book of Distance* (Randall Okita, 2019), *Heterotopias* (Noa Kaplan and Szilvia Ruszev, 2018), and *Carne y Arena* (Alejandro Iñárritu, 2017).

For its narrative design, the VR experience *Book of Distance* explores the spatial and aesthetic character of the theater, inviting the viewer not only to observe but to interact with some objects. It is a documentary-infused experience in which the author (appearing himself as an avatar using his own voice) guides us through his family's story of immigrating from Japan to Canada and living through harrowing times during the Second World War. The VR experience uses existing artifacts such as family photos, newspaper excerpts, and models of objects that bear importance to the family's personal history. The viewer is invited into a virtual space of memories by the author-narrator, who is also present. The viewer is prompted to discover and interact with objects that are significant in the narrative. They can grab the digital facsimile of family photos, documents, and old newspapers and look at them closely or interact with them in other ways. These gestures function as triggers in advancing the narrative on the one hand and adding an emotional depth to a non-fictional narrative created in VR on the other.

Heterotopias is a VR essay based on Michel Foucault's influential lecture, *Des espaces autres*. In Foucault's (1986) words, "the heterotopia is capable of juxtaposing in a single real place several spaces, several sites that are in themselves incompatible" (23). The primary goal of this VR essay is to establish a sensory version of Foucault's heterotopology, which he defines as "the study, analysis, description, and 'reading'" (23) of places that simultaneously reflect and invert the rules of social engagement. The experience uses developing eye-tracking technology to transform users' blinks into cinematic cuts. With every blink, the virtual space alters, producing variable configurations of stereoscopic 360-degree footage and computer-generated models. To complement the ungrounded transformation of space, the series includes spatialized audio and custom-made furniture. The experience is supplemented by spatial audio of an ambient soundscape, including a whispering sound collage based on the English translation of Foucault's original lecture (Kaplan and Ruszev 2018). *Heterotopias* doesn't employ storytelling in its traditional understanding, as it lacks both characters and action. A feeling of a narrative arises from the succession of the spaces – the well, the garden, the movie theater, the cemetery, the mausoleum, and the mirror – and their symbolic and embodied metaphorical meaning.

Alejandro Iñárritu's *Carne y Arena* is an immersive installation based on the accounts of refugees who have been trying to cross the between the United States and Mexico. The installation consists of three stages. In the first stage, the viewer is asked to enter barefoot a metal-walled and freezing cold room, evoking a detention center. In the second stage, the viewer experiences the border crossing situation in VR. And in the third stage, the viewer is confronted with the portraits and stories of the real people on which the experience and characters are based.

Finally, this article will discuss the terms "ambient storytelling" (Stein and Fisher 2013), "somatic montage" (Waite 2016), and "embodied narrative" (a term used in cognitive sciences) to discuss their relevance concerning narrative in VR.

2   Defining VR and the viewer-explorer

The definition of VR itself is not necessarily standardized in the literature. There is a more pronounced distinction between the so-called 360-degree videos or cinematic VR and "proper" VR experiences, but for the sake of this contribution, I will be referring to VR in its traditional sense.[1] Various definitions agree that VR is an immersive, multisensory, interactive, computer-generated, and three-dimensional viewer-centered ex-

---

1.   Cinematic VR has only 3DoF (three degrees of freedom) and the viewer cannot move or interact with the virtual space, instead they merely look around in a 360-degree sphere and, if available, have some basic interaction with the video (stop, play, "jump" to a next scene). In its traditional sense, VR has 6DoF (six degrees of freedom), which means that the viewer can move around in the virtual space so that objects in the space will appear closer or further away. Moreover, the user has the possibility to interact with elements of the virtual environment depending on how the experience has been designed and what input devices can be used beyond the VR headset.

perience (Mazuryk and Gervautz 1996). In her book *Narrative as Virtual Reality*, Mary-Laure Ryan lists a comprehensive set of characteristics of the medium.

> 1. You enter (active embodiment)... 2. into a picture (spatiality of the display)... 3. that represents a complete environment (sensory diversity). 4. Though the world of the picture is the product of a digital code, you cannot see the computer (transparency of the medium). 5. You can manipulate the objects of the virtual world and interact with its inhabitants just as you would in the real world (dream of a natural language). 6. You become a character in the virtual world (alternative embodiment and role-playing). 7. Out of your interaction with the virtual world arises a story (simulation as narrative). 8. Enacting this plot is a relaxing and pleasurable activity (VR as a form of art). (Ryan 2001: 51-52)

VR as a medium and technology finds its application in various fields such as education and health care, alongside its territorial gain in entertainment formats such as video games and other narrative genres. In this article, I am focusing on a particular form of VR that can be found on the spectrum between cinematic VR and video gaming. Characteristic of this form is the creative use of the possibilities given by game engines. Yet, at the same time, this form strives to create a mode of second-person narration that moves this form's aesthetic and narrative choices closer to cinema.

Cinema and gaming reflect the role of the viewer in their specific terminology. Between a spectator of a movie and a computer game user, there is a whole range of possible levels of interaction and agency. For the kind of VR experience relevant here, the term "viewer-explorer" seems to be the best suited. The word exploration implies a spatial activity, "to travel over (new territory) for adventure or discovery," as the Merriam-Webster Dictionary defines it.[2] The term exploration also contains a mixture of goal-oriented pursuit and serendipitous stroll.

VR as a medium has its kinship with four other media – cinema, theater, video installation art, and computer gaming. Each of these fields has its established theoretical approaches concerning aesthetics, narrative design, and the role of the viewer. If we have to emphasize the most prominent characteristic for each medium to which VR has the closest proximity, then for cinema, it is narrative; for theater, it is presence; for video installation, it is spatiality; and for gaming, it is interactivity. In this sense, VR can be assessed as an emerging medium where elements of film, theater, video installation art, and computer gaming converge in a new medium. VR "feels" close to cinema by "inheriting" its audiovisual grandiosity and yet stays uncanny by combining this grandiosity with a very different inhabitation of space – materially as well as temporally – by placing the viewer-explorer in the center of the experience. The diegetic time and space of VR converge with the real-time experience of the viewer-explorer. Looking at VR from the vantage point of theater, especially immersive theater, brings in a participatory aspect of the "spectActor" (Boal 1999). The spectActor, in this case, is physically present and immersed in a real-time narrative that they can shape. Video installation as a form of expanded cinema and VR has similarities in how the configuration of physical space and moving image facilitates an active, explorative relationship between the viewer and the experience. Finally, computer gaming and VR cover a substantial shared territory in interactivity and dynamic systems.

3   Embodiment and VR

The notion of embodiment plays a significant role in defining narrative in VR. I argue that the characteristic way in which the body of the viewer-explorer encounters a VR experience shapes the narrative in a participatory process. The term embodiment has been used differently in various disciplines. In its philosophical perspective, embodiment refers to a general understanding of how one understands and defines oneself (Blanke and Metzinger 2009). Cognitive sciences and psychology are generally concerned with the relationship between cognition and the agent's body. Although depending on the specific field, this relationship is viewed quite differently (Graziano and Botvinick 2002; Chemero 2009).

The term "sense of embodiment" (Kilteni, Groten et al. 2012) has been used in the context of VR to distinguish it from the general notion of embodiment. It consists of the components of the sense of self-location, the sense

---

2.   https://www.merriam-webster.com/dictionary/explore (last accessed 29-06-2021).

of agency, and the sense of body ownership. In the case of VR, the sense of owning, controlling, and being inside a biological body is complicated by the circumstances that it is also immersed in a virtual environment and extended with a virtual avatar.

Conceptualizing the body of the viewer-explorer and their sense of embodiment is critical in expanding the understanding of narrative in VR. In VR, the viewer-explorer's body is immersed in a perceptually hybrid environment. Stimuli are coming from both the computer-generated virtual environment and the physical world. Ideally, these stimuli are congruent. The blending of these two kinds of environments varies depending on the specific VR experience. For example, in Alejandro Iñárritu's VR experience *Carne y Arena*, the viewer-explorer is barefoot and walking on a sandy surface, which enhances the perceptual authenticity of the virtual environment of being situated in a desert. In the VR experience *Heterotopias*, the viewer-explorer's main bodily engagement with the experience is achieved with the help of a hanging chair. Through its suspension and relatively large size (a circular form with an approximate five-foot diameter), the viewer-explorer can change their posture and desired movement in the chair – they can choose to quietly sit with feet on the floor or lay down and swing around. The VR experience uses the physical affordances of the hanging chair to connect it to the VR spaces or specific objects within the given space. In the first scene, the viewer-explorer finds themselves suspended in a dark well, with a bucket dangling on a rope within the enclosed space. At the end of the first scene, the viewer-explorer gets pulled up from the dark well into a light-filled garden. An oversized birdcage hangs from the top and slowly swings over the head of the viewer-explorer. In the last space, several mirrors are suspended freely in the space of a mausoleum. They swing slowly, deliberately distorting and fragmenting the space.

In VR, the involvement of the body is determined by a perceptually hybrid environment that enwraps the viewer-explorer with both physically existing stimuli (such as the chair they sit on or the floor they are standing on) and virtual stimuli. Visual and auditory elements deliver the primary source of stimuli, which is complemented by haptic or olfactory stimuli depending on the technology involved. Notably, the body's involvement in VR activates kinesthetic (perception of one's own body parts and their movement) and proprioceptive aspects (awareness of the spatial orientation and presence of one's own body). Kinesthesia as a term – from Greek *kinein* "to set in motion; to move" and *aisthesis* "perception" – was first coined by psychologist and neurologist Henry Charlton Bastian in the late nineteenth century as the "Sense of Movement" (Bastian 1880).[3] Kinesthesia has been referred to as the "sixth sense," defined as "the perception of weight, effort and resistance, movement and position [...] involving the sensibilities of muscles, tendons, joints, and skin" (Boring 2019: 525). While kinesthesia is introspective, proprioception is outward-oriented and includes a sense of balance and orientation. Understanding the mechanisms of these body-space-body-related senses is key in developing an embodiment theory in the context of VR. Since the body of the viewer-explorer is at the epicenter of the experience, each formal, aesthetic, and story element of the experience is "evaluated" by the viewer-explorer in its relation to their own body. Layers of the virtual, physical, and biological overlap and complicate the experience by unsettling these same categories. The boundaries between one's own body and the environment, the body of the other, or one's own virtual avatar can become blurry in VR. Sita Popat argues that "bodies within these contexts may be experienced simultaneously as absent and present, together and separate" (Popat 2016: 360). In that sense, the body of the viewer-explorer oscillates between the states of being an author and a character in the VR experience. The actions in the VR experience are shaped by the viewer-explorer and, at the same time, the viewer-explorer is affected by these actions.

In *Carne y Arena*, the viewer-explorer encounters the precarity and violence of an illegal border crossing situation. The gradual crescendo of the stimuli surrounding the viewer-explorer peaks when the border patrol agents beleaguer a group of people trying to cross the border. The viewer-explorer is surrounded by agents shouting, dogs barking, and helicopters whirring above them. It is a physically unbearable situation not only because of the actions one sees, but the audiovisual effects of loud sounds and glaring lights. As a viewer-explorer, I cannot exclude my body from the stressful situation, but I can choose my physical position within it and either stay close or remove myself and observe.

The Book of Distance goes a step further by inviting the viewer-explorer to interact with some of the objects within the VR experience in order to further the narrative. One of the emotionally most impactful scenes is

---

3.   https://www.merriam-webster.com/dictionary/kinesthesia (last accessed 29-06-2021).

when I see Okita's family cross the border and then I am prompted to repeat that same step across a virtual line. It is a simple task that doesn't even need a hardware translation of the gesture. To grab something in VR, one needs to push a button on an input device. To take a step is to take a step with your own body. This gesture, combined with the symbolic meaning of the line, activates specific knowledge and/or memories stored in the body.

VR's special embodiment status lies in the hybrid and layered multisensory environment to which the viewer-explorer is exposed. The final experience is a result of the interplay of these stimuli coming from various physically existing and computational sources, creating a perceptually hybrid and multisensory environment. More than any other visual media, VR addresses the body in a particular way in which the body-self is experienced simultaneously as real and virtual. Kinesthesia and proprioception are the senses that situate the hybrid body-self in the enclosing environment and create the basis of the relationship between the viewer-explorer and the VR experience.

4   VR as Dream

Torben Grodal describes VR as a feeling of "strangeness and dreamlike un-realness" compared to film, where the viewer has a tacit knowledge that the film is a simulation. "This is because the closeness is 'our closeness,' and therefore it is more troublesome to be disregarded by the people close by in VR. [...] dream states are characterized by a hyper-activation of visual and acoustic perception whereas the muscles are totally immobilized, and thus active agency is absent in dreams" (Grodal 2018: 2). Although the body is not completely immobilized in VR and there is a certain amount of active agency, the interaction with the environment, characters and objects is not fully realistic. Objects do not have haptic resistance and characters cannot be touched or interacted with in the complex manner we do in our everyday life. VR has been compared not only to dreams but more generally to transcendental, shamanistic states (Jones 2000: 27), as a virtual space where dreams and desires can be projected. "Aesthetic illusion," a term used by Werner Wolf (2013), approaches the special state of mind in VR from the perspective of its aesthetic elements. He defines aesthetic illusion as "a specific imaginative, emotional and psychic response elicited by the reception of artefacts of various kinds, regardless of their aesthetic merits" (2).

Heterotopias offers an embodied experience that can be quite open-ended and abstract, compared to traditional action and character-based storytelling. Visually, the experience is highly stylized and rather dreamlike. The stereoscopic 360-degree recordings are color corrected and combined with computer-generated elements, so it is hard to separate the two sources. Besides the direct, bodily interaction, or rather immersion, through the hanging chair, the VR experience's main mode of interaction is utilized through blinking. Blinking, an involuntary action usually considered "noise" in the system, becomes the primary mode of interaction. The experience employs eye-tracking using the Fove headset to transform users' blinks into cuts. In *Heterotopias*, each blink triggers a new arrangement of visual and sonic elements. Consequently, space is continually redefined. The amplitude of the changes caused by blinking gradually increases during the experience, so that at some point (individually different) viewers become aware of the changes their blinking causes. By creating a feedback loop, the otherwise involuntary and unperceivable blink becomes apparent, conscious, and controllable. The user unconsciously-consciously performs the cognitive work of assembling the audiovisual experience, turning the concept of montage upside down (Kaplan and Ruszev 2018). The idea of blinking connects to the idea of the dreamlike state of VR. Although, physically, there is no blinking when we dream, the abrupt and unconsciously triggered shifts in the environment defy the continuity of perception familiar from our waking state. In this sense, the narrative continuity of the experience arises from a combination of an affective, bodily reflection and an abstract, symbolic reflection of the dreamlike experience.

5   Narrative in VR

Storytelling is a fundamental human activity that articulates, reflects, and shares our knowledge about the world. As the word itself contains an initial verbal character, narratology has long time focused on language-based storytelling. Modern narrative theories such as Russian formalism (Tynianov 2019; Šklovskij 2016) or

French structuralism (Genette 2002; Metz 1974) have been rooted in literature and therefore apply a linguistic approach. The rise of cinema as a new medium shifted storytelling from the domain of the written language into the visual realm. Nevertheless, cinema, as much as literature, has an author-driven narrative and can be connected to the two main Platonian categories of "diegesis" (the author directly addresses the audience) and "mimesis" (the author addresses the audience using characters) (Plato and Leroux 2013). VR and cinema are related as both operate in the visual realm. Yet, narrative in VR as compared to cinema is much less author-driven and prescribed. The viewer-explorer has the freedom to look around, move and, in some cases, interact within the VR experience.

Another aspect that falls under special consideration is the spatial and embodied character of narrative in VR. The viewer-explorer inhabits the virtual space with their body, even if their physical body does not exist within the virtual world. The senses of kinesthesia and proprioception are always activated in VR. The time and space of the virtual world become the real-time space for the viewer-explorer.

So what are some helpful ideas regarding narrative in other media that can be considered in VR? In his book *Poetics of Cinema* David Bordwell regards narrative as a "transmedium phenomenon" (Bordwell 2013: 3) and presents the elements that he considers to be essential to narrative. A narrative consists of events arranged in time including a continuity of agent and causal connections (4). Furthermore, a narrative involves some change that structures the narrative within an opening and ending point (6). Bordwell applies these ideas in the realm of the cinema and goes further in specifying other aspects of a narrative, driven by aesthetic elements of cinema.

This quite minimalistic and open definition of narrative can be useful in VR, as it points to the most fundamental structural elements of a narrative but leaves enough space for specific interpretations arising from VR as a medium. The questions are then how a narrative emerges from a participatory process and how it is contingent on VR's aesthetic specificities, such as an immersive, omnidirectional and spatial audiovisual environment and the embodied agency of the viewer-explorer? In this sense, we can talk about a story world, not as the totality of the "agents, circumstances and surroundings" (Bordwell 2013: 6), but as "the mentally constructed model of a 'universe'" (Hatavara, Hyvärinen et al. 2018: 1). Every VR experience constitutes its own universe that comes into being by the active participation of the viewer-explorer.

6 Cognitive approach: attentional theory and event segmentation

What are some ideas from the field of cognitive sciences studying perception in general and regarding film in particular that could be helpful in describing narrative in VR?

The "attentional theory of cinematic continuity" developed by Tim J. Smith studies the cognitive purpose of the rules of continuity editing. He looks at key elements of the continuity editing style, including match-action, matched exit/entrances, shot/reverse-shot, the 180-degree rule, and point-of-view editing. Smith explains the importance of the active role of the viewer in the "perceptual construction" of the film (Smith 2012: 2). He argues that the continuity "flow" of a film is dynamically constructed by the viewer, shaped by what the viewer is "attending to, what they are perceiving, and what they are expecting. [...] The continuity editing rules use natural attentional cues such as off-screen sounds, conversational turns, motion, gaze cues, and pointing gestures to trigger attentional shifts across cuts" (2). Furthermore, Smith describes the role of the saccadic movements and fixations of the eyes in perceptually stitching together the separate visual information and adding it to a working memory representation of the scene (6). In other words, the continuity of the visual environment is perceived in very short fragments during the fixations of the eyes and assembled into a continuous experience.

Another theory from the cognitive sciences regarding the perception of ongoing activity is the so-called "event segmentation theory" (Zacks, Speer et al. 2007), which assumes that the viewer constructs and maintains a mental representation of the current unfolding event and, based on this, they make predictions about possible continuations of the event.[4] When these possible predictions are violated, the viewer registers the beginning

---

4.   Here we have to note that the idea of mental representation and other embodied and enactive cognitive theories seem to be incompatible. The debate does not revolve around the question of whether or not we can segment our experience into separate events or

of a new event. On the side of film theorists, Bordwell and Thompson (2006) argued similarly in stating that continuity editing works by validating or refuting expectations. The most obvious violation of the expectations is the change of time and space in the next shot, which indicates the onset of a new scene. New events can also be perceived at a lower or higher level in film, perceiving a natural segmentation that constitutes the narrative flow. There can be a change within a scene, a turning point in the ongoing action, or a change in the emotionality or tonality of the scene. These changes can be punctuated by cuts as much as by other aural or visual cues – change of extradiegetic music, dialogues, acting, camera movement, change of lights and/or color. Event segmentation and the interplay between expectations and their violations play a role on a larger scale when making sense of the overall narrative structure of a film.

I argue that these two theses can be applied in the VR experience, in which the continuous environment is first fragmented through saccadic movements and segmented through expectation and prediction of future events. After this act of disintegration, the experience is reintegrated, based on the viewer's attention. Both these processes that are perpetually alternating and building on each other are key in "storifying" an experience.

7 Intersubjectivity, kinesthetic empathy, embodied simulation and the aesthetic elements of VR

Color, movement, camera angle, mise-en-scène, sound, and editing all impact the viewer on an affective, bodily level. Vivian Sobchack argues that the self-awareness of one's own embodiment is a radically irreducible condition of a reversible structure of empathy and sympathy for both the other body-subject and body-object, in what she calls intersubjectivity and interobjectivity, respectively. Her position on intersubjectivity allows for the "sanguine sense of not merely being-in-the-world but of also belonging to it" (Sobchack 2010: 246). This understanding of intersubjectivity gives us an interesting ground to grasp how the viewer-explorer might relate to their own virtual body on the one hand and how the feeling of belonging to a virtual world might result in the feeling of presence and empathy for other characters.

Tarja Laine draws a reciprocal relationship between film and spectator "among their bodily energy, affect, rhythm, valence and the very same attributes of the film's aesthetic system" (Laine 2018: 3). Moreover, the argumentative emphasis in her book *Feeling Cinema, Emotional Dynamics in Film Studies* is on the direct emotional engagement of the spectator with film aesthetics – albeit in a historically and culturally habituated fashion. Laine shifts the focus from a narrative character-driven analysis of a film toward the agential character of aesthetic elements that activates a perceptual, sensuous mental engagement by the viewer. Identification, empathy, or other reactions may arise but are not prescribed, as Laine argues (6).

I argue that this reciprocal relationship can be equally established between the aesthetic system of VR experience and the viewer-explorer. Instead of a linear succession of separate shots, a VR experience reveals itself as continuous space (or a succession of spaces). It therefore has a lower level of control over the attention of the viewer-explorer. Instead of cuts, a VR experience utilizes audiovisual clues that can guide the viewer-explorer's attention and shape their emotional and cognitive involvement and sense of narrative.

Change and repetition are basic actions that sustain attention cues. Color shift and movement, for example, affect lower-level feature perception. Change, affecting characters and objects, works on higher-level object perception. Changes that concern complex sequences are perceived as events. Cues can be aural such as a sound effect, a dialogue, or a piece of music. Cues can also have an interactive nature: objects that can be picked or interacted with, hotspots that can be looked at, movement within the environment itself that can be either a passive experience through the shifting space or active by moving virtually through space, or, if hardware allows, moving the viewer's own body in parallel to the movement in the virtual space. What is important to stress is that most of these clues/changes have an implicit embodied effect on the viewer that has to be calculated when designing an experience. The coordinate system of a VR experience is centered according to the body of the viewer. Things happen behind the viewer and not outside the film frame. Even cuts, dissolves, and wipes, when used, are experienced in an embodied way. All these elements constitute

---

if we can predict certain actions. In a simplified version, different positions within cognitive science debate whether this happens on a purely mental level or if and how the body is involved. See more in Menary (2010).

what Karen Pearlman calls "kinesthetic empathy" (Pearlman 2016: 7), which helps the viewer-explorer to align emotionally with the experience. In VR, other than in cinema this "kinesthetic empathy" can be achieved and enhanced through interaction by giving agency to the viewer-explorer within the virtual reality experience.

In a similar approach Vittorio Gallese and Michele Guerra investigate "embodied simulation" in the context of cinema with a short look at new media. They claim that part of the human neural resources that are involved in active interaction with the surrounding world can be reused for the mental process of perception and imagination (Gallese and Guerra 2020: 1). In other words, in order to understand the behavior of others, we rely on our own experiences and, based on those, we create an embodied mental simulation of what we encounter. This embodied simulation is the synthesis of what the viewer-explorer experiences in VR through their body. Gallese points out that neurons in the human brain show multimodal properties (182). This means that various senses are converging in our brain, that a tactile sense can be triggered by the image of a caressing hand or the description of the same image. The authors argue that this multimodality is primarily guided by our bodily experience and not by abstract mental construct (182). Although the book does not specifically apply embodied simulation to VR, it states that this direct relational modality can be utilized in any visual media to mentalize the behavior of other beings (200).

The VR experience *Book of Distance* is a good case study for the above-mentioned processes. The narrative space of the experience is built up, resembling the stages of a theater, where the viewer-explorer is guided through the episodes of the life of Okita's family. Stylized theater-like backgrounds and elegant use of light shape the progression of the narrative events. Combined with the presence of the author-narrator, this VR experience could have resembled the structure of a traditional documentary film. The added benefit of VR is the possibility of interaction. The viewer-explorer is invited to take in their hand the digital facsimile of family photos and newspaper excerpts. The fact that they can be moved close to the viewer-explorer's eyes and their indexicality enhances the emotional depth of the gesture. Repetition and mirroring are also gestures that are part of the narrative design and invite the viewer-explorer to actively involve their own body by using some objects bearing importance in the life of an immigrant. We can take a photo of what we see before the narrative progresses and in doing so mirror the act of retaining memories. These profound gestures add an emotional depth to a non-fictional narrative created in VR. They activate "kinesthetic empathy" on a deep bodily level and account for an engaging and stark VR experience.

8   Notes on Terminology

Finally, we can ask whether the term narrative can be applied to the medium of VR without modifications. Amendments regarding storytelling can be added either from the vantage point of VR being a spatial medium or the specificity of the embodied experience it creates. The term "ambient storytelling" has been coined by Jennifer Stein and Scott Fisher (2013) at the Mobile and Environmental Media Lab, exploring location-specific mobile storytelling as part of the Million Story Building Project. The project created an interface with the George Lucas Building at the University of Southern California using mobile phones, sensor networks, and software applications to create a responsive environment of collaborative storytelling. Although not used for VR, the term ambient storytelling covers well the spatial aspect of VR and could be well suited to cover new aspects of the narrative.

From the vantage point of embodiment, the term "somatic montage" (Waite 2016) introduces a new notion of cinematic montage for immersive cinema. According to Waite, "the concept of somatic montage addresses new forms of montage techniques that marry chronological with spatial sequencing into an embodied, participatory creation of narrative" (2). The term somatic montage addresses both the "distribution" of images in the (virtual) space and the active embodied relationship between the viewer and the immersive experience (3). Both terms hold some truth in addressing the relationship between the viewer, the space and the narrative. While "ambient storytelling" highlights the spatiality of VR, "somatic montage" pertains to the viewer's active and embodied participation in the construction of the experience.

"Embodied narrative" could be a third possible term (Menary 2008). It has been used in cognitive sciences to point at simulative thinking processes seen in the context of the brain-body-world interaction. These ideas go back to Lakoff and Johnson's (1999) claims that the cognitive structures assisting thinking and language

making arise from the organism-environment interaction and go as far as to claim that the self is narratively constructed (Dennett 1991; Velleman 2006). Without the claim that any of these terms have to be canonized, I call for a further investigation of the terminology of the narrative in VR in order to be able to capture all its specificity and particularity.

9   Conclusion

Based on the examples and theoretical implications, we can generally say that the narrative experience of VR is inherently embodied and spatial. Narrative in VR is a process, emerging from a story world and shaped by the participatory and embodied attention of the viewer-explorer. As the viewer-explorer is positioned at the center of the VR world, we have to investigate their involvement utilizing ideas from the fields of cognitive sciences and cinema and media studies in order to account for the embodied nature of this relationship. The viewer-explorer enters a story world and creates a unique narrative based lived through their body. There is still a great potential in VR as an emerging medium to develop a new storytelling language that needs a novel approach in theorizing it. This article is an attempt to accumulate interdisciplinary theories and ideas that help reflect narrative in VR.

References

Aylett, Ruth and Sandy Louchart (2003). "Towards a Narrative Theory of Virtual Reality." *Virtual Reality* 7(1): 2-9. https://doi.org/10.1007/s10055-003-0114-9.

Bastian, Henry (1880). *The Brain as an Organ of Mind.* London: Keagan Paul.

Blach, Roland (2008). "Virtual Reality Technology - An Overview." In *Product Engineering: Tools and Methods Based on Virtual Reality*, edited by Doru Talaba and Angelos Amditis, 21-64. Dordrecht: Springer Netherlands. https://doi.org/10.1007/978-1-4020-8200-9_2.

Blanke, Olaf and Thomas Metzinger (2003). "Full-body Illusions and Minimal Phenomenal Selfhood." *Trends in Cognitive Sciences* 13(1): 7-13. https://doi.org/10.1016/j.tics.2008.10.003.

Boal, Augusto (1999). *Legislative Theatre: Using Performance to Make Politics.* London: Routledge.

Bordwell, David (2013). *Poetics of Cinema*. New York: Routledge.

Bordwell, David and Kristin Thompson (2006). *Film Art: An Introduction*. New York: McGraw-Hill.

Boring, Edwin (2019). *Sensation and Perception in the History of Experimental Psychology*. Delhi: Fascimile Publisher.

Chemero, Anthony (2009). *Radical Embodied Cognitive Science.* Cambridge, MA - London: The MIT Press.

D'Aloia, Adriano and Ruggero Eugeni, eds. (2014). *Neurofilmology: Audiovisual Studies and the Challenge of Neuroscience*. *Cinéma&Cie. International Film Studies Journal* XIV(22-23).

Foucault, Michael (1986). "Of Other Spaces: Utopias and Heterotopias". *Diacritics* 16(1): 22-27.

Gallese, Vittorio and Michele Guerra (2020). *The Empathic Screen: Cinema and Neuroscience*. Oxford: Oxford University Press. https://dx.doi.org/10.1093/oso/9780198793533.003.0004.

Genette, Gérard (2002). *Figures*. Paris: Seuil.

Grau, Oliver (1999). "Into the Belly of the Image: Historical Aspects of Virtual Reality." *Leonardo* 32(5): 365-371.

Graziano, Michael and Matthew Botvinick (2002). "How the Brain Represents the Body: Insights from Neurophysiology and Psychology." In *Mechanisms in Perception and Action: Attention and Performance*, edited by Wolfgang Prinz and Bernhard Hommel, 136-157. Oxford: Oxford University Press.

Grodal, Torben (2018). "Virtual Reality Experiences, Brain, Body, and Muscular Agency - An Embodied Approach Informed by Neuroscience." Preprint.

Hatavara, Mari, Matti Hyvärinen, Maria Mäkelä and Frans Mäyrä (2018). *Narrative Theory, Literature, and New Media: Narrative Minds and Virtual Worlds*. New York - London: Routledge.

Jones, Stephen (2000). "Towards a Philosophy of Virtual Reality: Issues Implicit in Consciousness Reframed." *Leonardo* 33(2): 125-132.

Kaplan, Noa and Szilvia Ruszev (2018). "Heterotopias—Optical Mastication and Spatial Reconfiguration." In *Artistic Research Will Eat Itself*, The 9th SAR International Conference on Artistic Research University of Plymouth, April 11th-13th, edited by Geoff Cox, Hannah Dreyson et al, 197-203.

Kilteni, Konstantina, Raphaela Groten and Mel Slater (2018). "The Sense of Embodiment in Virtual Reality." *Presence: Teleoperators and Virtual Environments* 21(4): 373-387.

Laine, Tarja (2018). *Feeling Cinema: Emotional Dynamics in Film Studies*. New York: Bloomsbury.

Lanier, Jaron (2017). *Dawn of the New Everything. Encounters with Reality and Virtual Reality*. London: Vintage.

Mazuryk, Tomasz and Micahel Gervautz (1996). "Virtual Reality History, Applications, Technology and Future." Institute of Computer Graphics, Vienna University of Technology.

Menary, Richard (2008). "Embodied Narratives." *Journal of Consciousness Studies* 15(6): 63-84.

Menary, Richard (2010). "Introduction to the special issue on 4E cognition." In *Phenom Cogn Sci* 9: 459-463. https://doi.org/10.1007/s11097-010-9187-6.

Metz, Christian (1974). *Film Language. A Semiotics of the Cinema*. New York: Oxford University Press.

Pearlman, Karen (2009). *Cutting Rhythms. Shaping the Film Edit*. New York: Focal Press.

Plato and Georges Leroux (2013). *La République*. GF Texte integral 653. Paris: Flammarion.

Popat Sita (2016). "Missing in Action: Embodied Experience and Virtual Reality." *Theatre Journal* 68(3): 357-378.

Ryan, Mary-Laure (2001). *Narrative as Virtual Reality*. Baltimore: Johns Hopkins University Press.

Shklovsky, Viktor and Aleksandra Berlina (2016). *Viktor Shklovsky: A Reader*. New York: Bloomsbury.

Smith, Tim (2012). "The Attentional Theory of Cinematic Continuity." *Projections* 6(1): 1-27. https://doi.org/10.3167/proj.2012.060102.

Sobchack, Vivian (2010). *Carnal Thoughts. Embodiment and Moving Image Culture.* Berkeley: University of California Press.

Stein, Jane and Scott Fisher (2013). "Ambient Storytelling Experiences and Applications for Interactive Architecture." AMBIENT 2013: The Third International Conference on Ambient Computing, Applications, Services and Technologies.

Tynianov, Yuri (2019). *Permanent Evolution: Selected Essays on Literature, Theory and Film*. Boston: Academic Studies Press.

Waite, Clea (2016). "Somatic Montage for Immersive Cinema." In *Organization in Early Soviet Thought: Bogdanov, Eisenstein, and the Proletkult*, edited by Pia Tikka. Helsinki: Aalto University.

Wolf, Werner, and Walter Bernhart, eds. (2013). *Immersion and Distance: Aesthetic Illusion in Literature and Other Media*. Amsterdam: Rodopi.

Zacks, Jeffrey and Khena Swallow (2007). "Event Segmentation." *Current Directions in Psychological Science* 16(2): 80-84. https://doi.org/10.1111/j.1467-8721.2007.00480.x.

Szilvia Ruszev – University of Southern California (US)

✉ ruszev@usc.edu

Szilvia Ruszev is a film editor, media artist and scholar working across different media formats. Her broader research interest focuses on sensuous knowledge, montage theories and politics of post cinema. Her own artistic work relates to very personal moments, certain states of emotional solitude in relation to the Other, both in its particular and abstract notion. As editor, she collaborated with internationally acclaimed directors such as Peter Greenaway, Anders Østergaard, and János Szász. Her award-winning work has been part of numerous international film festivals and exhibitions such as Karlovy Vary IFF, TIFF Toronto, Berlin IFF, Siggraph and Codame. Between 2010-2016, she was a faculty member of the Editing Department at the Film University Babelsberg Konrad Wolf. Currently, she is an Annenberg Fellow, pursuing a Ph. D. degree in Media Arts + Practice in the School of Cinematic Arts at the University of Southern California.

Between Persuasion and Dissuasion: Narratological Meta-operativity in Augmented Experience Design

Federico Biggio[*]

University of Torino (Italy) - Université Paris VIII Vincennes-Saint Denis (France)

Abstract

The idea I will try to argue in this article is that a supposed "embodied media phobia" can more rightly be conceived of as an ideological catalyst of dysphoric beliefs about contemporary computational media rather than as entailing a factual risk for the future to be brought about by virtual and augmented reality. In this regard, the proliferation of sci-fi and of dystopian narratives within the contemporary film scene – prototypically represented by the TV series Black Mirror – conditions and even promotes the development of self-reflective thinking regarding the "dystopia in our daily lives" (Attimonelli and Susca 2020). Such ideology will be demystified in a further way too, by proposing a reflection around the concept of meta-operativity: according to the aesthetic theory advanced by Emilio Garroni (1977) and Pietro Montani (2014, 2018), if the interaction with embodied media can be conceived of as a process able to drive the development of meta-operative competence, then the symbolic value of dystopian stories can be understood as a strategy to foster meta-textual reading and a self-reflective interpretation of one's own experience.

Keywords: Meta-operativity; Virtual Reality; Interactive storytelling; Empowerment; Immersiveness.

*   ✉ federico.biggio@unito.it

1   The theory of meta-operativity against "embodied media phobia"

In the contemporary imaginary, immersive media such as virtual, augmented and mixed reality represent the new frontier of cinematic viewing experience. However, the technologies related to such emerging media require the hybridization between users' bodies and digital artifacts – a requirement which is often negatively regarded. In the course of the article, I will refer mainly to sci-fi dystopic narrations such as the Netflix series *Black Mirror* (Brooker 2011-2019) and *Kiss Me First* (Manson-Smith, 2018) or to experimental short films by Keiichi Matsuda (2016, 2019); regarding non-narrative texts, I will refer mainly to the philosophical field (Berardi 2014; Montani 2014; Žižek 2017) and to the fields of media studies and of media semiotics (Manovich 2006; Borelli 2020; Damone and Scelzi 2018).

All of these discourses appear as they fostered the spreading of a certain "embodied media interaction phobia." By "embodied media interaction," we mean the adoption of head-mounted displays such as headsets and see-through goggles, not only for audiovisual enjoyment, but for entertainment activities in general. According to Paul Dourish (2001), "embodied interaction is not a technology or a set of rules. It is a perspective on the relationship between people and systems. The questions of how it should be developed, explored and instantiated remain open research problems" (192). In particular, such questions mainly concern privacy issues and the idea that embodied technologies participate in the world they represent, sometimes by altering it. Besides, by "embodied media interaction phobia" we mean the attribution of disvalues to the practices of human-computer interaction with embodied media. For this reason, we will understand such discourses as representative of an ideological standpoint of "apocalyptic" type. The term refers to the dualism advanced by Umberto Eco (1964) between who adheres to and adopts "mass" cultural products within his/her own existence ("integrated") and who express a critical and demystifying attitude toward those same products ("apocalyptic").

In light of these considerations, the texts I will consider appear to put the focus not so much on privacy, but rather on the "immersiveness" of the experience and on its capacity to *deceive* the user's perception. In this respect, we are moving away from a narrative logic in the strict sense, according to which immersion has to be conceived of as an intensive and oriented movement by which to enter the "story," and are approaching a more general logic of the organization of subjective entertainment, both playful and serious.

In order to reason in an apodictic way and to understand the reasons behind such a conception, in the first section of the article, I will deal with "apocalyptic" discourses about interaction with immersive media.

Mainly, apocalyptic discourses promote a negative conception of the immersive experience by fostering the idea that the main danger for users is the "anaesthetization of sensibility." The concept has been advanced by Pietro Montani (2014) who, by reformulating Dewey (1934), defined it as *the negative effect of technical artifacts that human beings use – always and naturally – to perceive and understand the phenomenal world* (i.e., the "real reality", cf. Montani 2018). In particular, the negative effect concerns "the overall orientation of the technical design in the direction of a contraction and a channeling of feelings and, ultimately, the"drainage" of the emotional and cognitive processes that differentiate perception from sensation" (Montani 2014: 48, *my translation*). This line of thought has become dominant also by virtue of the widespread idea that "immersion is mentally absorbing and is a process, a change, a transition from one mental state to another [...] characterized by the decrease of critical distance from what is shown and by the increasing emotional involvement in what is happening" (Grau 2003: 13). Let's look at a specific case. Augmented reality applications such as *Ikea Place* or *Metro* provide for the delegation of perception elaboration processes to computer vision software which, operating computationally, measure real spaces so as to return an output to the users. In the meantime, users are free to enjoy the medial experience and the sublime mathematical accuracy of the calculus. However, by delegating perceptual and operational processes to a computational entity, users can allow it to anticipate – for example through algorithmic strategies of recommendation – the contents to be experienced, ending with the production of an image that is distanced from a heterogeneous and idiosyncratic representation of the world:

> as Augmented Reality will become ubiquitous, it will likely take over most aspects of our daily interactions with surrounding objects and human beings, making it practically impossible to distance ourselves from this added dimension of future society, much in the same way that most

people can no more leave their house without making sure they have their mobile phones on them (Palermos, 2017: 134).

Although these ideas are at stake because of their relevance, dysphoric judgments of "apocalyptic" discourses seem to exaggerate the idea that embodied media cause the anesthetization of the user's sensibility, especially when identifying the immersiveness of the experience to be the cause of these negative consequences.

Firstly, we will try to deepen the issue of immersiveness. In fact, while there is no doubt that embodied media interaction constitutes an advancement in the human-computer interaction paradigm, the idea that ever more sophisticated and automated devices could cause the 'drainage' of human sensibility and intellect seems to be related more to a certain fear of the cyborg, which may be more aptly identified as a timeless topic of the sci-fi genre than as a factually-based concern. In this respect, we will discuss the concept of presence, by understanding it as "the human reaction to immersion" (Slater 2003): it is precisely the immersiveness facet of experience that can be deemed to cause the anaesthetization of the sensibility of users.

Secondly, in order to restitute the ability of users to not be overwhelmed by technological progress, I will deal with the concept of meta-operativity. From a theoretical standpoint, Montani's aesthetic theory stems from the one proposed in the sixties by Emilio Garroni, which focused on the concept of *meta-operativity*. According to Garroni (1977, 2005), *meta-operativity* is a human capacity and, precisely, the speakers' linguistic competence, to think in advance and in a strategical way about an operation, before executing it. In particular, the meta-operative dimension would concern the human capacity to produce an artifact of which the end does not lie within itself, but in its capacity to create another, further artifact. The most often proposed example is that of a primate sculpting a silex in order to obtain some splinters useful for carrying out some kind of operation. Similarly, Montani proposed the idea of "interactive imagination" (Montani 2014: 75). By emphasizing its interactive character, imagination can be described as a faculty which is naturally designed for externalization in a technique. According to Montani, action in the real world by means of technological prostheses foster the imagination's ability to develop a creative attitude (Montani 2014: 12, *my translation*).

With these thoughts in mind, we will try, on the one hand, to understand to what extent the "embodied media interaction phobia" of "apocalyptic" discourses can be viewed in a metaphorical way – if they fail to accurately depict the contemporary factuality of the interaction of users with embodied media, at least they can be useful to describe the users' dealings with computational media metaphorically.

On the other hand, we will try to understand to what extent it is possible to speak of meta-operativity not only to define the technical empowerment of users by the use of embodied media, but also to define a broader self-reflective interpretation of the experience of fruition to account for cases in which it ultimately aims to foster user cognition towards choosing to act to support ethical and humanitarian causes.

2   Apology of immersiveness

Nowadays, emerging virtual as well as augmented reality media have been referred to as "immersive" media and, in some cases, as "pervasive" ones, implying a dysphoric connotation.

A serial product such as *Kiss Me First* (Manson-Smith, 2018), loosely inspired by the *Blue Whale* news phenomenon, tells the story of young men who get lost within a computer-generated world with tragic consequences. *Blue Whale* is remembered as a social network challenge which, since 2016, is claimed to have brought teenagers to self-harm and suicide. On the other hand, the *Kiss Me First* series was an adaption from a novel dealing with the cult of suicide and with online identity theft: in the course of the narrative, these two crucial themes are developed so as to stage the possible negative consequences of interaction with the embodied media. Among these consequences, there is a clear portrayal of the inability to distinguish between the real and virtual worlds, as well as between acting in the former or in the latter.

Not only has it been immersive experiences in virtual reality which have been stigmatized for "isolating" the individual in an artificial, programmed and automated environment: when *Pokémon Go* players from all over the world began to invade the streets in 2016 in search of fantastic creatures scattered throughout the territory, both newspapers and scientific communities expressed great concern about the decline in users' attention to

"real" reality. An article by CNN reported the episode of a man who accidentally fell off a cliff while using this application,[1] and a group of doctors at the University of Padua even spoke of a form of "blindness" characterizing *Pokémon Go* players in public contexts where, in particular, there are other individuals not participating in the game (Barbieri et al. 2017).

In the same vein, an audiovisual product such as *Hyper-Reality* (Matsuda, 2016) depicts users as immersed in a pervasive augmented reality from which it is no longer possible to catch a slight of the real world. In this short film, the user is depicted as alienated and flooded by pop-up windows and interactive elements displayed in the field of view. The visual design of this short film is far from representing a transparent experience of the augmented world: the unknown protagonist doesn't 'see through' the interface, she sees only the augmented world. Matsuda's central critique again concerns the inability to distinguish between the real world and augmented reality.

> Matsuda's short film can be divided into three parts: the first shows an everyday situation of commuting by public transportation where AR technology shapes every minute and every centimetre; in the second part the protagonist experiences an attempt to hack her digital identity; and in the third part she ends up selecting a new identity. The clip occurs in three different locations: a bus, a supermarket and a street. Each place exemplifies the visual transformations AR brings, sometimes in a sharp contrast to a grey and dull reality. The price for this augmentation is an inability to look, to gaze, to decide. It is evident from the first minutes, but becomes acute towards the end of the clip (Wellner 2020).
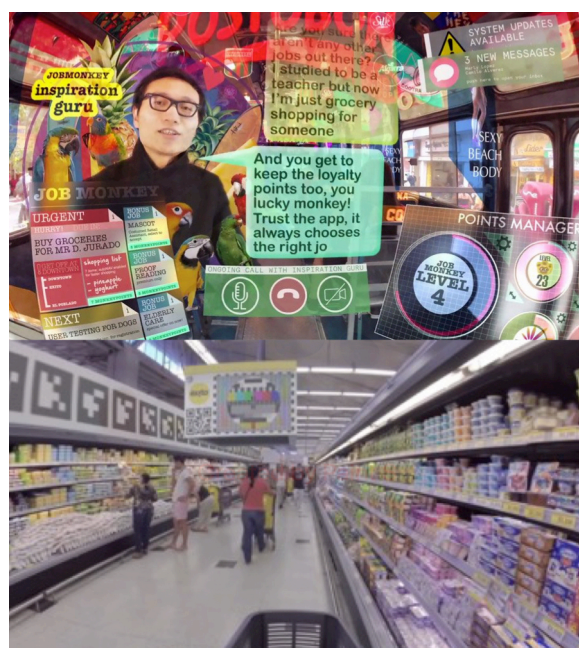

Fig. 1 – Shots from Hyper-Reality (Matsuda 2016)

Moreover, in the second part of the short film, a blackout occurs so that every device – including that of the protagonist – turns off, leaving one with the view of a reality of gray tones in which each individual is isolated within himself/herself.

Another movie to address the topic of augmented reality with a dysphoric connotation was *Auggie* (Kane 2019).

Just as in *Her* (Jonze, 2013), in this movie also the protagonist becomes in possession of a device – a pair of glasses – that allows the visualization of the hologram of a sensual woman programmed to respond to all the wishes of its owner. Beyond the issues of gender, on which we do not dwell, it is interesting to note that, even

---

1. https://edition.cnn.com/2016/07/15/health/pokemon-go-players-fall-down-cliff/index.html (last accessed 6-07-2021).

Fig. 2 – Shots from *Auggie* (Kane 2019)

in this film, after the initial euphoria, the protagonist becomes prey to self-denigration. Initially, the man is excited by this presence, to the point of rediscovering the pleasure of falling in love. However, the director's gaze is critical: it does not fail to stage the absurdity of such interaction, one leading an individual to speak towards an empty armchair or to try to touch a hologram with one's real hand (Fig. 2).

Neither in the scientific field has the implementation of digital prostheses into the human body and the use of wearable technologies been interpreted as a technical evolution of devices aimed at *optimizing* the phenomenal experience, as Steve Mann (1998) argued, but rather as a *technical involution*.

In the not so distant future, users wearing Google Glass will receive information about their objects of vision directly on the screen before their eyes, in the space between themselves and those objects. In other words, Google Glass will be a wearable computer with an optical interface displaying information about objects in the user's field of vision. [...] Little by little the entire world – already entirely mapped by Google maps – will be re-coded by Google Glass, so you can access those previously undergone experiences that Google Glass makes available for you. This implies that you will no longer experience the world, but, rather, that you will simply use or receive, or access) previously-experienced data about an object that is no longer the object of your own experience but purely a reference to a pre-packaged world (Berardi 2013, 20-22).

Similarly, in a very provocative article, Slavoj Žižek argued that "ideology is the original Augmented Reality" (Žižek 2017). By describing the *SixthSense* prototype by Pranav Mistry[2], the philosopher discussed the double idea that, on the one hand, AR is not really a real cutting-edge innovation because, on the other one, it denotes a process which features the mode of working of ideology. In Žižek's view, the object of the discourse is the ideology: it is the actual "augmented reality".

> [...] this magic effect of SixthSense does not simply represent a radical break with our everyday experience; rather, it openly stages what was always the case. That is to say: In our everyday experience of reality, the "big Other" – the dense symbolic texture of knowledge, expectations, prejudices, and so on – continuously *fills in the gaps in our perception*. For example, when a Western racist stumble upon a poor Arab on the street, does he not "project" a complex of such prejudices and expectations onto the Arab, and thus "perceive" him in a certain way? This is why SixthSense presents us with another case of ideology at work in technology: The device imitates and materializes the ideological mechanism of (mis)recognition which overdetermines our everyday perceptions and interactions (Žižek 2017, my italic).

Although the Žižek's article is not a very discussion about the actual mode of working of AR, it is interesting the way in which he deals with the belief that the AR was related to a subjective distortion of the reality. AR is conceived as a medium able to alter users' understanding of the real world, to fill in the gaps of users' perceptions, as well as ideology does. In fact, according to Žižek, what people "(re)construct" as their own experience is already supported by judgmental decisions.

---

2.   SixthSense is a wearable gestural interface that augments the physical world around us with digital information and lets us use natural hand gestures to interact with that information. Retrieved from: https://www.pranavmistry.com/archived/projects/sixthsense/ (last accessed 6-07-2021).

According to such ideologies, technical devices would lead to the "alienation" of the individual, in a perspective not dissimilar to that proposed by the Frankfurt School in the critique of the cultural industry (Adorno & Horkheimer 2002, Marcuse 1964). Embodied media technologies have been intended as instruments of "delegation and exemption" (Montani 2018), which receive from the human body the task of carrying out functions that users are not equipped to ensure by themselves, or "functions that the human body knows how to perform but which are considered alienable because the technical devices demonstrate that they can perform better than us, thus freeing us from different types of tasks"[3] (Montani 2018: 2, *my translation*).

For example, as Montani argued in *Tecnologie della sensibilità*, an embodied medium such as *Google Glass* would risk describing reality *just in one facet*, by depriving the user of the unpredictability of the experience (Montani 2014: 90). However, as I have still argued, it is hard to conceive of embodied media as *deactivators* of the naturalness of human experience by sustaining the idea that the immersiveness of the experience would entail the "anesthetization of users' sensibility."

The first reason for this difficulty concerns the concept of presence. Several researchers have highlighted the conceptual confusion surrounding the notion of presence as well as that immersion (not only in virtual environments), although it has not long been defined in an empirical way. In fact, the notion of immersion has often been confused with that of presence. The contribution of Slater is pivotal for understanding the difference between the two notions.

> Let's reserve the term "immersion" to stand simply for what the technology delivers from an objective point of view. The more that a system delivers displays (in all sensory modalities) and tracking that preserves fidelity in relation to their equivalent real-world sensory modalities, the more that it is "immersive." This is something that can be objectively assessed, and relates to different issues than how it is perceived by humans (Slater 2003).

According to Slater, if immersiveness is a feature of visual texts, presence is a consequence of the perception of such feature by users: "presence is a human reaction to immersion" (Slater 2003).

By referring to "apocalyptic" narratives, the first idea to foster the constitution of the "embodied media phobia" seems to be precisely the degree of immersiveness of images produced with augmented and virtual reality. When images produce a sense of immersiveness (in a virtual world, in an alternative reality), they are conceived to be alienating. However, if immersiveness is an objective quality of the texts and the concept of presence refers to an *effect of meaning* which users may feel while they enjoy an immersive experience, the capacity of texts to alienate users depends on the latter's behavior in relation to such texts (and not on a feature of the text: arguing that an immersive text automatically produces a sense of presence means conceiving of human-computer interaction in a deterministic way).

To this effect, Calleja (2011) denounced readings of the term "immersion" through two incompatible concepts, in particular immersion as "absorption" and immersion as "transport."

In this perspective, we have to deal rather with the cognitive attention of the subject as well as with the degree of the user's sense of presence which depends on a subjective reaction to the immersive text. Bernard Guelton (2014) also warned against the risk of conceiving of immersiveness as related to technological devices, by proposing a critique of the "monolithic approach" to immersion. He argued that we have to consider "immersion" besides what he called "*conscience ordinaire*" (ordinary consciousness). In a situation of "immersion," we deal with the intensity of the subject's attention to the objects of the experience, determined by a fusion of sensory information.

> En situation d'immersion réelle, l'activation de l'attention du sujet est produite directement par son environnement. Perception et action y sont étroitement corrélées. Être impliqué fortement dans une émotion, une situation urbaine ou un paysage par exemple relève d'autant d'immersions en situation réelle qui se distinguent sans trop de difficultés d'immersions fictionnelles ou virtuelles. Ici, point de représentation intentionnellement médiatisé par des tiers, de leurres ou d'artefacts. Mais l'immersion en situation réelle peut aussi être comprise en opposition à une

---

3.   The functions that the human being can perform and that have been delegated to technical devices are those of imagination. Montani (2014) spoke of interactive imagination.

conscience ordinaire dans laquelle l'attention du sujet est diffuse, fragmentée ou attentive à plusieurs objets à la fois (Guelton 2014: 11).

In this regard, he proposed to think of a fading attention (which however is not a prerogative of interaction with technological devices):

> Prenons l'exemple banal où nous avons à réaliser plusieurs tâches simultanément : conduire une automobile, entretenir une conversation avec un passager, programmer les actions à réaliser dans les heures ou la journée qui va suivre. Il se peut également que deux tâches qui demandent le même niveau d'attention entrent en conflit et contredisent d'une autre manière toute possibilité d'une conscience immersive (Guelton 2014: 13).

Hence, he proposed to think of immersion as a "tension" characterized by the splitting and fragmentation of the subject's attention, by a certain degree of intensity and by the neutralization of irrelevant stimuli.

The second reason for this difficulty precisely concerns the previously mentioned assumptions of aesthetic theory, according to which technical empowerment would always occur during interactions with embodied media. During the experience of virtual reality, the device's motion-tracking sensors are able to intercept the movement of the viewer's head and to provoke a perspective shift within the media environment represented in the text: this process is always perceived and understood by users who develop aesthetic meta-operativity. At this point, it is possible to repropose the paradigm of *technical empowerment*, advanced by techno-aesthetic theory (Montani 2014, 2018), which affirms the validity of the opportunities for evolutionary development offered by immersive media, on the basis of the idea that the living being is always, by its nature, technically "increased." According to a such perspective, technical artifacts such as headsets for virtual reality, when integrated with the body as an "extension," realize a "syncretic unity" (Montani 2018: 2, *my translation*), composed, in fact, of a technological prosthesis and of a human body, which ultimately becomes able to discover its own self and its own potentialities through the use of such technology.

More radically, in augmented reality experiences, users themselves have to choose, through the use of the device, the type of content to be displayed on their devices' screens. In this view, by interfacing with a technical artifact, users become able to "discover themselves and their potentials" (Montani 2018: 2, *my translation*), that is, to watch themselves acting in the virtual world): this can happen "only in the course of an actual activity" (2, *my translation*), that is, an act of fruition. It is at this level that "aesthetic meta-operativity" occurs. Users become able to reshape the world-environment (or at least that which they may have mediately perceived) with a more or less freedom (in the manner provided by the text) and to interact semiotically with objects within it (according to the codes of meaning established by the text). In comparison to before, users enjoy of an enriched world which the technological prothesis has provided to reveal.

3   The symbolic forms of embodied media interaction

Moreover, a condition where embodied media would work as *deactivators* of the naturalness of human experience does not describe our current time. The immersive media with which we are dealing with in the contemporary media landscape are still "emerging media." This means that they are not "habitual" or of daily use.

In our view, the purpose of dissuasive discourses about virtual and augmented reality can be found in their capacity to represent, in a symbolic and metaphorical way, the common dysphoric beliefs about the condition of contemporary users interacting with computational media. In fact, dissuasive discourses lead to conceive of immersive fruition as an "isolation" in an essentially subjective (user-oriented) and self-referential environment. If we look at the conceptual image to which such discourses refer, it seems they pounce upon the tropes of the "filter bubble" (Parisier 2011). In a such view, virtual and augmented reality depictions in "apocalyptic" discourses correspond to meaningful forms so as to convene a more consolidated and objective counter-ideology towards the role of the computational architectures of social media platforms in user interactions with digital media. Prevailing over the optimization of individual experience involves the alienation of ideological self-referentiality, this being allowed by the algorithmic logic that presides over the organization of the so-called echo-chambers (Persily et al. 2020), and it may be described as the progressive removal or

rejection of the real dimension of existence, as represented for instance by the phenomenon of the "hikiko-mori" (which designates a social withdrawal leading people to social isolation and self-confinement; often such praxis is related to an excessive use of digital devices and social media).

The same can be argued about critical discourses against contemporary media experiences afforded by interactive storytelling products that promise to ensure a participatory and "active" role for the viewer. The fruition model established by these textual forms is purely participatory and cooperative (Eco 1979): the reader becomes co-author of the text and the navigation of the "possible world" is structured in a hypertextual way and is closely linked to the pleasure of control (Grodal 2000) that the user experiences during the fruition.

However, although its mode of fruition has constituted a novelty in comparison to other non-interactive products, an interactive storytelling product such as *Bandersnatch* (Slade, 2018) – the interactive storytelling episode of *Black Mirror* – has been equally considered in a negative way: in particular, it was argued that the ability to determine the flux of the narration is merely an illusion (Elnahla 2018; Montani 2019; D'Aloia 2020).

However, in accordance with the ideas exposed earlier, the same illusion of being able to direct the story in an ever-original way could be interpreted as a rhetorical strategy of the text. In this view, aesthetics meta-operativity works to "reveal" the control and recommendation mechanisms that characterize the internal organization of the web-based media environments in which the user of contemporary digital media navigates on a daily basis. This meta-experiential function, which stems from a meta-textual interpretation of the interactive movie, is still comparable to the dissuasive rhetoric previously considered. This form of implicit critique could be interpreted as a way to stimulate users to develop a *narratological meta-operativity*[4]: the text provides for its own meta-textual reading, by inviting users to develop a self-reflective interpretation of the experience of fruition (the one depicted in the story as well as the one enjoyed by the users themselves). In this view, the text would represent a sort of "antidote" which can be useful during interactions with more consolidated computational media. That is, it helps users develop a meta-experiential competence that endows them with the capability, which is an evolutionarily advantageous one, to critically reflect on their own experience of web-surfing.

4   Narratological meta-operativity in the immersive documentary

Finally, it is hard to conceive of embodied media as *deactivators* of the naturalness of human experience because, in some cases, the interaction with such media has the objective of fostering empathy in viewers, who are understood by the text as being not mere receivers of a cultural product, but as social and active subjects in the real world.

In narrative texts related to the documentary genre, the authorial intention to elicit a meta-experiential competence in the viewers that drive them to reflect not only on the type of technical experience in which they are involved (aesthetical meta-operativity) but, more generally, on the cognitive and evolutionary possibilities offered by the technically increased experience (narratological meta-operativity) is more evident.

The documentary genre among immersive media is well represented by the virtual and augmented reality cinema of Gabo Arora and Chris Milk, with works such as *Clouds Over Sidra* (2015), or by the interactive storytelling forms in augmented reality such as *Outthink Hidden* (New York Times, 2017).

Clouds Over Sidra, a short film commissioned by the United Nations, tells the story of a girl who lives in a refugee camp in Jordan. The primary purpose of the audiovisual product was not so much to "tell a story" in order to entertain a general public as it was to rather document the precarious reality of the places depicted through the representation of a day in the life of an ordinary person. As the filmmakers have argued, virtual reality has been interpreted in terms of being a "machine of empathy" (Milk 2015) which will raise public

---

4.   We would like to make the concept of "meta-experiential competence" coincide with the result of what, for semiotic aesthetics, is the *meta-operational performance*. Meta-operativity, which is exclusively the prerogative of human beings, is an operation, an activity that produces an instrument that has no end in the instrument itself, but in creating a further instrument through the first. The technological and techno-textual systems that we will analyze in this contribution are technical artifacts produced within the contemporary media environment with the aim of bringing the human being to evolve (cognitively and intellectually).

awareness and give the viewer a close view upon phenomena that are both current, distant and difficult to understand for the Western world.

On the other hand, *Outthink Hidden* is an augmented reality application developed by the New York Times Company's T Brand Studio released at the launch of *Hidden Figures* (Melfi 2017). It offered location-based stories of remarkable but relatively unknown scientists: users could place virtual statues in ten cities around the US. Here, again, what is at stake is the willingness to restore visibility to previously discriminated figures.

As in *Clouds Over Sidra*, or even in *Outthink Hidden*, the crucial point of the spectatorial experience lies in the opportunity to put "real reality" on stage, enriched by the immersiveness of the image and the sense of presence that flows from it. It is not the very possible or alternative worlds depicted by "apocalyptic" narrations, but an actual *augmented world* in comparison to the world experienced prior to the viewing process, one believed to represent an improvement over the world as seen prior to the viewing experience, because at least users know something more about the world they inhabit. In this sense, it is precisely immersiveness that leads to empathy: these textual forms are able to "create an empathy functional to the fruition of ethical themes, mixing narration and attraction together" (Dalpozzo 2018: 103).

Obviously, the documentary genre is a borderline case and the "illusion of non-mediation" (Lombard & Ditton 1997), which features the immersiveness of the text, denotes a strategy of enunciation which is anchored to the narrative dimension set by the authors. In this view, the meta-operational competence that users can develop has to do with their own ability to *use* the text in the way foreseen by its technicalities (aesthetical meta-operativity).

Nonetheless, on the other hand, these examples are similar to dissuasive journalistic narrations and interactive storytelling texts insofar as they provide for their own meta-textual reading, by inviting the user to develop a self-reflective interpretation of the same real world inhabited by the viewers (narratological meta-operativity).

Hence, as the dissuasive journalistic narrations warn (and in a certain sense denounce) the "anesthetized" condition of the contemporary digital user, so the documentary texts of this type, by leveraging the expressive possibilities offered by immersive media, challenge the viewers by trying to persuade them to act ethically. The meta-operational value of this discursive operation lies precisely in the ability to reflect on one's own phenomenal experience in relation to the represented objects and to reorganize this relationship on the basis of the new knowledge obtained during fruition.

5   Conclusions

In the course of this article, I have tried to demystify some dysphoric beliefs which feature the cultural imagery of embodied media interaction. Apocalyptic narrations and journalistic sensationalist rhetoric fail to accurately describe the factual reality of human-computer interaction taking place during the experience of embodied media.

To this effect, I reproposed the aesthetic theory on meta-operativity and technical empowerment. In its most successful applications, augmented reality has proven to be a medium capable of optimizing the phenomenal experience of the world, without anesthetizing the emotional involvement of the user. One of the meta-operational advantages that augmented reality experiences bring is, for example, the possibility of predicting a future situation before it is actually realized (this is the case with marketing applications). This concerns the implementation of immersive tools in everyday life and, consequently, the creativity of the uses that can be made of these tools.

Furthermore, I have argued that such texts can also be studied in order to determine their symbolical and metaphorical value, as they can be understood as depictions of a set of fears about more consolidated computational media.

Therefore, whether the object of fruition is a "real" and material object, one that is physically present, that the dysphoric narration allows to approach in a critical way, or whether it is a distant and exotic place, which the artifact allows to bring *hic et nunc* and to be enjoyed illusorily and immediately, it seems fair to say that the

hypothesis of a technical and aesthetical empowerment can be valid for assessing the realization of a syncretic unit that produces the development of a meta-experiential competence in the individual.

In this perspective, immersive media cease to be conceived of merely as devices of fruition, but rather present themselves as creative and functional devices able to increase human imagination and to bring an experiential gain to the phenomenal experience in which the very protagonists of a potential narrative are the users themselves. The texts call the viewers to reflect about the ethics of the production of digital systems as well as to express their individual creativity by using the technical artifacts.

To conclude, it is not only science fiction and journalistic narrations that promote the development of a meta-experiential competence oriented towards the correct interpretation of a phenomenon of digital culture. It is instead also the ability of technical devices and of interactive textual forms, in their generality, to promote the development of a narratological meta-competence – which is evolutionarily advantageous – in the context of the phenomenal experience that can first be imagined narratively and, subsequently, intentionally used for creative purposes by users. This ultimately fuels the redesign and evolution of the devices involved and of the semiotic systems of interactive textual forms.

References

Attimonelli, Claudia and Vincenzo Susca (2020). *Un oscuro riflettere: Black Mirror e l'aurora digitale*. Milan: Mimesis.

Barbieri, Stefania and Vincenzo Pierantonio (2017). "Pedestrian Inattention Blindness While Playing Pokémon Go as an Emerging Health-Risk Behavior: A Case Report." *JMed Internet Res* 19(4): 331-339. https://doi.org/10.2196/jmir.6596.

Berardi, Franco "Bifo" (2013). *Neuro-Totalitarianism in Techno-maya Goog-colonization of Experience and Neuro-plastic Alternative*. Los Angeles: Semiotext(e).

Borelli, Giorgio (2018). "Realtà aumentata e *general intellect*. Ipotesi per una semiotica materialistica degli *smartmedia*." *E/C* XXII(23): 82-39. https://mimesisjournals.com/ojs/index.php/ec/article/view/522 (last accessed 6-07-2021).

Calleja, Gordon (2011). *In–Game. From Immersion to Incorporation*. Cambridge, MA: The MIT Press.

D'Aloia, Adriano (2020). "Against interactivity. Phenomenological notes on *Black Mirror: Bandersnatch*." *Series. International Journal of TV Serial Narratives* VI(2): 21-32. https://doi.org/10.6092/issn.2421-454X/11410.

Dalpozzo, Cristiano (2018). "*Cinema e realtà virtuale, ovvero 'The early virtual (post)cinema of attractions'*." *La realtà virtuale. Dispositivi, estetiche, immagini*, edited by Cristiano Dalpozzo, Federica Negri and Arianna Novaga, 87-105. Milan: Mimesis.

Damone, Giuseppe and Raffaella Scelzi (2018). "The hidden media in augmented reality." *E/C* XII(23), 75-81. https://mimesisjournals.com/ojs/index.php/ec/article/view/521. (last accessed 6-07-2021).

Dewey, John (1934). *Art as Experience*. New York: Balch & Company.

Dourish, Paul (2001). *Where the Action Is: The Foundations of Embodied Interaction*. Cambridge, MA: The MIT Press.

Eco, Umberto (1964). *Apocalittici e integrati*. Milan: Bompiani.

Eco, Umberto (1979). *Lector in fabula*. Milan: Bompiani.

Elnahla, Nada (2019). "Black Mirror: Bandersnatch and How Netflix Manipulates Us, the New Gods." *Consumption Markets & Culture 23(5)*: 506-511. https://doi.org/10.1080/10253866.2019.1653288.

Garroni, Emilio (1977). *Ricognizione della semiotica*. Rome: Officina edizioni.

Garroni, Emilio (2005). *Immagine, linguaggio, figura*. Rome-Bari: Laterza.

Grau, Oliver (2003). *Virtual Art. From illusion to immersion*. Cambridge, MA: The MIT Press.

Guelton, Berndard (2014). *Les figures de l'immersion*. Rennes: Presses Universitaires de Rennes.

Horkheimer, Max and Adorno Theodor W. (2002). *Dialectic of Enlightenment: Philosophical Fragments*. Edited by Gunzelin Schmid Noerr. Translated by Edmund Jephcott. Stanford: Stanford University Press.

Lombard, Matthew and Theresa Ditton (1997). "At the Heart of It All: The Concept of Presence." *Journal of Computer-Mediated Communication* 3(2). http://jcmc.indiana .edu/vol3/issue2/lombard.html (last accessed 6-07-2021).

Mann, Steve (1998). "Humanistic computing: 'WearComp' as a new framework and application for intelligent signal processing." *Proceedings of the IEEE* 86(11): 2123-2151.

Manovich, Lev (2006). "The Poetics of Augmented Space." *Visual Communication* 5(2): 219-240.

Marcuse, Herbert (1964). *One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society*. Boston: Beacon Press.

Milk, Chris (2015). "How virtual reality can create the ultimate empathy machine." TED Talk: https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine (last accessed 6-07-2021).

Montani, Pietro (2014). *Tecnologie della sensibilità. Estetica e immaginazione interattiva*. Milan: Raffaello Cortina.

Montani, Pietro (2018). "Empowerment tecnico e assunzione di responsabilità. Verso un'etica del digitale." *Lessico di Etica Pubblica* IX(1): 1-10.

Montani, Pietro (2019). "Elogio in 10 punti di Bandersnatch." *Fata Morgana Web*, January 14, https://www.fatamorganaweb.it/bandersnatch-black-mirror/ (last accessed 6-07-2021).

Palermos, Spyridon Orestis (2017). "Augmented Skepticism: The Epistemological Design of Augmented Reality." In *Augmented reality. Reflections on its Contribution to Knowledge Formation*, edited by José María Ariso, 133-150. Berlin: De Gruyter.

Pariser, Eli (2011). *The Filter Bubble. What the Internet is Hiding from You*. London: Penguin Press.

Persily, Nathaniel, Tucker Joshua and Barberà Pablo (2020). "Social media, echo chambers, and political polarization." In *Social Media and Democracy: The State of the Field, Prospects for Reform*, edited by Persily Nathaniel and Tucker Joshua, 34-55. Cambridge: Cambridge University Press.

Slater, Mel (2003). "A Note on Presence Terminology." http://www0.cs.ucl.ac.uk/research/vr/Projects/Presencia/ConsortiumPublications/ucl_cs_papers/presence-terminology.htm (last accessed 6-07-2021).

Wellner, Galit (2018). "Posthuman Imagination: From Modernity to Augmented Reality". *Journal of Posthuman Studies* 2(1): 45-66.

Žižek, Slavoj (2017). "Ideology Is the Original Augmented Reality." https://nautil.us/issue/54/the-unspoken/ideology-is-the-original-augmented-reality (last accessed 6-07-2021).

Federico Biggio – University of Torino (Italy) - Université Paris VIII Vincennes-Saint Denis (France)
✉ federico.biggio@unito.it
Federico Biggio is a Ph.D. candidate in Semiotics and Media at the Department of Excellence of Philosophy and Educational Sciences of the University of Turin and at the Department of Hypermedia of the University of Paris 8 Vincennes-Saint Denis. His research areas concern the cultures of digital media, in particular those related to the such called "immersive media". Moreover he is interested in the digital humanities and in the analysis of computational techniques in cultural and academic field. After film studies, in 2016 he graduated in Communication and Media Culture with a thesis on augmented reality and wearable technologies and he obtained an annual research grant at the Interdepartmental Department of Territory Sciences at the Polytechnic of Turin. Among his publications, Augmented consciousness: Artificial gazes fifty years after Gene Youngblood's Expanded Cinema (2020), Toward a semiotics of augmented reality (2020), Semiotics of distances in virtual and augmented environments (2021).

VR Stories of Travel and Exile: Forensic Storytelling and the Politics of Dynamic Framing

Blandine Joret*

University of Amsterdam (Netherlands)

Abstract

In this article, I analyse recent VR works that emphasize fictional or documentary stories of travel and exile, and thereby consider an active engagement with the environment crucial to the construction of narratives. In so doing, I re-examine and bring into dialogue three existing strands in film theory from the perspective of VR: an aesthetics of discovery (Andrew, 2007), the idea of liberal and embodied perception (Bazin 1953, Sobchack 2004) and an implied connection between film spectatorship and forensics (Benjamin 1931 & 1939). I then propose forensics as a narrative model for VR storytelling, and thereby emphasize broader epistemological and ideological implications of the discovering spectator. As in forensic research, a VR environment offers the spectator scenes in which each detail is potentially relevant to the story: meaning is then achieved through the discovery of relevant pieces information.

Keywords: VR Travelogues; Widescreen Aesthetics; Liberal Spectatorship; Politics of Place.

*   ✉ b.joret@uva.nl

33

Exile is a space-time dimension that one has not chosen, and where one arrives marked by rage, fears, suffering, early longing, love, broken hope, and also by a certain shy hope, one that signals a return.

(Freire 2016: 29)

We are at White Sands New Mexico, some 15.000 years ago. A smaller than average individual, possibly a mother, rushes towards an undefined destination carrying a toddler on her hip. On their way, they cross paths with a mammoth and a giant sloth, which doesn't seem to bother the mother (the sloth, on the other hand, is cautious). Not much later, this mother is homebound on the exact same track at slightly lower tempo, but without the child. In 2020, a team of palaeontologists meticulously analyses the fossilized "longest late-Pleistocene double human trackway in the world", using advanced image technologies and detailed measurements to recreate this ancient, somewhat mysterious travelogue. Matthew Bennet and his research team refer to the narrative practice as an "ichnological interpretation": a forensic and narrativized analysis, on the slippery line between "'paleo-poetry' and evidenced fact" (Bennet et al. 2020: 17). The results are reported widely in mainstream journalism, which confirms that this journey speaks to collective imagination: where was this woman going, why was she apparently in a hurry and, most importantly, what happened to her child? This oldest documentary story remained nevertheless completely undocumented: no oral or historical accounts, and naturally no filmed testimonies – except, their footsteps suggest the intrigue. In this first travelogue, it is an active engagement with the earth and environment which generates the story: paleo-poetry or not, this scientific reconstruction is exemplary in its emphasis of discovery as a narrative practice.

In this article, I analyse recent Virtual Reality works that emphasize fictional or documentary stories of migration and exile, and thereby consider an active engagement with the environment crucial to the construction of the stories. In so doing, I re-examine and bring into dialogue three existing strands in film theory from the perspective of VR: an aesthetics of discovery (Andrew 2007), the idea of liberal and embodied perception (Bazin 1953, Sobchack 2004) and an implied connection between film spectatorship and forensics (Benjamin 1931 and 1939). Adding to 360-degree video or spherical cinema, VR distinguishes itself by facilitating environmental interaction and engagement, which calls for a reconsideration of existing aesthetic theories of embodied sense-making and liberal conceptions of the gaze. In dialogue with recent studies on the disappearance of the frame in VR aesthetics (Brillhart 2015-2016, Uricchio 2018), I argue that editing and therefore storytelling in VR is in line with wider screen aesthetics: it includes less restricted techniques that activate the spectator's gaze, such as lighting, environmental sound, or depth of field. Deepening the ideological implications of such dynamic framing practices, furthermore, I support my analyses with theories on liberal spectatorship and democracy of vision. Following this line of thinking, I then propose forensics as a narrative model for VR, and thereby emphasize broader epistemological implications of the discovering spectator as examiner.

1   Off-screen film theory

The centrality of the frame permeates the history of film theory: from an ontological and philosophical dimension, the 24 frames a second have been crucial to understand the way cinema dissects and reconstitutes movement and time. Aesthetically, framing is the director's means of selecting information, and therefore of creating stories. To streamline information, to include and exclude, is perhaps a condition sine qua non for narrative: without structured plotting of events, no stories can be told. In other words, the frame expresses the filmmaker's intervention and is therefore the guarantor of film as art. In Rudolf Arnheim's words, the frame enables "restrictions to transform the peep show into art" (1933: 154). From there on, Arnheim's defence of film art leads him to dismiss any attempt to transcend the frame. From sound cinema, widening screens like Cinemascope or Cinerama to three-dimensional cinema: "there can be no composition of that [3D] surface" (Ibid.: 156), and "montage will seem an intolerable accumulation of heterogeneous settings" (Ibid.).

In his justification of the "formative potential" (Ibid.: 159) of cinema, Arnheim is exemplary of early day prescriptive film theories, yet the persistence of the frame returns prominently in psychoanalytic and semiotic film theory as an undeniable semantic marker in socio-political film analysis: not only does the frame, the "material unit of the image" as Stephen Heath describes it (1976: 258), solidify prescribed subject positions, it also "encloses film as narrative" (Ibid.: 260): narrative "supports the frame against its excess", and as with

Arnheim, the "denial of the frame can only lead to the breakdown of cinematic form" (Ibid.: 261). Although Heath's suggestion to film analysis has been critiqued from the start,[1] it nevertheless stands for a reassessment of the frame as an essential building block of cinema: the history of cinema starts with the immobility of the spectator, their "being-in-frame" (Ibid.: 260). Furthermore, Heath insists on the connection between framing and narrative structure: "narrative may be seen as a decisive instance of framing" (Ibid.: 261), he writes, thereby linking narrative constrains to framing conventions and repeating Arnheim's inherent connection between framing and cinematic form. With VR, then, Arnheim's biggest nightmare may indeed come true; and considering the importance of a fixed frame in subsequent theoretical and ideological enterprises, the implications of apparent frameless practices in VR storytelling pose essentially disciplinary questions. What about film language, narrative structures or the filmmaker's creative vision? If the frame contains ideology and film history began with the immobilization of the spectator's gaze, does VR qualify as post-cinematic?

There is, however, an alternative route which is entirely sketched around the ambiguity of the frame and the affirmation of off-screen space. In an address of the post-cinema question, Dudley Andrew attributes to post-war realist aesthetics, starting with André Bazin, a reformulation of cinema that departs from film theories based in framing and editing, thereby initiating a "redefinition of cinema's elemental makeup." (2007: 64). In what he terms the "aesthetics of discovery" lies a paradigmatic shift away from the frame that advocates a spectator who "'discovers' significance, rather than 'constructs' meaning" (Andrew 2007: 47). Theoretically speaking, Bazin's aesthetic and historical orientation takes a U-turn from prescriptive film theories, of which Arnheim's outlined above is exemplary. Aesthetically, his interest in off-screen space and minimal editing is therefore of interest for studies on VR and storytelling. Historically speaking, too, Bazin reasons that with the advent of sound cinema and wide-screen technologies, prescriptive theories based on the frame and editing become obsolete: "The evolution of cinema since sound, overall and in particular during the past decade, leans to a negation of montage and of plastic aesthetics, at least the sort of pictorial plastics based on the existence and proportions of the frame" (Bazin 1953a: 246). Rather than grounding film art in the frame, then, Bazin instead emphasizes the notion of the off-screen and depth of field as leading force in cinema's aesthetic and technological evolution, moving beyond the frame and into the spectator's perceptive dimensions.

Naturally, the question of storytelling untied from editing concerned Bazin: concepts like "horizontal montage" after watching Chris Marker's *Lettre de Sybérie* (*Letter from Siberia* 1957), or "neo-montage" in *La Course de taureaux* (*Bullfight* Boroutsky and Braunberger, 1951) testify to the fact that he was busy looking for alternatives. Horizontal montage reverses traditional audio-visual hierarchies by acknowledging sound rather than image as semantic marker: the same sequence accompanied by a different voice over will produce entirely diverging meaning. Neo-montage adheres to the found-footage logic, rather than dialectical or continuity editing: in breaking down apparent syntheses between shots, it "achieves an openly visible analysis of its construction" (Dall'Asta 2011: 63).[2] In a manuscript with the title "The Big Ideas", referring both to wider screen aesthetics as well as its intellectual implications, he elaborates specifically on the possibility of frameless storytelling:

> It is quite generally believed that the subtlety of storytelling and of psychological depth are credited to editing, which some even consider to be the essence of film art [...] And so of course the size of a CinemaScope screen reduces the possibilities of editing in ways even more decisive than realist sound cinema did. But it won't serve only spectacular subjects, and those who will understand and master its possibilities will also be able to make them serve a cinema of analysis and intelligence (Bazin 1953c: 2541).

Similarly, the apparent lack of a frame in Virtual Reality urges a radical reconsideration of editing. In "probabilistic experiential editing" (Brillhart 2016), VR editing becomes an effort to guide the spectator's most likely

---

1. The viewpoints highlighted in this section cover only the tip of a far-reaching theoretical debate at the time, including seminal texts in film and ideology. Jean-Louis Comolli, for instance, argues for a more active form of framing, and aligns it to "narrative condensation" (1987:70) while emphasizing the ideological implications of it: "the frame imposes itself and the spectator submits" (Ibid.: 76). On this topic, see also Noel Carroll, 1981 and Dana Polan, 1985.

2. In her chapter, Monica Dall'Asta suggests several parallels between Bazin's film aesthetic and Walter Benjamin's seminal "Work of Art" essay. Similarly, the notion of "forensic storytelling", central to this article, ties Bazinian film studies to Benjamin's views on critical spectatorship, politics and aesthetics.

interaction: continuity editing becomes concerned with stitching the image into spherical coherency, point of view shots become points of interest and match on action turns into match on attention. Linear narrative structures, furthermore, become spherical, "like a ripple effect - like a drop in a bucket, and then a ring around that, and a ring around that. [Editing in VR] was really about rotating those rings to corral people through the general idea of a story, or an experience" (Ibid.). Addressing today's largest global humanitarian crisis, *Carne y arena* (*Flesh and Sand*, Iñárritu 2017) illustrates that VR is indeed capable of expressing "big ideas", as it puts the audience in the shoes of South American immigrants crossing the Mexican border with the United States. Ironically, when it arrived in Amsterdam, the installation was set in a deserted film studio: bare footed in a cold detention centre, visitors await their turn for a unique walk-around VR experience. This prologue, so to speak, already emphasizes a sensuous experience to the setting, continued by the sand under your feet and blowing wind on your face throughout the VR experience. As you follow a group of clandestine refugees and their traffickers, voices and environmental sounds will guide your attention from one character to another, which determines the stories you hear. A sudden gust of wind, the deafening sound of a helicopter makes you turn towards its blinding searchlight, which enables the cut towards the film's climactic sequence of a border control's gun pointing straight into your face. A close reading of the editing techniques quickly reveals similarities with wide-screen aesthetics, like the use of environmental sound effects, depth-of-field and lighting to guide the spectator around. The problems in theory arising from VR, and in particular its implications for storytelling, are indeed similar to those raised by wide-screen cinema: without edges, traditional cut-and-paste editing fails completely, and therefore the necessity for alternative, dynamic storytelling models is revived.

2   Politics of choice

The lineage described by Andrew as an "aesthetics of discovery" in fact rests on a veritable paradigm shift with far-reaching ideological implications: it postulates a particularly active notion of spectatorship as crucial to the organisation of the narrative. In her reading of Bazin's work on depth-of-field, Jennifer Fay links wide-screen aesthetics and cinematic realism in general to a veritable democratic experience, "promot[ing] global humanism and world understanding" (Fay 2018: 176). While editing and close-ups impose views on spectators, depth-of-field puts forth an "aesthetic of choice": it gives the viewer the "time to form an opinion, first to see everything, then to choose importance," she writes, and thereby "restore(s) the individual's belief that [they] can make choices" (Ibid.). Similarly, John Mullarkey develops from Bazin's aesthetics a "democracy of vision" centred around the experience of ambiguity: "[depth of field] enables the freedom for the spectator's 'eye' to explore, thus protecting a democracy of vision" (Mullarkey 2012: 45). Ultimately, this intellectual freedom translates into an immersive and essentially participatory notion of spectatorship: "Bazin wants to end the observer status of the spectator and replace it with 'participating perception'" (Ibid.: 44). It is important here to underline that Bazin's affirmation of choice is not universal, nor is it therefore culturally un-coded. In a study on film language, he recounts an anecdote from 1940 when English missionaries used film to indoctrinate populations in southern Africa: knowing the particular film by heart, they were astonished to find that "everyone responded that they had been profoundly interested in the white chicken" (Bazin 1953b: 1080), a detail they themselves had never noticed. Reversely, in his own film club screenings of *Le jour se lève* (*Daybreak*, Carné 1936), Bazin notes that spectators systematically forget a large and very present piece of furniture in Gabin's room, simply because it plays no role in the story (Ibid.).[3] Instead of advocating some sort of universal film language, these observations show that liberal perception itself is processed in terms of cultural codes as well as narrative efficiency.

This nuance is important, because it points to the politics involved in choice and the distribution of attention, and it underscores a dynamic tension at the heart of this aesthetics of choice. "The democratic film style [is] fraught with seemingly undemocratic tension", Fay writes (2018: 181), as the viewer "is induced actively to participate in the drama planned by the director" (Bazin qtd. in Ibid.: 183). Indeed, the liberal spectatorship implied in Bazin's work on depth of field, his affirmation of off-screen space and wide-screen aesthetics comes

---

3.   Here, Bazin is clearly more nuanced than Alain Badiou in his later assessment of cinema and democracy, in which he argues for the universality, or "generic humanity", of film: "The character of the Tramp, perfectly placed, filmed in a close frontal manner, in a familiar context, is no less a representative of generic"popular" humanity for an African than for a Japanese or for an Eskimo" (2009: 2).

with a trick: the image remains, of course, constructed. Rather than being spoon-fed through fixed editing and framing practices, however, information starts to rely on the dynamics of attention, which undeniable has its own ideological dimension — albeit more subtle, and perhaps precisely therefore even more coercive.[4]

Outlining these thoughts on dynamic framing and its political implications on notions of spectatorship, it becomes increasingly difficult not to confuse mid-century views on depth of field and wide-screen cinema with contemporary concerns relating to VR. In fact, the "big ideas" on intellectual emancipation, democracy and global humanism embedded in Bazin's realism extend well into the post-cinema debate. Serge Daney, for instance, postulates that with television and the zapper at hand, spectators may one day become "editors in their head" (1991: 165). Moving further from traditional film and media studies, the principle of discovery as sensemaking directly translates into a rhizomatic conception of networks: rather than structured from start to finish, VR narratives are decentred and "oriented toward an experimentation in contact with reality" (Deleuze and Guattari 2004: 13). And so, following up on Andrew's suggestion to extend this lineage further, the proposed paradigm shift from frame to off-screen aesthetics, from the construction of meaning to the discovery of significance, gives way to more phenomenological understandings of film centred on sensory interactions and environmental engagement.

I believe these affiliations, though they transgress quite beyond the disciplinary borders of film theory, nevertheless provide a strong sense of continuation from realist film aesthetics into the contemporary applicability of an aesthetics of discovery, particularly its implications for VR storytelling. Solidifying the suggested connections between an aesthetic of discovery and storytelling in VR, I will in the following part of this article draw on specific case-studies that incorporate discovery and spatial engagements into exilic experiences which make up the narrative.

3   Exilic Realities: some case-studies

In "traditional" cinema, established documentary and fictional genres like the travelogue and the road movie illustrate that movement through space can constitute the backbone of narrative structures. With open-ending and episodic plot structures, travel narratives typically transfer social and cultural critique as well as existential themes onto an active spatial engagement. A remarkable amount of recent VR stories adopt this narrative logic and follow in the footsteps of *Carne y arena* as semi-documentary stories of travel and exile. Always rooted in real-life testimonies, storytelling dynamics of VR appear to lend themselves well to convey wandering experiences of exile and migration as a highly politicized movements through space. The increased mobility of the spectator in Virtual Reality, which follows from its aesthetics of choice, finds literal translation in stories of travel, and in particular of exile — in these cases, VR appears to be the designated storytelling device.

Traveling While Black (Williams 2019) takes us to the times of racial segregation, when traveling throughout the USA was not only engrained with politics but also life-threatening for Black Americans. As if to affirm its cinematic affiliation, the film starts in an old-fashioned film theatre: red curtains flank the stage, all the seats besides your own are empty. Black and white home video footage is projected on the screen, and besides one or two curiosity driven looks towards the film projector in the back of the theatre, your gaze remains fixed on the screen in front. The contrast is therefore stark, when in the following scene you find yourself in the middle of a deserted street: the pavement is wet, it must have rained before. Slowly you start to turn around trying to figure out why you are left here, on the sidewalk of a deserted street. You are right in front of a former silent movie theatre Ben's Chili Bowl, Washington DC. Ever since its foundation in 1958, this diner has been a shelter for the community. Being there, listening to testimonies of racial violence and memories of student and civil rights movements, one feels participant of this community. Shot more than fifty years after the Civil Rights Act, each story told in *Traveling While Black* testifies to the fact that the co-called Green Book, a travel guide listing safe dining and accommodation facilities, has been internalized: while lawfully obsolete, systemic and persisting racism continues to divide public space. Structurally, too, the film emphasizes the politics of place, belonging and community: you sit right at the table or on a barstool, intimately close to the one who's talking

---

4.   In this regard, William Uriccio's suggestion (2018) of future "algorithmic stories" is worth mentioning, in which AI predicts spectatorial behaviour in Virtual Reality just like algorithms in Facebook streamline advertisements and information on timelines, tailored to the specific interest of its users.

— other costumers don't really mind your table, until at one point everyone present engages in listening and the scene becomes somewhat of a collective fellowship. The film's elegant use of superimpositions in lieu of hard cuts in editing is also noteworthy: alluding to the diner's former use, archival footage is projected on the ceilings and walls, thereby spatializing what in traditional film language would have been a cut. Flashbacks of driving on public transportation are first projected on the horizontal mirror besides your table; and just when you started looking at the landscape passing by, the mirror becomes a window and the diner has changed into the bus on the road.

In her introduction to *Belonging: A Culture of Place* (2019), bell hooks accounts for this internalised Green Book in contemporary America, stating clearly that "[n]aturally it would be impossible to contemplate these issues without thinking of the politics of race and class" (2019: 3). Indeed, travel is not a neutral practice, feeling at home and having a sense of belonging is not a universal given or even conceivable to many. "Many folks," she writes, "feel no sense of place," (Ibid.: 1) thereby referring to "the everyday anguish that shapes the habits of being for those who are lost, wandering, searching" (Ibid.: 2). Likewise, cinematic space is biased and democracy of vision, as discussed previously, remains intertwined with prejudice. The politics underlying this discussion on place indeed resonate with existing film studies of space and place, notably in Vivian Sobchack's *Carnal Thoughts* (2004). In anticipation of her well-known "cinaesthetic subject" as a means to include the body and sensuous production of meaning in film, she distinguishes the "pleasurable and aimless meanderings of the *flaneur*" (15)[5] from her study of moving through space, and insists on its critical value: " 'not knowing where you are' is the most global and existentially threatening and 'not knowing how to get to where you want to go' the most local and mundane" (Ibid.: 34-35). Sobchack's turn to spatial experience aligns with her more general endeavor to find grounds for embodied sensemaking in cinema, which positions itself in opposition to the persistent "hegemony of vision" (Ibid.: 64) permeating film theory since the seventies. Importantly, she emphasizes not knowing, or experiences "without a thought" (Ibid.),[6] as catalysts for embodied sensemaking, thereby suggesting the centrality of the spectator's affective engagement in cinematic sensemaking. Ultimately, then, her exploration of the " 'lived geography' of being disoriented in a worldly space" (Ibid.: 15) is a quest for a different kind of knowledge emerging from the cinema: one which is lived, rather than given. Applied to VR storytelling, formerly formal framing practices become embodied and meaning relies on a discovering spectator.

Discovery is enhanced significantly in interactive Virtual Reality stories, specifically those that incorporate an active engagement with objects and props as narrative turning points. *The Key* (Tricart 2019), critically acclaimed for its persuasive and interactive narrative structure, is an exilic experience that starts like a video game, arguably clouding the film's political content: standing up and actively using your controllers, you are asked to open a locker and grasp mystical floating ball-friends. As you are tempted to move around, a brightly coloured animated world with alien figures creates itself: suddenly you're standing in line in the midst of a vast desert, awaiting your turn to pass a multi-eyed monster creature. As you continue the journey the key returns and this time unlocks the memories of a refugee: the colours start to fade, and the animated world transforms into the desolate ruins of a bombarded apartment. The film's narrative design is structured around not knowing where you are in an imaginary landscape, in which the sudden change towards a real and specific setting incorporates dissociative amnesia, a known post-traumatic stress disorder among refugees (Sandialo 2018). The prominence of keys, furthermore, references a common practice among refugees to hold on to the keys of the houses they left behind (Solsman 2019): the process of unlocking the narrative, then, becomes an effort in remembering the home which has turned to ruins. A similar emphasis on objects, memory and homelessness guides the narration in *We Live Here* (Troche 2020), which tells the life story of Rockey, a sixty-year-old woman without a home. Confined in her igloo tent in a Los Angeles public park, you are invited to

---

5. On the camera and the flaneur, see also Susan Sontag who links the drifting photographer-flâneur to a bourgeois appropriation of urban space, in contrast with the homeless or the drifters: "The photographer is an armed version of the solitary walker reconnoitring, stalking, cruising the urban inferno, the voyeuristic stroller who discovers the city as a landscape of voluptuous extremes. Adept of the joys of watching, connoisseur of empathy, the flâneur finds the world 'picturesque' " (1973: 42-43).

6. As her precursors seeking more sensorial sensemaking in film, Sobchack positions herself explicitly in opposition to methodological and theoretical explorations in semiotics, structuralism and psychoanalysis of the seventies. Instead, she positions herself in line with Sergei Eisenstein's synaesthetic film theory, Tom Gunning's cinema of attractions, Gilles Deleuze's sensory thought, Linda Williams' body genres, Richard Dyer's cinema of sensations, Laura Marks' haptic cinema, Walter Benjamin's tactile appropriations, and Siegfried Kracauer's definition of the spectator as corporeal material being.

pick up objects lying around: a diary, a box of photographs and notes, a small bottle of fairy-tale stardust each contain an imaginative sequence which temporarily takes you out of the suffocating setting of the tent. One of these objects is a miniature house, which prompts Rockey's voice-over: "I miss the sound of a key turning, locking the door and you can go to sleep, you know you are safe." Sitting in this tent, you see this house from an outsider perspective: the lights are on, people are laughing, you hear the door being locked, and you are excluded.

In these stories of exile the form and the content of displacement go hand in hand: thrown onto an unknown itinerary, spectators (the term gradually becomes frail) cannot but participate in the sensemaking process — nothing happens, otherwise. In this manner, choice and object-oriented designs in VR solicit exilic experiences through narrative structures that accentuate engaged spectatorship. Writing about traditional cinema, Hamid Naficy indeed emphasizes the embodied effect of exilic cinema as "provid[ing] both an ocular and an ideological perspective on deterritorialization. The ocular is encoded in the tactile optics and the ideological in the structures of feeling and synaesthetic sensibilities of the style" (2001: 30). That these real life or VR stories are fundamentally built on so-called carnal knowledge (Sobchack 2014) amplifies the tactile optics of exilic cinema and may in fact clarify the sensemaking implications of a cinema of discovery. At the end of the day, discovery does imply a more critical, participatory learning process if compared to the unidirectional transfer of meaning. This way, Paolo Freire emphasizes the embodied knowledge implied in exilic experiences: "Exile cannot be suffered when it is all reason. One suffers exile when his or her conscious body, reason and feeling — one's whole body — is touched by it" (Freire 2016: 30). In critical education studies, Freire is most known for developing alternative pedagogies to the so-called "banking system" of education, which he characterizes as a one-way *communiqué* that "regulate[s] the way the world 'enters into' the students," who then "'receive' the world as passive entities" (Freire 1970: 76). Instead, he advances "a critical reading of the world" before any literate "reading of the word" can occur: "it implies the sharpening of the learner's *epistemological curiosity*, which cannot be satisfied with mere description of the object's concept" (Freire 2016: 36).[7] This epistemological curiosity is fully in line with the ramifications of the aesthetics of discovery described throughout this article: the wandering experience, ultimately, is a critical reading of the world — an environmental activity that, rather than imposing meaning, produces it.

4   Towards forensic storytelling

The previous paragraphs each explore theories of film that question the dominance of framing as primary signifier in film from an aesthetic and political perspective. In conclusion, I will further develop the implications of "reading the world" into a particular storytelling model, which is also an attempt to solidify the link between VR and existing film and media theory. Addressing this issue of disciplinary continuity or break, William Uricchio suggests in an interview for the VR programme series XTENDED at the Eye film museum in Amsterdam that VR produces "an experiential narrative" (2018), thereby citing Carlo Ginsburg's hunting metaphor for storytelling: "a hunter walks through the world and sees a footprint, a bit of fur on a branch, a broken twig. And from that, is able to assemble a story" (Ibid.). Ginsburg's hunter-storyteller indeed offers a concrete example for the epistemological practice described by Freire as "reading the world":

> The hunter would have been the first 'to tell a story' because he alone was able to read, in the silent, nearly imperceptible tracks left by his prey, a coherent sequence of events...What may be the oldest act in the intellectual history of the human race [is] the hunter squatting on the ground, studying the tracks of his quarry (Ginsburg 1989: 93).

The equation with hunting is equally present in Vilém Flusser, who acknowledges in *Towards a History of Photography* that "the act of photography is like going on a hunt in which photographer and camera merge into one indivisible function. This is a hunt for new state of things, situations never seen before, for the improbable, for information" (2000: 39). While Flusser wrote about photography, the indivisibility of the camera and the photographer anticipates the embodied framing practices in VR. And this hunt for "information", in other

---

7.   Uncoincidentally, Freire's participatory pedagogy is implemented in popular education projects in Syrian refugee camps in Jordan, see: Magee and Pherali 2017.

words for meaning, aligns with the sensemaking model proposed in a cinema of discovery. Rather than developing the hunting metaphor here, however, I conclude this essay with an exploration of forensics as proposed in Walter Benjamin's work on documentary photography. Doing so, I hope to sketch a fitting framework to tie the question of storytelling in VR back to earlier documentary theories of critical spectatorship that seek in photography a forensic and engaged kind of seeing.

As the palaeontologists retracing the story behind the fossilized footsteps in the White Sands desert, we are in VR actively imagining possible scenarios: why is the cup spilled, why was the window left open; why is this footstep deeper than the others, where did the baby steps go? We discover the scene as we engage with it, and this discovering mode drives the narrative. The storytelling logic appears to revolve around an active reading of clues, whose apparent lack of intrigue solicit the spectator's curiosity. From a similar perspective, Benjamin famously described the empty streets of Paris, photographed by Eugène Atget, in forensic terms:

> It has quite justly been said of [Atget] that he photographed them like scenes of crime. The scene of a crime, too, is deserted; it is photographed for the purpose of establishing evidence. With Atget, photographs become standard evidence for historical occurrences, and acquire a hidden political significance. They demand a specific kind of approach; free-floating contemplation is not appropriate to them. They stir the viewer; he feels challenged by them in a new way (Benjamin 1939: 226).

The emptiness of the scene constitutes the lack of a clearly established narrative, which in turn stirs spectators into a critical, examining mode of looking. In another formulation, he writes: "[...] the city in these pictures is like an empty apartment that has yet to find new tenants" (Benjamin 1931: 293).[8] Rather than having things explained and conceptualized, the interpretative freedom enables discovery: Benjamin's critical spectator follows almost naturally from an aesthetics of choice, here expressed as a challenge, and the critical mind is then triggered to complete the scene. Where Benjamin rejects "free-floating contemplation", Bazin's democracy of vision similarly depends upon participatory spectatorship — Sobchack's "lived geography" in turn implies Freirean epistemological curiosity.

The forensic framework of a crime scene furthermore supports the undeniably political nature of this engagement: the image turns into evidence and the spectator becomes its witness. The case-studies analyzed in this article each emphasize the embodied perception and framing practices as part and parcel of the storyline. Likewise, the fossilized foot tracks, Atget's documentary photographs and wide-screen aesthetics share with VR an essentially engaged and critical spectatorship without which these stories remain untold. The application of forensics as narrative trope, finally, has distinctive aesthetic implications which account for the fact that the scene is organized — in other words, that there is intrigue. What made Atget's photography compelling, what moves us in depth-of-field or in wide-screen cinema, and what makes us engage actively in Virtual Reality is precisely the fact that there must be an event to be discovered. Thriving on suspense and mystery, what is more enigmatic to examine than the scene of a crime?

While I have in this article emphasized interactivity and environmental engagement in VR, the ideas supporting my arguments nevertheless transcend technical specificity. With my analyses, I attempted to formulate an initial answer to the question of storytelling techniques in VR which move beyond editing and framing, and thereby to place practices of VR storytelling in continuation with particular aesthetic lines of thinking in film and media studies. The analogy between wide-screen aesthetics, a cinema of discovery and forensic storytelling not only helps to understand the specificities implied when framing is embodied, but also suggests ways of thinking through the aesthetic and political implications of VR. This way, recent documentaries on clandestine migration explicitly foreground the forensic framework of evidentiary material as well as an expressed inquiry into new documentary forms of representation, whether in VR or not. To name but a few: *Those Who Feel the Fire Burning* (Knibbe 2015) replaces commonplace TV helicopter shots of Mediterranean mar-

---

8. On forensics in Benjamin, see also Peter Hutchins' study on photography and legal frameworks, in which he relies implicitly on a kinaesthetic epistemology intending to "establish a connection between vision and touch" in physiology (1997: 230). Ultimately, forensics not only bridges VR storytelling with foundational texts in film and media studies, but also ties in with literature, which demonstrates its storytelling potential. The work of William Faulkner, in particular, has been theorized as "forensic fiction" by literary scholars (Ross 1994), and his style described incidentally by Bazin as "a new way of seeing things provided by the screen" (Bazin qtd. in Baldwin 2000: 35).

itime migration with ground-braking drone aesthetics to visualize the oneiric presence of drowned refugees on shore. *Meet Mortaza* (Derobe 2021) is a combined 360-degree video, VR walk-around installation and augmented reality exhibition retracing Mortaza Jami's trip from Kabul to Paris through fingerprints, objects, passport and other documentation. And Amel Alzakout's *Purple Sea* (2020) combines an internal monologue with footage of the director's own crossing on a dinghy, with an action camera tied to her wrist: before turning it into a film, the footage was intended to be evidence in court of humanitarian crimes at sea. Looking into existing theories on the politics and aesthetics beyond framing and editing, as well as texts on alternative constructions of spectatorship in film and media theory, this article suggests that with Virtual Reality we are not as much "post-cinema" as it seems — at least if one is willing to acknowledge that there has always been an off-screen, exilic and embodied nature to film studies. Considering the humanitarian crisis these stories represent, finally, the narrative framework of forensics testifies to the contemporary necessity of engaged and critical spectatorship.

References

Andrew, Dudley (2007). "A Film Aesthetics to Discover." *Cinémas: Journal of Film Studies* 12(2/3): 47-71. https://doi.org/10.7202/016750ar.

Arnheim, Rudolf (1957, original 1933). "Complete film." In *Film as Art*, 154-160. Berkeley: University of California Press.

Badiou, Alain (2009). "Cinema as a Democratic Emblem." *Parrhesia* (6): 1-6.

Baldwin, Doug (2000). "Putting Images into Words: Elements of the 'Cinematic' in William Faulkner's Prose." *Faulkner Journal* 16(1/2): 35-64.

Bazin, André (2014). "Will a War in 3D Take Place?" In *André Bazin's New Media*, edited by Dudley Andrew, 243-7. Berkeley: University of California Press.

Bazin, André (2018). "Langage de notre temps." In *Écrits complets*, edited by Hervé Joubert-Laurencin, 1078-1081. Paris: Éditions Macula.

Bazin, André (2018). "Les idées larges" In *Écrits complets*, edited by Hervé Joubert-Laurencin, 2540-2541. Paris: Éditions Macula.

Benjamin, Walter (2009). "Brief History of Photography." In *One-Way Street and Other Writings*, 273-303. New York: Penguin Group.

Benjamin, Walter (1968). "The Work of Art in an Age of Mechanical Reproduction." In *Illuminations*, edited by Hannah Arendt, 217-252. New York: Schocken Books.

Bennett, Matthew, David Bustos, Daniel Odess, Tommy Urban, Jens Lallensack, Marcin Budka, Vincent Santucci, Patrick Martinez, Ashleigh Wiseman and Sally Reynolds (2020). "Walking In Mud: Remarkable Pleistocene Human Trackways from White Sands National Park (New Mexico)." *Quaternary Science Reviews* 249: 1-21. https://doi.org/10.1016/j.quascirev.2020.106610.

Brillhart, Jessica (2015-2016). "The Language of VR." *Medium.com*. https://medium.com/the-language-of-vr (last accessed 29.01.2021).

Carroll, Noël (1982). "Address to the Heathen." *October* 23: 89-163. https://doi.org/10.2307/778587.

Comolli, Jean-Louis (2015). "Opening a Window?". In *Cinema Against Spectacle: Technique and Ideology Revisited*, edited by Daniel Fairfax, 57-86. Amsterdam: Amsterdam University Press.

Dall'Asta, Monica (2011). "Beyond the Image in Benjamin and Bazin." In *Opening Bazin: Postwar Film Theory and Its Aftermath*, edited by Dudley Andrew and Hervé Joubert-Laurencin, 57-66. New York: Oxford University Press.

Daney, Serge (1997). "Montage obligé." In *Devant la recrudescence des vols de sacs à main: cinéma, télévision, information*, 159-166. Paris: Aléas.

Deleuze, Gilles and Felix Guattari (2014). *A Thousand Plateaus: Capitalism and Schiophrenia*. New York: Continuum.

Fay, Jennifer (2018). "Democratic Film and the Aesthetics of Choice." *German Life and Letters* 71(2): 169-192. https://doi.org/10.1111/glal.12190.

Flusser, Vilém (2000). *Towards a Philosophy of Photography*. London: Reaktion Books.

Freire, Paolo (2017), *Pedagogy of the Oppressed*. New York: Penguin Group.

Freire, Paolo (2016). *Pedagogy of the Heart*. London: Bloomsbury Academic.

Ginsburg, Carlo (1989). *Clues, Myths, and the Historical Method*. Baltimore: Johns Hopkins University Press.

Heath, Stephen (1976). "On Screen, in Frame: Film and Ideology." *Quarterly Review of Film Studies* 1(3): 251–265. https://doi.org/10.1080/10509207609360952.

hooks, bell (2019). *Belonging: A Culture of Place.* New York: Taylor & Francis.

Hutchings, Peter J. (1997). "Modern Forensics: Photography and Other Suspects." *Cardozo Studies in Law and Literature* 9(2): 229-243.

Magee, Arran and Tejendra Pherali (2017), "Freirean Critical Consciousness In a Refugee Context: A Case Study of Syrian Refugees In Jordan." *Compare: A Journal of Comparative and International Education* 49(1):1-17. https://doi.org/10.1080/03057925.2017.1403312.

Mullarkey, John (2012). "The Tragedy of the Object: Democracy of Vision and the Terrorism of Things in Bazin's Cinematic Realism." *Angelaki: Journal of the Theoretical Humanities* 17(4): 39-59. https://doi.org/10.1080/0969725X.2012.747329.

Naficy, Hamid (2001). *An Accented Cinema: Exilic and Diasporic Filmmaking*. Princeton: Princeton University Press.

Polan, Dana (1985). "The Critique of Cinematic Reason: Stephen Heath and the Theoretical Study of Film." *Boundary 2* 13(2/3): 157-171.

Ross, Stephen M. (1994). "Forensic Fictions: The Lawyer Figure in Faulkner." *Modern Fiction Studies* 40(4): 844-847. https://doi.org/10.1353/mfs.1994.0042.

Sandalio, Rocío Naranjo (2018). "Life After Trauma: The Mental-Health Needs of Asylum Seekers in Europe." *The Online Journal of the Migration Policy Institute*, https://www.migrationpolicy.org/article/life-after-trauma-mental-health-needs-asylum-seekers-europe (last accessed 29.01.2021).

Sobchack, Vivian (2004). *Carnal Thoughts: Embodiment and Moving Image Culture*. Berkeley: University of California Press.

Solsman, Joan E. (2019). "How Tribeca's VR Award Winner The Key Made Magic Our of Metaphor." *CNet*, https://www.cnet.com/news/tribeca-film-fest-vr-award-winner-the-key-made-magic-out-of-metaphor/ (last accessed 29.01.2021).

Sontag, Susan (1973). *On Photography*. New York: Rosetta Books.

Uriccio, William (2018). "William Uricchio on Virtual Reality and the Myth of Total Cinema." *Eye Filmmuseum*, https://youtu.be/Wg-mfDL0Sm8 (last accessed 29.01.2020).

Blandine Joret – University of Amsterdam (Netherlands)

✉ b.joret@uva.nl

Blandine Joret is a lecturer in Film, Media and Culture in the Media Studies department at the University of Amsterdam. Her current research looks at the intersection of film and popular education with an emphasis on post-literate, audiovisual means of communication. Blandine's first monograph, *Studying Film with André Bazin*, is published in 2019 with Amsterdam University Press.

The Problems and Potentials of VR for Documentary Storytelling

Dirk Eitzen*

Franklin & Marshall College (United States)

Abstract

A primary goal of many VR documentaries is to foster empathy with others. Unfortunately, some of the very qualities that make viewers' experiences in the new medium unique and compelling, including the freedom to look around, also compromise its effectiveness as a means of genuinely understanding the experiences of others. This essay explores the question of whether the VR medium may have other compensatory advantages for documentary storytelling. It does this by considering social and psychological differences between third-person storytelling, which includes popular movies, first-person storytelling, as in many video games, and second-person storytelling, which is a common feature of documentaries. A key conclusion is that, even though VR is never likely to be a particularly effective instrument for creating empathy with others, through special forms of second-person storytelling, it does have some unique and effective means of engendering caring for others.

Keywords: VR and Nonfiction; VR and Narrative; VR and Empathy; Presence and Immersion in VR; Perspective or Point of View in VR.

---

* ✉ deitzen@fandm.edu

1   The Problem with VR

The special power of VR as a medium, as anybody who has experienced it will attest, is its capacity to give the viewer or user the sense of being right in the middle of a place: a refugee camp, the cockpit of a spacecraft, floating through the Grand Canyon, or whatever. This "feeling of being there" is frequently referred to as *immersion*. VR's sense of immersion derives mainly from the viewers' ability to look around freely the presented space. (By the way, unless I specify otherwise, I use the term VR in this essay to refer to both 360 VR, so called because it records places and events using a 360-degree panoramic camera, and interactive VR, with its computer-generated environments, most often used for gaming.)

When VR began to gain traction as a commercially and technically viable medium of entertainment (Google Cardboard was introduced in 2014; the HTC Vive, Oculus Rift, and PlayStation VR platforms in 2016), theorists and practitioners of the new medium had grand expectations that this power of immersion would enable a new form of storytelling, in which viewers did not merely observe characters and events, as in traditional cinema, but also had a sense of being directly involved with them. Documentarians were particularly excited by this prospect. For example, Chris Milk, the producer of the pioneering VR documentary *Clouds over Sidra* (2015), famously referred to 360 VR as an "empathy machine." He reasoned that when you are physically *with* somebody, in their presence, you feel a kind of connection to them, which translates into caring and compassion, and that this effect carries over into the virtual presence you feel with VR.

There are some pretty glaring holes in this logic, as empathy researcher Paul Bloom (2017) and others have observed. If you are standing next to a man who is laying bricks, your physical proximity to the bricklayer may help you grasp more viscerally the business of laying bricks, but it is no guarantee that you are going to feel connected to the man, much less care about him. Standing next to him virtually, in VR, isn't going to change that. And what if, instead of laying bricks, the person you are virtually next to in VR is waving a Nazi banner or having a colonoscopy? There would no doubt be some emotional impact in the "feeling of being there" in such situations, but it would be quite different from empathy.

Anyway, in spite of the hoopla surrounding VR in its early years, when it comes to documentary storytelling and storytelling generally, the new medium appears to be turning out to be something of a flop. When you look at the current offerings of With.in, which bills itself as "the premier destination for cinematic virtual reality," you find short-form experiences akin to the "attractions" of early cinema—views of exotic places, reports of news events, short animations, sensations like frightening experiences, and so on—but there is nothing that resembles the kind of sustained storytelling that contemporary moviegoers enjoy, either fictional or nonfictional. With.in's own studio has turned its attention from VR storytelling to producing VR workout videos.

To VR skeptics, including myself, it comes as no surprise that the new medium has not taken off as a vehicle for storytelling. One obvious reason is the headset. It is inconvenient and uncomfortable. The lag between head movement and the corresponding scan of the virtual environment in the viewer, although barely perceptible, gives some people nausea or headaches. And wearing the headset gives people the feeling of being cut off from the real world, including other people, which is particularly ironic with respect to documentary, which is supposed to do just the opposite.

On the other hand, VR is taking off as a platform for gaming. VR gamers are evidently not troubled by the discomfort or sense of isolation caused by the headset or, if they are, they deem it a price worth paying for the immersive experience. This shows that the headset isn't the main reason for the lack of success of long-form VR stories. Something else is to blame. I maintain that that something is, simply, the fact that the VR medium is not conducive to telling stories. Certain intrinsic qualities of the medium actually get in the way.

Think about what stories are and how they work. Stories don't show you characters doing random things; they show you characters doing things *for particular reasons*. It isn't the actions that are central; it is those reasons. Stories work by inviting and allowing you to "get into characters' heads," so to speak: to imagine their intentions, desires, emotions, beliefs, knowledge, and so on. Psychologists commonly refer to this sort of perspective taking as "theory of mind." That is how we navigate the social world. Most of the time, we do it automatically, without thinking about it. We can also do it deliberately, when we want to explain or judge

somebody's behavior, for instance. And we can do it just for fun, as when we read novels and watch fiction films. Trying to make sense of the *why* of people's actions and behavior is engrossing and satisfying. That is the beating heart of all stories and storytelling.

Novels and spoken stories help us make sense of why characters do what they do by describing their thoughts and feelings expressly, with words. Pictorial media, like paintings and movies, depend largely upon inference, instead, since it is impossible to directly depict what is going on in somebody's head. But cinema has tools that can guide such inferences extremely effectively. With its frame, it can foreground important clues, like close-ups of characters' facial expressions. The frame also allows for control of viewers' vantage point. Plus, along with editing, the frame permits cinematic storytellers to minimize or simply sideline anything that is not directly relevant to making sense of characters' actions. That is why cinema is such an effective storytelling medium.

VR has no frame. Its effect is to put you in the middle of a space or event. The only way VR can create the equivalent of cinema's facial close-up is by having a character or subject approach very close to the camera. In VR, this feels looming and weird. The only way VR can keep viewers from looking around to see what may be off to the side or behind them is by blurring it or blacking it out. This defeats the whole purpose of VR, which is to give viewers the freedom to look around. VR sometimes uses movement, light, and sound cues to call viewers' attention to particular elements of a scene, but those tend to be weak clues as to what is going on in characters' heads. Precisely because VR lacks a frame, it is an ineffective storytelling instrument when compared to conventional cinema. But there is an even bigger problem.

The very fact that you can look around in 360 VR is an *invitation* to look around. The very fact that you can interact with elements of the environment in VR games is an *invitation* to interact. In the first case, your attention is directed toward the environment; in the second, it is directed toward the gameplay. In both cases, the focus turns to your *own* experience, as opposed to the experience of other people in the space. This can be interesting, worthwhile, and fun, but instead of helping you understand what characters or subjects in the scene are thinking and feeling, which is what is most important from a storytelling perspective, it tends to interfere with or distract from it.

I'm discussing the experiential dimension of VR here. Because this is impossible to fully convey in writing, I refer you to a video essay I authored, with concrete examples and illustrations, entitled "Why VR Does Not Promote Empathy." It can be watched online at *[in]Transition: The Journal of Videographic Film & Moving Image Studies*, 7.2, 2020.

Incidentally, whether these experiential differences have any measurable impact with respect to viewer prejudice and pro-social behavior is debatable. A very interesting empirical study by Harry Farmer designed to test just this, using *Clouds over Sidra*, found no significant difference between VR, a flat-screen version of the movie, and a written transcription. This study is reported in *Immerse* under the title "A Broken Empathy Machine?" (2019). On the other hand, a study led by Fernanda Herrera at Jeremy Bailenson's VR lab at Stanford, comparing a VR and first-person written account of the experience of becoming homeless, found that the VR experience had a significantly stronger and longer-lasting effect in prompting participants to sign a petition in support of affordable housing (2018). The debate about whether documentaries of any kind "really make a difference" is an old and ongoing one. They clearly make a difference *to viewers*. I would argue that that is sufficient. In any case, that is what I am discussing here.

Early theorists of VR, including documentary scholar William Uricchio, anticipated my reservations about the medium and respond the them. Look, he wrote in 2016, "VR is not film":

> Just as film's pioneers spent their first decade emulating theater, many of today's VR makers are doing their best to emulate the logic of film. And just as early filmmakers finally shattered the proscenium arch and evolved new vocabularies, we can expect VR's makers to find robust, exploration-based alternatives to the still-dominant film paradigm of carefully composed frames, editing strategies and fades to black.

VR's only problem, in other words, is that it has not yet discovered or invented the right means for effective storytelling.

In a response to my video essay, new-media scholar Miriam Ross raises another objection. In conceiving storytelling as I do, in cinematic terms, she says, I am conceiving stories and storytelling too narrowly. There is not just one kind of story, she suggests; there are many. VR pioneers are not just figuring out how to tell conventional stories with new and different means, they are exploring new forms of story. In so doing, she implies, they may be helping to expand our very idea of what stories and storytelling mean.

A student of mine, an avid video-gamer, made the same point to me more concretely and forcefully. She told me, imagine someone arguing, in the early days of video games, that video games will never succeed as a vehicle for storytelling because they do not tell stories in the same way that movies do. That argument has been proved dead wrong. The video game industry now makes more money than the movie and sports industries combined. And video games do in fact tell stories. Video-game stories are different from the kind of stories that movies tell but they are stories just the same. In video-game stories, instead of imagining other peoples' stories, as in movies, you *experience* stories yourself. You are, in effect, the protagonist. At the same time, you take on the role of an imaginary character, who may be nothing like the actual you, and you encounter situations and events that are nothing like those you experience in real life. In this way, my student argued, video games may be even better at mobilizing and developing perspective-taking skills than cinema is. If today's VR documentaries fall short as stories, the reason is not that they haven't discovered the right techniques; it is that they haven't discovered the right kind of story.

In the early days of academic video-game theory, a debate raged between "narratologists," who argued that video games did indeed tell stories, albeit of a new form, and "ludologists," who argued that what is most interesting and distinctive about video games had nothing to do with stories and storytelling. An essay by Harmut Koenitz in the *Encyclopedia of Computer Graphics and Games* (2018) gives a very nice overview of this debate. It gradually settled down as it became clear that the difference between the two camps had less to do with video games *per se* than it did with their definitions of narrative. If children playing with toys, football games on TV, and scientific papers can all be usefully thought of as forms of stories and storytelling, then surely video games can, too. (The narratologists' view.) If, on the other hand, one thinks about these other forms of discourse in terms of stories and storytelling, that tends to flattens out the very significant differences between them. (The ludologists' view.) Both views have merit. It is worthwhile to think about both the similarities and the differences between video games and conventionally structured narratives. In the same way, it is worthwhile to think about both the similarities and the differences between VR narratives and cinematic narratives. But to do this fruitfully, we need to start by agreeing on a definition of narrative.

2   What Is a Story, Anyway?

The broadest, most inclusive definition of story probably goes something like this: Story is the means by which we understand and explain human behavior. It is also the means by which we navigate and imaginatively engage in the social world. As such, it is an intrinsic part of all social life. For example, when you watch even the most abstract experimental film, you can hardly help but "narrativize" it. When you wonder "What does this *mean*?" or when you ask yourself, "What does the filmmaker *intend* by this?" you are thinking about the movie in terms of story.

Telling stories intentionally invites this kind of response. It is the use of some form of discourse, such as speech or cinema, *for the purpose of* prompting people to imagine the mental and social lives of other people. An abstract experimental film might be designed solely to prompt an aesthetic experience. In that case, it is not storytelling; it is "art" or something else. But if part of its intended purpose is to prompt viewers to reflect on the lives and experiences of themselves or other people, as appears to be the case in the semi-documentary works of Stan Brakhage, for example, then it can be regarded as a form of storytelling, even if the stories it elicits are relatively undirected and open to viewers' subjective interpretations.

By this expansive definition, most VR movies are definitely a form of storytelling.

In view of this fact, I need to tweak the way I describe the shortcomings of VR. Its problem is not that it is an intrinsically weak storytelling instrument; its problem is that, rather than focusing our attention on the mental

and social lives of *other* people, in the way that movies typically do, it almost inevitably draws our attention toward our *own* experience, much like video games.

My video-gaming student critic might ask, So what's wrong with that? Part of what's great about video games is that they allow you to have your own adventures, to make your own choices, to experience things for yourself. If VR does that, too, isn't that a totally good thing?

Sometimes, but sometimes not. It depends upon the purpose of the VR movie. If the purpose is make-believe play—to imagine piloting a spaceship or fighting off zombie attackers—then by all means have your own experience and enjoy it. The same is true if the purpose of a VR movie is to be evocative or prompt an aesthetic experience, like the films of Stan Brakhage. In that case, the effect of being able to look around could be marvelous. So, too, if the purpose is to simulate the experience of swimming with sharks off the Great Barrier Reef (although I would call this simulation, not storytelling).

But what is the purpose of virtually visiting a Syrian refugee camp? Is it to explore? To have an adventure? To have a stimulating aesthetic experience? Or is it to genuinely understand the mental and social lives of the people who are forced to live there? If that is the goal, then paying attention to your *own* experience will definitely get in the way.

I believe that one of the most fundamental and worthwhile purposes of storytelling is to help us imagine other persons' experience. Advocates of VR "empathy" seem to believe this, too. Their mistake is to suppose that just being in the same place as another person, actually or virtually, automatically confers a deeper understanding of that person's mental and social life. It *may* confer deeper understanding, but only if our focus remains firmly on the mental and social life of that other person. VR's perpetual invitation to look around is a constant distraction from this. That's my beef with VR as a storytelling instrument.

Nevertheless, there is real emotional power in being able to look around in VR, to be free of the dictates of cinema's frame, to "see for yourself" as it were. So, it may be, as my video-gaming student critic argues, that there are ways of prompting or inviting us to imagine the mental and social lives of other people that are different from cinema and better suited to VR. What might those look like?

Mainstream movies are designed to so engross us in the lives and experiences of characters that we forget ourselves. Media scholars sometimes refer to this phenomenon as "transportation," following literary theorist Richard Gerrig (1993) and media psychologists Melanie Green and Timothy Brock (2002). Movies accomplish it by foregrounding characters' problems, desires, and emotions. Extraneous or background elements, like visual effects and music, largely serve to shape or reinforce our understanding of what characters are thinking and feeling. All of our attention and imagination is focused on the events we see unfolding on the screen and, in particular, on the impact those events have on the characters. Even though we may wind up "identifying" with those characters, we are just observers. Even though we may project our own feelings on the characters and compare our own experiences to theirs, the story we are experiencing is always *their* story, not ours. For that reason, we can think of this as third-person storytelling.

This is an admittedly over-simple description of the way movies work—especially documentaries, as I will explain later—but it gets to the heart of what makes "escapist" Hollywood movies so popular.

Video games can induce a state of absorption similar to narrative transportation. Game theorists refer to this as "flow"—a term borrowed from psychologist Mihaly Csikszentmihalyi (2008). But what puts you in this state is not a focus on the problems, desires, and emotions of characters, as with movies; it is on dealing with the challenges of the game. Even though, in most video games, the experience involves taking on the role and even the body of a virtual character, and even though your character's task is typically depicted in social terms, like making money or vanquishing enemies, what puts you in that state of flow is not imagining what characters in the game may be thinking and feeling; it is mastering the skills you need to advance to the next level. Even in the case of a video game like *The Last of Us*, which is famous for making players cry on account of its bittersweet narrative ending, the feeling of sadness is mostly relevant as part of the player's experience. The player's experience is the primary focus. For that reason, we can think of this as first-person storytelling.

This description of video-game play is, again, over-simple. In fact, the emotionally moving scenes in *The Last of Us* and similar games are cinematic "cutscenes" in which the player is a mere observer and has no control.

Third-person scenes, in other words. First-person applies mainly to the gameplay sequences. In *The Last of Us*, these gameplay sequences revolve around the relatively simple and repetitive actions of avoiding or dispatching zombie-like creatures and human enemies. These actions are the heart of the gameplay experience and are what put gamers into that state of flow. They are obviously a very long way from imagining the thoughts and feelings of other people.

Although I'm using the terms first- and third-person in a somewhat idiosyncratic way here—to refer to two different kinds of experience, instead of two different kinds of narration, as film and literary scholars typically do—there is nothing particular new or controversial about the difference I am describing between the experience of movies and the experience of video games. But there is a fascinating social dimension to this difference that is not often discussed. When you watch a movie, because what matters is somebody else's experience, you are generally supposed to silence your cell phone, shut your mouth, and pay attention. If you feel a social or emotional connection to somebody during a movie, it is most likely to a person on the screen. Video games are very different in this regard, as is especially apparent from online games like *Fortnite*. Because the focus of video-game play is your own experience, you are more than welcome to share it. Through such sharing, "my" experience often becomes "our" experience—still first-person, but first-person plural. This can create the feeling of a social and emotional connection to other players, especially those on your team. The downside is that other characters, including folks on the other team, can be effectively reduced to incidental props or opponents to be beaten. So, the difference between what I'm referring to as first- and third-person storytelling clearly has important ramifications if your goal is to use stories to foster caring or compassion for others.

I argued earlier that, like video games, VR stories constantly prompt you to attend to your own experience. But that's not the whole picture. Video games in VR are, for all intents and purposes, just regular video games, with the addition of stereoscopic vision and the use of the headset rather than a thumb controller to look around. In other words, they are first-person stories in exactly the same way traditional video games are, if a bit more lifelike or vivid. But with VR documentaries, like *Clouds over Sidra*, something more complicated is going on. The stories they tell are not just experienced in third person, in the way of entertainment films, and not just in first person, as with video gameplay. They have a second-person quality.

In second-person discourse, you have a sense of being in a direct relationship with someone. When somebody writes you a letter, asks you to pass the salt, or "likes" one of your Facebook posts, that is second-person discourse. In a 1975 essay, film semiotician Christian Metz distinguished "two kinds of voyeurism": story and discourse. In story, he said, you are not aware of the presence of an author or interlocutor; in discourse, you are. Metz proposed a psychoanalytic explanation for the invisibility of the author in mainstream movies. A much simpler cognitive-psychological explanation is that we just tend not to notice what we are not paying attention to. (You can see some experiments that dramatically and sometimes humorously demonstrate this psychological phenomenon by searching for "inattentional blindness" on YouTube.) But Metz's distinction remains useful. The difference between what he calls story and discourse is the essential difference between what I'm referring to as third-person and second-person storytelling.

In VR documentaries, because of VR's power of immersion, you have a sense of being in the same space as subjects, even though you cannot interact with them. This effect is particularly pronounced when they look or speak directly to you (to the camera, actually), something that rarely happens in fiction films, precisely because it disrupts the "transparence" of third-person storytelling. Our attention, in these moments, is subtly drawn to our relationship with the subject. It is important to note that this is not the same thing as focusing on or prompting us to imagine what that person is thinking or feeling, the way third-person storytelling does. Still, the visceral sense of the subject's "presence" might facilitate our thinking about and even caring about what the person who is virtually next to us is thinking and feeling—in a different way from a cinematic close-up, obviously, but perhaps to similar effect.

Some of the most compelling experiments in VR fictional storytelling make deliberate use of this second-person effect. An excellent example is *Wolves in the Walls*, which won an Emmy in 2019 for outstanding innovation. The story, based on a children's book by Neil Gaiman, is about a little girl who hears scratching in the walls and, because nobody believes her, sets out to prove that something is really there. What is most fascinating and engaging about the way the story is told is not "the feeling of being there" in VR; it is way the

little girl constantly interacts with you. She looks directly at you when she talks and her eyes follow you when you move about. If you try to duck or dodge out of her line of sight, she asks, "What are you doing?" She hands you things, like a virtual camera, and invites you to do things with her, like draw on the wall. When you observe something in the story in third-person mode, like the girl's mom canning in the kitchen, the girl is by your side, looking with you and talking to you. This is not a video game, where the focus is on your own choices. The focus, most of the time, is on the girl and her story. But you are not just an observer, either. Instead, you are part of the story, as the girl's friend and confidante. *Wolves in the Walls* is an outstanding example of effective second-person storytelling.

From this example, you might suppose that effective second-person storytelling with movies requires interaction, in much the same way that effective third-person storytelling with movies requires a frame. But, as it happens, there is a popular form of conventional cinema that routinely and systematically uses forms of second-person storytelling. Documentary!

Conventional cinematic documentaries are full of explicit second-person discourse, like interviews and voice-over narration. There is also an implicit sense in which documentaries *are* second-person discourses, in their entirety. Like allegorical fables and newspaper editorials and "thesis" novels, we know they are supposed to have a message or point. They are trying to "tell us something."

This suggests that there may be a natural affinity between VR as a medium and documentary storytelling, having to do with second-person address. It also suggests that, in spite of the shortcomings of VR as a means of understanding what is going on in characters' or subjects' heads, VR may have compensatory advantages for documentary storytelling, having to do with the sense it can give of being in a relationship with other people by virtually putting you in the same space as them.

3   Second-Person Storytelling in VR Documentary

In his popular textbook *Introduction to Documentary*, Bill Nichols describes the many different ways in which documentaries "speak" to us. For example, a documentary may imply, "I speak about *them* (other people) to *you*." Or it may suggest, "I speak about *us* to *you*." But "you" is always part of the equation. As Nichols writes,

> Without this sense of active address, we may be present at but not attend *to* the film. [Documentary] filmmakers must find a way to activate our sense of ourselves both as the one to whom the filmmaker speaks (about someone or something else) and as members of a group or collectivity, an audience for whom this topic bears importance (44).

Nichols is describing documentaries' implicit second-person address.

Usually, the implicit purpose *of* a documentary and the explicit second-person address *in* the documentary are closely aligned. For example, with *March of the Penguins* (2005), Morgan Freeman's sonorous narration, the film's awesome aerial shots, and its personification of penguins all fit perfectly with the movie's primary aim as a documentary, which is to foster appreciation of nature. Even though the techniques work to draw us into the story, they are also constant subtle reminders of the overarching purpose of the story. This is not just a regular entertainment film, they say; it is *important*, since it is about the life-and-death struggle of actual penguins. In the documentaries of Michael Moore, the alignment is even more direct. Since Moore is the main character in his films as well as the filmmaker, he more or less tells us, outright, what we are supposed to think (whether or not we happen to agree with him).

In VR documentaries like *Clouds over Sidra*, in contrast, there is a subtle misalignment between the way the movie "speaks" to us and its purpose. The maker of the movie, Chris Milk, has told us what the purpose of the movie is: it is supposed to create "empathy" with its subject, a 12-year-old Syrian girl in a refugee camp in Jordan. The movie does succeed in giving us a vivid and visceral sense of her physical situation: rows of tents in a filthy grassless environment, the living room of the girl's family's tiny apartment, her schoolyard, surrounded by a barbed-wire fence, and so on. But, as I've said, it tends to distract us from the girl herself. The effect is to prompt us to think (or feel), "How would *I* like to live in a place like that?" or, sometimes, "I wonder what I will see if I turn around."

Is there any harm in this? Or, to put the question positively, might there be some benefit of this effect, with respect to capturing viewers' attention, prompting sympathetic emotional responses, and even fostering genuine understanding of and compassion for other people? That is the important question, not whether we are focusing on the girl or her surroundings.

The second-person address of documentaries can elicit gratifying social emotions. That is a fundamental part of the appeal of documentaries and of nonfiction generally, and part of what we get from them in exchange for the fact that, as stories go, they are usually comparatively dull.

One of the social-emotional gratifications of documentaries is the appeal of acquiring knowledge or edification. This is basically an appeal to our egos. In watching a documentary, we may imagine ourselves to be especially smart and sophisticated, morally superior, privy to special knowledge or inside information, or part of a community that shares particularly worthwhile values, beliefs, or concerns. A second social-emotional appeal is the sense of an implicit alliance with the filmmaker, involving reciprocity: the filmmaker owes you honesty and you owe the filmmaker trust. With respect to these two gratifications, VR documentaries like *Clouds over Sidra* are no different from conventional documentaries. But consider a third social-emotional appeal.

Documentaries appeal to us as social actors: inhabitants of a shared social world, with responsibilities and concerns that go along with that. "Appeal" here implies both an attraction (something engaging and gratifying) and an entreaty (a request for attention and possibly action). In documentaries these two kinds of appeal are related. The second-person addresses of documentaries give us a sense of being recognized and acknowledged. I believe this is what Bill Nichols means when he says that documentaries "speak" to us and "activate our sense of ourselves." This kind of appeal is not specific to documentaries. It is implicit in any second-person discourse, whether that is "please pass the salt," Morgan Freeman telling you about penguins, or the little girl in *Wolves in the Walls* following you with her eyes.

In the case of Morgan Freeman telling you about penguins, the appeal is indirect and not particularly strong. It requires some investment on your part. To help create this investment, *March of the Penguins* leans on dramatic stories and cuddly penguins. The "story" in the VR documentary *Clouds over Sidra* is not nearly so intrinsically engaging—it consists largely of the refugee girl telling you about how she spends her days. On the other hand, there is something undeniably compelling about the girl sitting across from you in VR and speaking to you directly. "The feeling of being there," in the same space as the girl, gives her address to you a kind of immediacy and force. The perpetual temptation in VR to gawk around, to see what is behind you or off to the side, is modified by a subtle emotional pressure to pay attention to the girl, prompted by the sense of her "presence" (a word very commonly used in discussions of VR). Notably, this emotional pressure is absent when the girl is not on screen.

Consider the social ramifications of this kind of address, compared to those of movies and video games. The "transparent" third-person address of mainstream fiction films creates an imaginary connection to characters in the movies. You "put yourself in their shoes," so to speak. That is the power and the appeal of that kind of storytelling. The first-person address of video-game storytelling invites you to focus on your own experience. That is its power and appeal. But you can also share your experience with others, which creates the feeling of a social bond or connection. Second-person discourse has a similar effect, of creating the feeling of being in a relationship with someone. In fact, the chatter that takes place during online multiplayer video games *is* second-person discourse.

What's special about the second-person addresses in VR stories is the sense of being *with* somebody else, as a companion or associate or friend. This creates a subtle feeling of obligation toward the person speaking to you. You *could* look away, because this is VR, but perhaps you *shouldn't*. This sense is by no means the same thing as empathy. Still, it may be a stepping stone to *caring*. So, if VR has some special strength for documentary storytelling, I think it is its capacity to virtually put you in the presence of other people, who can speak to you directly. VR is not nearly as good as conventional cinema for creating understanding of others, because if its lack of a frame, but perhaps in some cases it can compensate for or even overcome that weakness by facilitating a sense of social connection with and obligation toward its on-screen subjects.

Other VR researchers and practitioners have come to a similar conclusion, from other angles. A notable example is a 2018 article on the ethics of VR documentary, by documentary scholar Kate Nash, in which she discusses "proper" and "improper" distance. She writes, "VR runs the risk of producing improper distance and an ironic mode of moral engagement when it invites forms of self-focus and self-projection rather than a more distanced position that allows for recognition of distance between the self and other." She's describing here what I call first-person storytelling. It's fine for video games, as I've said, but where understanding others is the goal, Nash argues, it is morally problematic.

Nash's examples of "proper" distance in VR all involve what I refer to as second-person storytelling. In her words, these works "do not simulate the other's experience or aim to put the user in their shoes directly. Rather, they simulate an encounter, a meeting with the other" (126). One of her examples is a scene from *My Mother's Wing* (2016), a VR documentary about a Palestinian woman trying to cope with the loss of her two children who were killed in a shelling attack. We are positioned as though in conversation with the mother, sitting on the floor, as she addresses her two lost children. The VR makes this feel like a face-to-face encounter. That in turn creates a sense of immediacy and moral responsibility. But even in moving moments like this one, the VR medium is also pulling us in another direction, Nash observes:

> In these moments of simulated face-to-face encounter, the user is also being invited to explore a new space.... The effect is to encourage a profound turning away from the speaking subject. The user's attention is divided but more than that, the physical turning away that visual exploration demands is profoundly at odds with the moral demand of the face-to-face encounter. There is a risk of improper distance insofar as the user prioritizes their own experience of transportation and exploration (spatial presence) over engagement with the testimony of the other. Similarly, insofar as the user focuses on their experience of transportation as indicative of 'what it is like' to be in the space of suffering it is possible to speak of improper distance (128).

Nash's argument is conceptual. She does not discuss the practical implications of what she calls improper distance. But there is empirical research on the same phenomenon in real-world simulations, like wheelchair-for-a-day experiences, that sheds light on its social and psychological consequences. Michelle Nario-Redmond and her co-researchers review this research in a 2017 article, "Crip for a Day." Although disability simulations are intended to promote empathy in much the same way that VR documentaries are supposed to, the research shows that their actual effects are more complicated. On the positive side, they engage people, stimulate discussion, and generate warm feelings and altruistic impulses toward disabled people. But they have dangerous unintended consequences, as well. They tend to result in pity and guilt, self-orientation and smugness, frustration and fatigue, and a corresponding tendency to avoid people with disabilities. On the whole, some researchers conclude, disability simulations "serve to constitute and reproduce, rather than disrupt, disability oppression." In a similar way, when you drop in on a refugee camp for a few minutes via VR, there is the danger that you are involved in a kind of virtual voyeurism that results more in feelings of self-righteousness and pity than in genuine understanding and compassion.

4   Practical Take-Aways

There is social and emotional value in visiting a refugee camp. There is value in being present at a culturally significant event, like a political rally. There is value in having an unusual experience, like swimming with sharks. There is no doubt also genuine social and emotional value in experiencing such things as these virtually, through VR. So, VR is without question a valuable medium for nonfictional representations and discourses. *But* if your priority is to foster genuine understanding of other people's lives, hopes, fears, pains, happiness, and so on, then you are better off using conventional cinema, since that is better than VR at keeping your audience's attention focused on other people and more effective than VR at conveying other people's thoughts and feelings. In other words, for third-person storytelling, conventional cinema simply works better than VR does.

Here, I need to insert a tangential clarification. Throughout this essay, I have been discussing third, first, and second-person experiences as though they are separate and discrete. In fact, they are regularly intermingled, in fiction films, video games, documentaries, and VR experiences. So, it might be best to think of them as the

center of narrative gravity of moments or scenes. "Center of narrative gravity" is actually a term philosopher Daniel Dennett (1992) coined to describe his conception of the self in consciousness. I use the same term here because I find it quite helpful to think about the three modes of narrative experience as three different modes of self-consciousness. Our creative imagination can focus on three different things when we think about social situations: our own subjective experience (first person), our understanding of the experience of others (third person), or our relationship with someone else (second person). We can only focus on one of these at a time, because of the limits of attention. Nevertheless, when watching VR documentaries, we experience a kind of tension between these perspectives and switch back and forth between them, in the way I have described.

Anyway, what VR is really good at, much better than conventional cinema, is first-person storytelling: helping us imagine viscerally, through firsthand experience, what it feels like to live in a refugee camp, to attend a political rally, or to swim with sharks. VR simulations of such experience are interesting and worthwhile in their own right and can be extremely useful for reporting on some situation or event. Where empathy is concerned, however, this usefulness comes with a caveat. When we're focused on our own experience, it is hard to genuinely imagine somebody else's. We may *think* we are imagining somebody else's experience but, as with wheelchair-for-a-day experiences, our self-absorption tends to eclipse genuine understanding. Note, however: this weakness by no means precludes genuine *caring* for others.

All of the discussion about whether or not VR fosters empathy obscures the very important difference between empathy and caring. Think about the difference this way: you can truly and deeply care about the death of coral reefs without empathizing with coral reefs. In the same way, you can truly and deeply care about the plight of Syrian refugees without empathizing with any particular refugee. Third-person stories (e.g., stories about the plight of particular Syrian refugees) definitely facilitate understanding; understanding naturally contributes to caring; and VR is unfortunately not very good at third-person storytelling. Just the same, there are other means of fostering caring that VR is able to use quite well. Three, in particular: creating interest, conveying information about places, and cultivating a sense of social connection.

"The feeling of being there" in VR is intrinsically interesting, especially if the place you are virtually visiting is foreign or spectacular. This interest can be leveraged into interest about a topic, whether that is coral reefs or the plight of refugees. It does not require empathy; all it takes is attention. Getting somebody to put on a VR headset is surely a way of capturing their attention. Unfortunately, this kind of interest does not last very long. As soon as the novelty wears off, people want more, like a story or a game. Stories and games are what sustain viewers' interest. For telling stories, conventional cinema works much better than VR.

VR does have the unique ability to convey information about a place or environment. Words and two-dimensional images cannot convey what it looks like from the top of Mount Everest. VR can. In the same way, VR has a unique ability to convey what happens to a coral reef when it dies or what life in a refugee camp is like. Knowing what life in a refugee camp is like does not create empathy, any more than knowing what happens when a coral reef dies, but both can surely contribute to understanding, and that can lead to caring. So, if information about a place or situation is central to a documentary story, VR is an excellent means of conveying that. The traveling shots through erstwhile Nazi concentration camps in the documentaries *Night and Fog* (1956) and *Shoah* (1985) come to mind as examples of scenes to which VR could have powerfully contributed. But, again, if understanding the experience of other people is what is most important, you are better off with traditional cinema.

Finally, VR has a unique ability to create a sense of the "presence" of another person, which invites attention and respect for that person. As with interest generated by the novelty of "the feeling of being there," this effect is transitory, not enough to hold viewers' attention for very long. And, as with VR's information about place or environment, it does not result in empathy. But it does tend to generate a feeling of moral obligation, as Kate Nash observes, and that is an essential ingredient of caring.

There is a famous interview in *Shoah* in which Abraham Bomba, a man who had been forced to work as a barber in a concentration camp, breaks down while describing one of his barber friends coming across his own wife and daughter while cutting hair in the anteroom of a gas chamber. The scene is shot very simply: Bomba sits at a table, framed in a medium shot. As a thought experiment, I tried to imagine what this scene would feel like had it been shot in VR. On one hand, VR would likely have weakened the scene, even cheapened

it, by inviting me to look around at the space. On the other hand, if I'd had the feeling of sitting at the table across from Bomba, I would have found it very difficult to look away. This is the moral ambivalence of VR that Kate Nash describes.

There is also a third possibility, which is that with VR I'd have been able to look back and forth between Bomba and his interviewer, filmmaker Claude Lanzmann. That would have created a different kind of social and situational awareness. I suppose this would have diluted my attention to Bomba's story and made me less likely to cry. On the other hand, I suppose it would have allowed me to experience a deeper and more genuine empathy with Bomba who, in this moment, is being asked to revisit horrors of his past for the viewers' sake. I would have had a fuller, truer picture of the second-person discourses in which I was involved. There are VR documentary filmmakers who have called for more of this kind of transparency in VR. Instead of literally hiding, as the camera operators of *Clouds over Sidra* and other VR documentaries do, they encourage VR filmmakers to include themselves and their tripods in their scenes. This would have the advantage of taking the second social-emotional appeal of documentaries that I mentioned earlier—the implicit contract between filmmaker and viewer, involving honesty and trust—and putting it right in the movie, without expressly calling attention to it or foregrounding it in the way a conventional documentary would need to do, by cutting to shots of the filmmaker.

There is one other more interesting creative possibility, which is to abandon the goal of quasi-cinematic storytelling altogether and instead use the more game-like qualities of interactive VR to try to create a sense of social connection with documentary subjects. The *Book of Distance* (2020), by artist and filmmaker Randall Okita, is an interactive animated VR documentary that succeeds quite well in doing this. The subject of the piece is the artist, himself, as he tries to imagine the experiences of his Japanese grandfather, who immigrated to Canada just before World War II. These imaginings are presented in animated vignettes, which often include family photographs and other historical artifacts that can be interacted with. The effect is to engage viewers in the artist's personal quest to make sense of his family history.

The question is, might this have all been done more effectively by conventional cinematic means. The VR medium provides an interesting, compelling, first-person experience. But does it ultimately bring us any deeper understanding of or genuine caring for Okita and his grandfather? Or does it mainly make us feel satisfied for self-centered reasons, like a video game?

This question calls to mind a 2017 essay in *The Atlantic* by video-game theorist Ian Bogosian, entitled "Video Games are Better without Stories," in which he discusses the video game *What Remains of Edith Finch?* The mechanics of that game are similar to the mechanics of *The Book of Distance*. You (the player) are Edith Finch, the last survivor from a cursed family, exploring a vacant house you inherited from your deceased mother. As you explore, two things happen: first (as in *The Book of Distance*), you gradually uncover stories about your doomed ancestors, through diaries, recordings, and mementos; second (unlike *The Book of Distance*), you encounter weird new spaces in the house and experience weird altered states, like taking on the form of animals. Bogosian found the game satisfying. Still, he muses, "Why does this story need to be told as a video game? The whole way through, I found myself wondering why I couldn't experience Edith Finch as a traditional time-based narrative." Bogosian's answer, essentially, is that because then he would not have had all of those weird and wonderful aesthetic experiences. In other words, the game's "story" succeeds because it abandons the whole idea of third-person storytelling. It is not really about a person named Edith Finch. It really is about *you*, the player. And that's good, Bogosian seems to conclude, because *What Remains of Edith Finch?* is, after all, a game.

But what if Edith Finch's ancestors were real people, with real pasts and real stories. In that case, treating her past as something to "explore" and "experience" game-wise might be giving short-shrift to those people's actual lives and experiences. What saves me from such misgivings, with respect to *The Book of Distance*, is that the real subject of the documentary is the author himself. He speaks to us directly, in his own voice, throughout the experience. So, in our first-person explorations and experiences, we have a sense of partnering with him.

To return to my earlier question, could this have been done more effectively with conventional cinematic means? The answer is no. That might well have resulted in a more directed, more focused, possibly even a more moving story about Okina's grandfather, but it would have sacrificed much of the sense of partnering

with the artist in an exploration of his family history. So, *The Book of Distance* is one example of documentary storytelling that is more effective in VR than in conventional cinema. But notice that *The Book of Distance* does not ask us to "identify" with Okina's grandfather or to "empathize" with him or be "transported" into his life and experiences. Instead, we are invited to remember him and to reflect on events in his life by experiencing his grandson's artistic re-imaginings of them. That is second-person storytelling.

If the goal of a documentary is third-person storytelling, however—that is, to provide a kind of window into the life, thoughts, and feelings of somebody other than the filmmaker and the viewers (such as, for example, a Syrian girl living in a refugee camp), then you are better off with conventional cinema. To put it more bluntly, *Clouds over Sidra* is an interesting and briefly engaging VR experience, but it is not a particularly good documentary. Nevertheless, because it uses VR, it may prompt some people to put on a headset and pay attention, for a few minutes, to what it looks and feels like to be in the middle of a refugee camp. Even though it is a mistake to suppose that this creates compassion, by itself, it can help to lay a groundwork for compassion by drawing interest to and focusing attention on the situations of other people who are in need not just of compassion, but also of political advocacy and material support, like the countless refugees in the U.S., Europe, and around the world. And that is, without question, a good thing.

References

Bloom, Paul (2017). "It's Ridiculous to Use Virtual Reality to Empathize with Refugees." *The Atlantic*, Feb. 3. https://www.theatlantic.com/technology/archive/2017/02/virtual-reality-wont-make-you-more-empathetic/515511/.

Bogosian, Ian (2017). "Video Games are Better without Stories." *The Atlantic*, April 25. https://www.theatlantic.com/technology/archive/2017/04/video-games-stories/524148/.

Csikszentmihalyi, Mihaly (2008). *Flow: The Psychology of Optimal Experience*. New York: Harper Perennial Modern Classics.

Dennett, Daniel (1992). *Consciousness Explained*. New York: Back Bay Books.

Farmer, Harry (2019). "A Broken Empathy Machine?" *Immerse: Creative Discussion of Emerging Nonfiction Storytelling*, Sept. 30. https://immerse.news/a-broken-empathy-machine-can-virtual-reality-increase-pro-social-behaviour-and-reduce-prejudice-cbcefb30525b.

Gerrig, Richard J. (1993). Experiencing Narrative Worlds: On the Psychological Activities of Reading. New Haven, CT: Yale University Press.

Green, M. C. and T. C. Brock. "In the Mind's Eye: Transportation-Imagery Model of Narrative Persuasion." In *Narrative Impact: Social and Cognitive Foundations*, edited by Green, M.C., J. J. Strange and T. C. Brock, 315-41. Mahwah, NJ: Lawrence Erlbaum.

Herrera, F., J. N. Bailenson, E. Weisz, E. Ogle, and J. Zaki (2018). "Building Long-Term Empathy: A Large-Scale Comparison of Traditional and Virtual Reality Perspective-Taking. *PLoS ONE* 13(10): e0204494. https://doi.org/10.1371/journal.pone.020449.

Koenitz, Helmut (2018). "Narrative in Video Games." In *Encyclopedia of Computer Graphics and Games*, Living Edition, edited by Newton Lee. New York: Springer Link. https://doi.org/10.1007/978-3-319-08234-9_154-1.

Metz, Christian (1981). "Story/Discourse (A Note on Two Kinds of Voyeurism)." In *The Imaginary Signifier: Psychoanalysis and the Cinema*, 89-98. Bloomington: Indiana University Press.

Milk, Chris (2015). "How Virtual Reality Can Create the Ultimate Empathy Machine." TED: Ideas Worth Spreading. https://www.ted.com/talks/chris_milk_how_virtual_reality_can_create_the_ultimate_empathy_machine.

Nario-Redmond, Michelle, Dobromir Gospodinov, and Angela Cobb (2017). "Crip for a Day: The Unintended Negative Consequences of Disability Simulations." *Rehabilitation Psychology* 62.3: 324-333. https://pubmed. ncbi.nlm.nih.gov/28287757/.

Nash, Kate (2018). "Virtual Reality Witness: Exploring the Ethics of Mediated Presence." *Studies in Documentary Film* 12.2: 119-1301. https://doi.org/10.1080/17503280.2017.1340796.

Nichols, Bill (2018). *Introduction to Documentary*, 3rd ed. Bloomington: Indiana University Press.

Uricchio, William (2016). "VR is Not Film, So What Is It?" *Immerse: Creative Discussion of Emerging Nonfiction Storytelling*, Nov. 8. https://immerse.news/vr-is-not-film-so-what-is-it-36d58e59c030.

Dirk Eitzen – Franklin & Marshall College (United States)

✉ deitzen@fandm.edu

Dirk Eitzen is Professor of Film & Media Studies at Franklin & Marshall College in Lancaster, Pennsylvania. He has produced a dozen documentaries, including The Amish & Us (1998) and Save Our Towns, Save Our Land (2000), which both aired nationally on U.S. public television. His scholarly work includes numerous theoretical essays on documentary including, most recently, "The Duties of Documentary in a Post-Truth Society" (in Cognitive Theory and Documentary Film , eds., Catalin Brylla and Mette Kramer, 2018).

Obsolescence, Forgotten: "Survivor Holograms", Virtual Reality, and the Future of Holocaust Commemoration

Neta Alexander*

Colgate University (US)

Abstract

"Survivor holograms" and a VR rendition of the Majdanek concentration camp are two recent examples of the urgent effort to preserve the experience of Holocaust survivors in the "post-witness era." These innovations, however, deny the tension between the premise of immortality associated with immersive technologies and their inherent planned obsolescence. By closely studying the USC Shoah Foundation's Dimensions in Testimony, this essay explores how 3D digital projections and room-scale VR construct new regimes of mediation and immersion. This is achieved by developing an understanding of obsolescence as physical (the fragile body of the survivor), technological (non-compatible hardware, software, and algorithms), and narratological (turning testimonies into fragmented soundbites). Taken together, these categories demonstrate that technological solutionism cannot prevent embodied testimonies from sinking into oblivion, and force us to ask what form of memorialization might resist entropy.

Keywords: Virtual Reality; Holocaust; Hologram; Immersive narratives; Embodiment.

∗ ✉ nalexander@colgate.edu

I will give them an everlasting name.

(Isaiah 56.5)

1   Introduction: "Maybe You Should Try to Reboot"

Davina Pardo's short film *116 Cameras* (2017) is a documentary investigation of USC Shoah Foundation's project Dimensions in Testimony. The titular cameras refer to the rig surrounding a Light Stage used to record over twenty testimonies of Holocaust survivors since 2012. The stage is the same geodesic dome used in Hollywood films such as *Spiderman* (2002) and *Avatar* (2009). The documentary's protagonist is not a fictional superhero, however, but rather a Holocaust survivor named Eva Schloss, whose testimony is about to become a 3D digital projection. *116 Cameras*, released as part of the *New York Times'* Op-Docs series, documents the process by which Schloss' testimony is pre-recorded and later rendered as an interactive 3D projection.

Such digital projections are often described by media scholars and the popular press as holograms (de Jong 2018, Frosh 2016, McMullan 2016). Yet, this term is inaccurate because, as USC Shoah Foundation clarified in a press release, "to date the technology to display a hologram does not exist."[1] Instead, the press release uses the term "interactive biographies." Nonetheless, they are impressive technological feats that update and extend the decades-long cultural fantasy of holographic rendering. Integrating advanced filming techniques, specialized display technologies, natural language processing, and speech-recognition algorithms, Dimensions in Testimony (DT) offers students and museumgoers the chance to have something closely resembling an in-person conversation with a Holocaust survivor long after the last survivor has perished. Each 3D digital projection includes the answers to over one thousand questions, ranging from the highly personal ("What was your most emotional moment in the concentration camp?") to the philosophical and ethical ("How can we prevent future genocides?"). As described on the USC Shoah Foundation website, "the program matches questions with the survivor's most relevant response. Over time, the exhibit 'learns' and the relevancy rate and speed of the survivor's responses improves." The result, according to the creative team, "simulates face-to-face interaction."[2]

Pardo's film follows the weeklong process of interviewing Schloss about her wartime experience as she sits in the middle of the Light Stage. Surrounded by thousands of LED lights and dozens of cameras, the 88-year-old refers to this cutting-edge setting as "the cage."[3] About a third of the way through the film, there is a brief moment captured by Pardo. This scene, though seemingly inconsequential, provides us with a surprising entryway into understanding recent attempts to reinvent Holocaust remembrance in the "post-witness era" (Popescu 2015: 1) when fewer and fewer survivors are capable of sharing their experience in person. In an attempt to record "neutral moments" (Pinchevski 2019: 93) that will create a more seamless experience during future "conversations" between Schloss' projection and its users, the interviewer asks Schloss to repeat several sentences designed to promote the illusion of a real-time human encounter while also troubleshooting technical issues. These phatic utterances include, "I'm actually a recording. I can't answer this question" and "I don't remember." However, when asked to repeat the phrase "Maybe you should try to reboot," the octogenarian woman hesitates: "Maybe you should try to…" The interviewer repeats, "Reboot." Schloss attempts it: "Rebook?" The interviewer quickly says, "Never mind," to which Schloss smilingly replies, "That's too technical for me."

This moment of confusion, which could easily go unnoticed amid Schloss' harrowing retelling of her memories from Auschwitz, is actually noteworthy. For a scene meant to create a humorous binary between the elderly, technologically naïve survivor and a vanguard creative team producing a "future proof testimony" (Pinchevski 2019: 93) instead exposes both the promise and peril of 3D projections. It attests to the extent to which the creators of DT are aware of the limitations of digital technologies, which frequently disconnect, freeze, buffer, and need a reboot (Alexander 2017). It also reflects a creative and ethical decision to eliminate exactly those

---

1. For the full promotional one-sheet of Dimensions in Testimony, see https://sfi.usc.edu/dit.

2. See https://sfi.usc.edu/dit.

3. The full documentary is available online via *the New York Times*. See https://www.nytimes.com/video/opinion/100000005201010/116-cameras.html.

elements that might turn a real-life encounter with a Holocaust survivor into a memorable experience: silence, hesitation, and fragmentation. As Shoshana Felman and Dori Laub (1992) famously argued, it is precisely those moments that perpetuate the "crisis of witnessing" whereby the memories and experiences of trauma cannot be translated into intelligible speech or linear narrative. Instead of using these moments of desynchronization to teach students about the limitations of mediated encounters, the interviewer struggles to construct an archive of explanations and solutions, an antidote to the unpredictable nature of future interactions. This decision also eliminates the subtle differences in survivor testimony that happen on separate retellings, which themselves are expressive and meaningful.[4]

This essay studies the DT archive of pre-recorded questions and answers in conjunction with another recent project initiated by the USC Shoah Foundation, the VR work *The Last Goodbye*, which premiered at the 2017 Tribeca Film Festival. Both projects share the language of interactivity and immortality both on the USC website and in their media coverage. As such, they present us with a problem, namely the diminishing number of elderly Holocaust survivors, and offer a solution: groundbreaking technology enabling us to make their firsthand authentication accessible "in perpetuity."[5] These recent approaches to Holocaust remembrance are examples of the "immersive witnessing" (Gregory 2016) that has led to a creative explosion in the field of VR and 3D projections in the last decade (Raz 2019). Committed to the mission of "never again," such projects belong to the growing category of "virtuous VR" that seeks "to preserve and transmit the experience of disadvantaged and suffering people through immersive stereoscopic video" (Nakamura 2020: 49). These projects, however, *conflate digitization with immortalization* by effectively denying the various ways in which, like every technology, they are bound to become obsolete. They ignore the ubiquity of planned obsolescence as the dominant business model in American capitalism (Slade 2007) and the extent to which both software and hardware are designed to become non-compatible and require constant "upgrades" (Chun 2016).

VR and 3D projections promise their users the ability to engage with trauma by controlling a personalized, responsive interface. This essay will not fully engage with the question of whether these technologies could or should function as "empathy machines."[6] Instead, I approach the attempt to immortalize the last remaining Holocaust survivors through the framework of obsolescence: How does the ideology of immortality associated with interactive technologies serve to deny the reality of a rapidly changing technological landscape built on planned obsolescence and non-compatible devices? How do such technologies reshape our understanding of Holocaust commemoration by producing new regimes of mediation and immersion? What are the unique aspects of "the humanitarian impulse" (Rangan 2018) aimed at "giving a voice" to an aging population of Holocaust survivors? These inquiries promote a multi-layered understanding of obsolescence as physical (the fragile body of the survivor), technological (non-compatible hardware, software, and algorithms), and narratological (transforming testimonies into disjointed soundbites). Taken together, these categories demonstrate that technological "solutionism" (Morozov 2013) cannot prevent carefully curated testimonies from sinking into oblivion.

2   From the Unrepresentable to Compatible Narratives

With their allure of groundbreaking interactivity, both VR works and survivor holograms extend the logic of the video testimonies of Holocaust survivors that began to be collected thirty-five years after the liberation of the camps (de Jong 2018: 245). Since the early 1990s, videotaping the remembrances of survivors has been described as a race against time. As the number of survivors dwindles, educational institutions such as the USC Shoah Foundation and the National Holocaust Centre and Museum in the U.K. have searched for new tools that can make their testimonies more relevant to younger, digital audiences and that, unlike the VHS cassette,

---

4.   I would like to thank Joseph Pearson for alerting me to this potential downside of the interactive testimonies, as well as for his many useful comments on an early draft of this paper.

5.   See https://sfi.usc.edu/dit.

6.   The idea that VR works are "empathy machines" was popularized by American artist Chris Milk, who created a series of 360-degree documentary VR projects for the United Nations. For an overview of the current debates on empathy and VR, see Raz and Nakamura (2019 and 2020). For Milk's 2015 TED talk titled "How virtual reality can create the ultimate empathy machine" see https://www.youtube.com/watch?v=iXHil1TPxvA.

are more compatible with emerging technologies.[7] Indeed, the pursuit of a multi-sensorial, tactical mediation of trauma preceded the new immersive techniques. In *The Witness as Object* (2018), Steffi de Jong reminds us that video testimonies are often exhibited alongside a physical object belonging to the survivor, such as a doll, a suitcase, or a pair of shoes. In both the Israeli Holocaust museum Yad Vashem and the Bergen-Belsen concentration camp memorial, for example, "the video testimony and the object authenticated each other" (de Jong 2018: 242). In this case, it is the slow degeneration of the physical object that testifies to its authenticity. Limbless dolls or scrappy clothing tell stories of struggle, hiding, and risk. When viewed next to a survivor's recorded testimony, these objects — that will degrade less quickly than the features technology — hold the power to illustrate Nazi atrocities and make personal stories more relatable to museumgoers.

The question of authenticity invoked by de Jong is complicated by growing anti-Semitism and Holocaust denial (Diaz 2020, Griffin 2020). It has long been debated what constitutes proof of the systemic extermination of over six million Jews by the Nazis. Is it archival photos such as the four photos taken by Jewish members of the *Sonderkommando* in Auschwitz in 1944? Video recordings such as the 55,000 testimonies archived by USC Shoah Foundation's Visual History Archive or those seen in Claude Lanzmann's monumental *Shoah* (1985)? Legal documentation of atrocities and war crimes collected during the Nuremberg trials? Court testimonies during the 1961 Eichmann trial? Physical objects that can help historians recreate the lives of Jewish families in pre-war Europe or the nightmarish existence in the camps? All of these artifacts risk being destroyed or contested and their authenticity can always be questioned. Furthermore, they all fail to capture the real horrors of the Holocaust. Examining the post-war liberation films produced in 1945 by American filmmakers like Billy Wilder or George Stevens, Hannah Arendt warned:

> All pictures of concentration camps are misleading insofar as they show the camps in their last stages, at the moment the Allied troops marched in. [...] What gives the films their special horror — namely the sight of the human skeleton — was not at all typical for the German concentration camps; extermination was handled systematically by gas, not by starvation (1958: 446).

The multiple meanings of obsolescence should thus be traced back to the Nazi attempt to render the European Jewry obsolete in a way that would leave no trace of their systemic extermination. The need to acknowledge loss and erasure in any retelling of the Holocaust germinated a plethora of creative approaches. Exploring the works of postgeneration artists and writers such as Art Spiegelman, W.G. Sebald, Eva Hoffman, and Susan Meiselas, Marianne Hirsch argues that, "As a form of counter-history,"memory" offered a means to account for the power structures animating forgetting, oblivion, and erasure and thus to engage in acts of repair and redress. It promised to propose forms of justice outside of the hegemonic structures of the strictly juridical, and to engage in advocacy and activism on behalf of individuals and groups whose lives and whose stories have not yet been thought" (2012: 16). More recently, this tension between the personal loss and the strategic destruction of documents and archives gave rise to the "counter-monument" architecture seeking to "challenge the very premise of the monument" by invoking emptiness or strategically damaging the urban terrain (Young 2000: 92). It also led art historian Georges Didi-Huberman to argue that it is precisely those rare, blurry photos shot by the *Sonderkommando* that can bring us closer to the suffering of Jewish prisoners in the Nazi concentration camps: "The question of images is at the heart of the great darkness of our time, the 'discontent of our civilization.' We must know how to look into images to see that of which they are survivors" (2008: 182).

The problem of Holocaust remembrance is therefore twofold, as it needs to account for the destruction of evidence enacted by the Nazi regime throughout the war and for the risk that whatever testimony given by those who survived might be deemed "incomprehensible, senseless, or unimaginable" (Didi-Huberman 2008: 6). However, Didi-Huberman stresses that the inherent difficulty of grasping the deadliness of the Nazi masterplan should not be conflated with the need to find new ways to achieve the difficult task of Holocaust memorialization. Simply saying that *Auschwitz* is "unrepresentable" might paradoxically relegate it to "an unknowing repetition of the Nazi *Arcanum* itself" (Didi-Huberman 2008: 26) rather than dismantle it.

---

7. Similar to Dimensions in Testimony, the UK National Holocaust Centre and Museum launched The Forever Project, aimed at turning survivors' testimonies into "life-sized digital projection[s] that will answer you from a vast set of pre-filmed replies." The project was launched in 2017 and accompanied by a crowd-sourcing campaign that emphasizes its urgency. For an overview of The Forever Project, see https://www.holocaust.org.uk/foreverproject1.

Still, "the intolerable image" (Rancière 2011) presents us with its own set of paradoxes, the first of which is that it forces the viewer to look away. For images of atrocities to produce a political effect, the viewer must be willing to incriminate herself in the structural exploitations they expose. As studied by Jacques Rancière, this is rarely the case. For a photo of a dead child killed by American soldiers in Vietnam to truly shock an American, for example, "the spectator must already be convinced that what it shows is American imperialism, not the madness in human being in general" (Rancière 2011: 85). Rancière goes on to develop a theory in which the viewer does not want to be convinced, and the witness does not want to speak. He focuses on a seminal scene from *Shoah* in which the former Treblinka hairdresser Abraham Bomba recounts the arrival and shearing of prisoners about to enter the gas chamber. As Bomba starts crying and his voice cracks, "the voice of the director urges him to continue: 'You must go on, Abe. You have to'" (Rancière 2011: 91). Echoing Felman and Laub's "crisis of witnessing" (1992), Rancière's analysis makes manifest the obsolescence of speech. This unwillingness to speak creates a tension between witness and listener, one of credibility. To render Bomba's testimony legible for future generations, it must first be verbalized and then recorded, edited, and distributed by Lanzmann.

What Didi-Huberman, Lanzmann, Arendt, and Rancière tend to neglect is the obsolescence not only of the humans who bear the memory of the Holocaust, but also of the technologies employed to immortalize their stories. While *Shoah* has been digitized and made available on many digital platforms, including YouTube, only a small fraction of the testimonies collected over decades on VHS are accessible online. In the case of the USC Visual History Archive, for example, only 4,000 out of 55,000 testimonies can be streamed. Even when digitized, these hour-long testimonies are less and less likely to find engaged audiences in an attention economy fetishizing immersive experiences, viral clips, and personalization. Instead of the "unrepresentable," therefore, I suggest the concept of *compatibility* in order to reframe the most recent attempts to reinvent Holocaust remembrance. As used in Software Studies, compatibility is the capacity for two systems or applications to work together without having to be altered. Compatible software applications use the same data formats. The use of VR and 3D projection, as I demonstrate below, asks Holocaust survivors to be compatible with changing notions of storytelling and immersion as a corrective to the obsolescence of their bodies and memories.

The desire to become compatible with changing aesthetics and platforms replaced the representational turn in Holocaust Studies with a "mass production and consumption" of traumatic memory (Young 2000: 94). The question is no longer whether the Holocaust can be represented, but rather how best to employ new technologies to teach future generations about the dangers of fascism. Thus, recent Holocaust commemorations have included video games, mobile apps, and an Instagram story recreating Anne Frank's diary (Parker 2016, Reich 2020, Scharf and Horowitz 2019), to name but few examples. While many of these works enjoyed a favorable reception and reached millions, they all share the risk of gamifying the trauma. At the most extreme end of this slippery slope was an ill-fated attempt by the Babyn Yar Holocaust Memorial Center in Kyiv, Ukraine, to employ algorithms in order to "assign each visitor to one of multiple categories, including executioners, collaborators or victims, and tailor their experience accordingly" (Kramer and Varenikova 2020). This would be followed by a VR-based re-enactment of various experiences related to the assigned role, including prisoners of war who had to burn corpses. Following a public outcry and the resignation of several board members after the exhibition design was unveiled, this controversial attempt was shelved. Still, the risk of producing "a Holocaust Disney" (Kramer and Varenikova 2020) remains.

The *compatible narratives* explored below, however, are more complex and productive attempts to collaborate with survivors. They recast testimonies as a multi-sensory experience involving either 3D digital projections or a user-controlled interface inviting users to explore a room-scale VR on their own pace. By closely looking at two USC Shoah Foundation projects featuring a Holocaust survivor named Pinchas Gutter, I unpack the "moral affordances" (Frosh 2016) of these technologies and challenge their premise of immortality.

3   Survivor Holograms and the Allure of Responsiveness

The Dimensions in Testimony project aims to create 3D projections of holocaust survivors such as Eva Schloss and the 85-year-old Gutter. In a promotional video, Stephen Smith, the executive director of USC Shoah Foundation, explains, "We're almost out of time to have deep conversations with Holocaust survivors. If we

don't have these conversations now they will never take place."[8] The responsive projections are tasked with recreating the experience of a real-time dialogue for future generations.

While DT avoids using the term "survivor hologram," it is precisely this cultural fantasy that earned the project its worldwide coverage. A small digression into the decade-long history of the hologram is therefore needed. Coined two years after the Holocaust by Hungarian engineer Dennis Gabor, the term "hologram" was originally used to describe any three-dimensional image. It became popular in the 1970s and 1980s through reflective magazine covers or glass plates depicting fine art. Often used for erotica, the hologram was not initially thought of as an educational tool. This potential was discovered by Soviet museum curators who sponsored holograms of national treasures that could be transported by bus to remote villages across the Soviet Union throughout the 1970s (Johnston 2008: 225). A 1973 Rolling Stone article described the hologram as a futuristic extension of the photograph and mused that the hologram is likely "to push your subliminal awe and wonder button and leave an ancient message flashing somewhere below the surface of consciousness" (Johnston 2008: 224). In short, it was a "powerful magic" (ibid).

In what many Holocaust survivors describe as nothing less than magic, the DT uses natural-language processing algorithms to match real-time questions with pre-recorded answers. In the case of Gutter, for example, his holographic rendition tells students how he barely survived five concentration camps and a death march from Germany to Czechoslovakia. In an interview I held with him during the 2017 Tribeca Film Festival, Gutter explained that algorithmic-based holograms and VR are more effective ways to share his story with wide audiences than traditional documentation techniques:

> The first film I watched about the Holocaust was *Schindler's List*, which I thought was excellent. I saw other Holocaust films that moved me, but then — a couple of days later — they flew out of my head. Yet people who have heard my story personally tell me they will always remember me and this encounter changed them. I feel that through these works I can transmit my empathy and feelings and create a direct bond. Once you spend some time with someone, you won't forget them (Alexander 2017a).

Gutter's notion of immortality is twofold: The hologram will keep his memories alive after he dies, and the personal encounter this new technology enables will ensure that the retelling will forever stay in the minds of those who interact with it. This is achieved in part by using a technique called "light field rendering" that produces the three-dimensional projection. Unlike stereoscopic 3D projection, which requires the viewer to wear tinted glasses, the DT hologram can be viewed from different angles and without the need for accessories. As summarized by Amit Pinchevski, "No effort was spared to render the witness not only responsive but also virtually present at the scene of interaction" (2019: 93).

Co-presence or "co-witnessing," however, does not guarantee an empathetic response or a deeper understanding of traumatic events (Nash 2018). Gutter's hopeful description of the unique power of immersive technologies does not recognize the complex and sometime contradictory relationship between witnessing, empathy, and social change. As Kate Nash, Pooja Rangan, Lisa Nakamura and others have argued (2018, 2018, 2020), humanitarian artworks often produce indifference or hopelessness. As we will later see, embodied narratives such as the ones offered by VR might give rise to "identity tourism" produced, marketed, and consumed by mostly white, able-bodied users (Nakamura 2020). Even when the mediated encounter between a user and a survivor produces empathy — a notoriously contested, and not always desired, concept (Bloom 2016) — it is rare that humanitarian art projects lead to collective action, especially if the depicted trauma is seen as a relic of a distant past.

There are several other unacknowledged tensions in the DT project. First, while the digital projections will endure much longer than the physical bodies of the survivors, it paradoxically transforms the witness into an object. His or her testimony is authenticated not by the presence of a physical object like a neckless or a doll, but by the projected image and voice of the survivor. This reproduces the logic of "the era of the witness" that started with the Eichmann trial, when "remembering individuals were turned into legitimate carriers of cultural memory and legitimate historiographical sources" (de Jong 2018: 246). Yet, the holographic renderings create

---

8.   The video is available on https://www.youtube.com/watch?v=nGzAc9mIoTM.

a conversation not between a student and a survivor, but rather between a user and an algorithm. It is the speech-recognition algorithm that is tasked with identifying key words in a user's question and searching the archive for the pre-recorded answer deemed most suitable. This process raises ethical questions that further complicate the idea of the witness as an historiographical source. For the conversation to appear authentically life-like, the algorithms involved must recognize verbal fluency for both the questions and the answers. As a growing number of studies demonstrate, however, speech-recognition algorithms "work best for white, highly educated, upper-middle class Americans" and their use can therefore "extend the application of bias" (Carter and Egliston 2020). Embracing the logic of technological progress, a project aimed at fighting xenophobia and anti-Semitism unwittingly markets itself through its innovative employment of technologies known to be biased and exclusionary.

Secondly, the survivor holograms, which are solely available in Holocaust museums or other educational settings, require not only verbal fluency, but also a degree of media literacy and historical knowledge. For this process to be productive, the person posing the question must be familiar with historical facts such as the names of concentration camps, the Nazi ideology, or the progression of World War II. It is this context (or lack thereof) that can determine whether the encounter will germinate a deeper understanding of fascism or will "rehearse neoliberal shifts in humanitarian communication in which individual feeling becomes the focus for intervention rather than structural inequalities or potential exclusions" (Nash 2018: 21). This danger might be mitigated, yet not entirely eliminated, by the decision to screen a short film about each survivor before museumgoers converse with his or her hologram. Still, the conversational setting and the thrill of a new interactive technology are designed to excite and induce emotive and visceral, rather than contemplative, reactions. This is also demonstrated by the recording of answers to questions such as "What was the most emotional moment you remember from the concentration camp?"

Thirdly, the archive created over twenty hours of interviews with each survivor (usually conducted on the Light Stage during the course of a single week) is limited and heavily curated. As Paul Frosh warns, this approach might paradoxically transform an individual story into a universal moral tale:

> Gutter's testimony is structured in advance as a series of answers to questions, many of them generic crowd-sourced queries to 'any' Holocaust witness [...] The holographic encounter defines the survivor's testimony as a 'cut and paste' arrangement of discrete statement-units. These are reconfigured by recognition and response algorithms according to the vocal and linguistic triggers of audience members, without regard to the statements' original ordering within the survivor's subjective experience and verbal expression (2016: 363).

The desire to create an experience more compatible with changing notions of students' interests and attention spans can therefore lead to a more fragmentary and, as Frosh term it, "hollow" encounter. For him, "the illusion is not just optically hollow, but ontologically and psychologically so," since it replaces a real-life encounter with the other with easily digestible fragments of horror and survival (Frosh 2016: 363). Frosh's critique is helpful in emphasizing what might be lost: the tactile encounter with the witness, moments of silence and repetitions crucial for a deep understanding of trauma, and an engagement with a coherent narrative providing historical context through a retelling of the war progression. This question of the different pacing and unfolding of narrative, which might become faster when automated, is important in that it strays from what an experience with a survivor can be like.

Drawing on Frosh's analysis, I wish to return to the promise of immortality embedded in the marketing materials of DT. In a promotional one-sheet, the creative team behind DT explains that, "Words such as 'hologram' and 'avatar' fail to accurately describe Dimensions in Testimony. We avoid using these terms because to date the technology to display a hologram does not exist, and 'avatar' implies that the image is animated or is somehow unreal."[9] The ambitious task at hand is therefore to render survivors compatible with *yet-to-exist technologies*. Much like the need to prerecord the phrase "Maybe you should try to reboot," this one-sheet reminds us the creators are aware of the potential obsolescence of the state-of-the-art technologies used to construct the 3D projections. The hope is that future, more advanced, technologies will animate the archive of answers in ways that did not exist when the survivors were still capable of telling their stories. Again, however,

---

9. See https://sfi.usc.edu/dit.

this does not take notice of the fact that the more sophisticated a technological format is, the less compatible it tends to be with older formats and interfaces. In the case of the survivor hologram, any new technology will have to accommodate the original recordings' audio compression format, 4k resolution, speech-recognition algorithms and accompanying set of hardware (screen, speakers, Wi-Fi connectivity).

Finally, DT ignores the tension between the fascination with a new technology and the desire to promote a meaningful dialogue with the bearer of historical trauma. As long as the holographic rendering enjoys the status of a new, magical technology, it will tend to draw attention away from the words uttered by the survivors and their affective and ethical potential. Then, when the technology is more ubiquitous and is no longer a gimmick, students and museumgoers may lose interest in the fragmented testimony that requires many hours to watch in its entirety. In short, a speculative future in which holographic renderings are as ubiquitous as smartphones does not necessarily immortalize survivors; instead, it could extend their compatibility for several years or decades until a new gimmick comes along.

I use the term "gimmick" to denote an aesthetic form associated by Sianne Ngai with industrial capitalism. In her recent theorization of the gimmick as a cultural form, she attends to its contradictory temporal states: "At higher levels, expensive new technology adopted too early might be described as working too well, performing above standard, but unprofitably" (Ngai 2020: 475). This desynchronization with "the times" results in a "compromised aesthetic form: that of seeming either too old or too new," while "it aggressively insists on its contemporaneity with its audience" (ibid). The hologram, described by its creators as a "time-offset interaction," is used to simulate an interactive, synchronous conversation "through the fourth dimension of time" (Pinchevski 2019: 92). The result is "too new" to be experienced outside a customized museum setting. Once its newness will be deemed by the glow of more innovative technologies, the 3D projection risks being transformed from a gimmick to a system of display not easily compatible with newer formats.

4 *The Last Goodbye*: Walking Barefoot through Majdanek

If the appeal of DT is the responsiveness afforded by speech-recognition algorithms, *The Last Goodbye* partakes in the reinvention of Holocaust remembrance by constructing an embodied, multi-sensory guided tour of a concentration camp. Mainly shot in Majdanek, a Nazi concentration and extermination camp built and operated by the SS on the outskirts of the city of Lublin during the German occupation of Poland, the 16-minute VR work invites participants to walk through the camp alongside Pinchas Gutter. Unlike Gutter's hologram, the display of which is limited to educational settings, *The Last Goodbye* premiered at the Virtual Arcade of the 2017 Tribeca Film Festival and later was presented at the Venice Film Festival. It thus lacks the historical context afforded by a Holocaust museum, and instead it competes for the viewer's attention as part of a "virtuous VR" industry including humanitarian works on refugee camps, natural disasters, and police brutality (Nakamura 2020). As such, it requires the user to remove her shoes when entering a dedicated area in which she is invited to put on the Oculus headset.

With its unique ability to both create room-scale environments and react to the user's movement in real time, VR potentially "converts sensorimotor responsiveness into moral responsibility" (Frosh 2016: 351). At best, this technology affords a multisensory simulation that "is qualitatively different from cinematic sympathy" since it perpetuates an "unprecedented perceptual proximity" (Raz 2019: 1005). Employing neuroscience, Gal Raz argues that "VR may induce multi-level unconscious psychological transformations, which may sustain after the experience is over" (2019: 1011). This argument promotes an understanding of VR as a technology with unique "moral affordances," while echoing the ideology of connectivity as a means to achieve a lasting effect.

However, this sense of "response-ability" (Tait 2011) to the suffering of others is contested by a growing number of media scholars (Nakamura 2020, Nash 2018). Providing the user with a sense of safety and control, VR subjects even the most harrowing testimonies or re-embodiments of traumatic events to gamification, rendering them pleasurable (Bloom 2017). While some VR works have been proven to mitigate racial biases,[10] they risk conflating deep attention and learning with "slacktivism" (Morozov 2011) or, worse, "identity tourism" (Nakamura 2020). These critiques echo Saidiya Hartman's seminal question in *Scenes of Subjection*: "In order

---

10.   For an overview of the literature on VR and racial bias, see Raz 2019: 1009-1013.

for suffering to induce a reaction and stir feelings, it must be brought close. [...] So, then, how does suffering elude or escape us in the very effort to bring it near" (1997: 20)?

In *The Last Goodbye*, suffering is immortalized and brought near by a multisensory technology. In a promotional video uploaded to YouTube, the technical processes receive significantly more screen time then the story told by Gutter.[11] Instead of the natural language processing used to create survivor holograms, this VR work was brought to life by "dozens of photogrammetry artists and engineers" who recreated Majdanek's crematorium and gas chambers in 360-degree room-scale. As the narrator explains, "The entire experience uses the most innovative technologies to enable viewers to walk with Gutter eye-to-eye as he revisits the railway car, the gas chamber, shower room, and barracks of Majdanek." The result is "the first-ever Holocaust survivor testimony in room-scale VR" and makes Gutter's story accessible "for generations to come."

Fully aware of the need to maintain a "proper distance" (Nash 2018) between the user and Gutter, *The Last Goodbye*'s co-creators, Gabo Arora and Ari Palitz, successfully negotiate many of the tensions described above. Unlike the holographic rendering of Gutter, for example, they incorporate the "crisis of witnessing" into the VR narrative. In what can be seen as a gesture to Bomba's moment of breakdown in *Shoah*, the work opens with a documentary segment in which the VR user is introduced to Gutter in a most unlikely place: a hotel bathroom where he shaves in front of a small mirror. This initial encounter immediately invokes a surprising sense of intimacy and vulnerability: the user is barefoot, while Gutter wears a knee-length white bathrobe. In a voice-over narration, Gutter confesses that he is extremely anxious about going back to Majdanek for what he describes as "my very last visit to the camp." This opening scene is a mirror image of the holographic projection depicting survivors with professional makeup and carefully chosen clothes. It not only functions as an exposition to Gutter's testimony, but it also allows the VR user a much-needed break before moving from the busy festival setting to a concentration camp. Gutter's hesitation also pushes against the idea that survivors are immortal and instead places them in the realm of anxiety, loss, and quotidian existence. This decision effectively shifts our attention from the "unconscious psychological transformations" attributed to VR by Raz to the "audiovisual unconscious" historically associated with survivor narratives captured on video. As studied by Pinchevski (2012), this "audiovisual unconscious" consists of the multiple silences, slippages, tics, and repetitions — in short, moments of transgression mostly eliminated from Gutter's hologram, yet kept in *The Last Goodbye*.

Another creative decision that proves crucial to incorporating the tensions inherent to mediated testimonies is the recreation of Majdanek's crematorium, where more than 60,000 Jews were murdered. When Gutter approaches the room in which both his parents and his twin sister, Sabina, were murdered, he explains to the viewer that he cannot enter it, as "I shudder inside and fear takes over all my body." This moment creates a split between the witness and the viewer. While Gutter chooses to stay outside, the VR recreation enables the viewer, if she wishes, to enter the space and take a closer look. This is a physical and ethical junction forcing the viewer to ask herself to what extent anyone can truly understand the horrors faced by Holocaust survivors. Instead of an invitation to re-embody the other through VR pedagogy, with its problematic claim to create new knowledge through empathy, *The Last Goodbye* differentiates the survivor and the viewer in unmistakable ways.

On the other hand, this VR work, much like the hologram, is heavily invested in the logic of immortality achieved by technological reproduction. The final scene is not shot in Majdanek but rather in a tranquil European park, where Gutter plays with his grandson. His voice-over narration tells us, "I'm always hopeful for the future. I believe things will improve. I don't know if it will happen in my lifetime, but maybe in yours." This direct address to a future generation who might watch the work long after Gutter dies connects it to his faith in immersive technology. The irony is that VR works made with Oculus, such as *The Last Goodbye*, are not always compatible with other VR platforms, and they tend to stop working whenever a software update is being introduced.[12] Gutter's one last visit to Majdanek is thereby jeopardized by the precarious nature of the technology his testimony promotes.

---

11. The video is available on https://www.youtube.com/watch?v=rOgtLhHSjy0.

12. In its attempt to introduce "VR for the masses," Oculus released four different consumer VR headsets in the last decade. See https://www.theverge.com/2019/4/30/18523000/oculus-quest-review-vr-headset-price-specs-features.

Since 2019, *The Last Goodbye* can be watched in full on YouTube. However, without the VR headset and the user's ability to wander the space on their own, the work loses its interactivity. The digitization exacerbates the motion sickness associated with VR while denying the viewer the awe and wonder of an optical illusion and the excitement of a setting such as Tribeca's Virtual Arcade. Rather than immortalizing Gutter's story, its afterlife on YouTube makes it look outdated less than three years after the work was hailed as "striking and deeply emotional" and won two Webby awards (Boston 2018).

5   Conclusion

The forms of obsolescence explored in this essay should not be mistaken as an attack on immersive technologies and their potential to enact social change. Instead, my comparative reading of 3D projections and room-scale VR seeks to highlight what is too often missed: that the technologies themselves are subject to degradation and are designed to become incompatible with changing formats and new software, hardware, and compression algorithms. One possible solution to this paradox is to incorporate these tensions into the testimonies themselves in ways that point to the limitations and challenges of mediating trauma.

Much like *The Last Goodbye*, internet users can now watch Lanzmann's monumental *Shoah* on YouTube. Lanzmann's epic documentary begins with a quotation from Isaiah, "I will give them an everlasting name." Yet, its use of static interviews and hour-long testimonies is not compatible with the culture of newsfeed, meme and viral videos. Faced with digital born audiences, it may not stand the test of time.

What *Shoah* can still teach us, however, is that only those art forms that can incorporate a sense of reflexivity about the limits of representation are the most enduring. With its famous phantom ride through the empty barracks of Auschwitz, the film implies that our ability to fully comprehend the scale and impact of the Holocaust is limited. Only when the hologram starts flickering or buffering will we get a glimpse into the obsolescence not only of the technology itself, but also of the European Jewry whose memory it is trying to immortalize.

References

Alexander, Neta (2017a). "How Virtual Reality is Reinventing Holocaust Remembrance." *Haaretz*. https://www.haaretz.com/jewish/holocaust-remembrance-day/.premium-how-virtual-reality-is-reinventing-holocaust-remembrance-1.5464154 (last accessed 04-01-2021).

Alexander, Neta (2017b). "Rage Against the Machine: Buffering, Waiting, and Perpetual Anxiety." *Cinema Journal* 56(2): 1-25. https://doi.org/10.1353/cj.2017.0000.

Arendt, Hannah (1958). *The Origins of Totalitarianism*. Cleveland: The World Publishing Company.

Bloom, Paul (2016). *Against Empathy: The Case for Rational Compassion*. New York: Ecco.

Bloom, Paul (2017). "It's Ridiculous to Use Virtual Reality to Empathize with Refugees." *The Atlantic*. https://www.theatlantic.com/technology/archive/2017/02/virtual-reality-wont-make-you-more-empathetic/515511/ (last accessed 04-01-2021).

Boston, Michelle (2018). "A Final Farewell." *USC Dornsife*. https://dornsife.usc.edu/news/stories/2844/a-final-farewell/ (last accessed 04-01-2021).

Carter, Marcus and Egliston, Ben (2020). "No Escape from Reality." *Real Life Magazine*. https://reallifemag.com/no-escape-from-reality/ (last accessed 04-01-2021).

Chun, Wendy H.K (2016). *Updating to Remain the Same: Habitual New Media*. Cambridge, MA: The MIT Press.

De Jong, Steffi (2018). *The Witness as Object*. New York: Berghahn Books.

Diaz, Johnny (2020). "Anti-Semitic Incidents Surged in 2019, Report Says." *The New York Times*. https://www.nytimes.com/2020/05/12/us/antisemitic-report-incidents.html (last accessed 04-01-2021).

Didi-Huberman, Georges (2008). *Images in Spite of All: Four Photographs from Auschwitz*. Chicago: University of Chicago Press.

Felman, Shoshana and Laub, Dori (1992). *Testimony: Crises of Witnessing in Literature, Psychoanalysis, and History*. New York: Routledge.

Frosh, Paul (2016). "The Mouse, the Screen and the Holocaust Witness: Interface Aesthetics and Moral Response." *New Media & Society* 20(1): 351-368. https://doi.org/10.1177/1461444816663480.

Gregory, Sam (2016). "Immersive Witnessing: From Empathy and Outrage to Action." *Witness*. https://blog.witness.org/2016/08/immersive-witnessing-from-empathy-and-outrage-to-action/ (last accessed 04-01-2021).

Griffin, Alexander (2020). "How the ADL Is Working to End Facebook's 'Thriving Ecosystem of Holocaust Denial'." *Haaretz*. https://www.haaretz.com/jewish/.premium-facebook-boycott-holocaust-denial-adl-1.9018784 (last accessed 04-01-2021).

Hartman, Saidiya (1997). *Scenes of Subjection*. Oxford: Oxford University Press.

Hirsch, Marianne (2012). *The Generation of Postmemory: Writing and Visual Culture After the Holocaust*. New York: Columbia University Press.

Johnston, Sean F. (2008). "A Cultural History of the Hologram." *Leonardo* 41(3): 223-229. https://doi.org/10.1162/leon.2008.41.3.223.

Kramer, Andrew and Varenikova, Maria (2020). "Victim or Executioner? Let the Computer Decide." *New York Times*. https://www.nytimes.com/2020/05/11/world/europe/ukraine-holocaust-babyn-yar.html.

McMullan, Thomas (2016). "The Virtual Holocaust Survivor: How History Gained New Dimensions." *The Guardian*. https://www.theguardian.com/technology/2016/jun/18/holocaust-survivor-hologram-pinchas-gutter-new-dimensions-history (last accessed 04-01-2021).

Morozov, Eygeny (2011). *Net Delusion: The Dark Side of Internet Freedom*. New York: Public Affairs.

Morozov, Evgeny (2013). *To Save Everything, Click Here: The Folly of Technological Solutionism*. New York: Public Affairs.

Ngai, Sianne (2020). *Theory of the Gimmick: Aesthetic Judgment and Capitalist Form*. Cambridge: Harvard University Press.

Nakamura, Lisa (2020). "Feeling Good about Feeling Bad: Virtuous Virtual Reality and the Automation of Racial Empathy." *Journal of Visual Culture* 19(1): 47-64. https://doi.org/10.1177/1470412920906259.

Nash, Kate (2018). "Virtual Reality Witness: Exploring the Ethics of Mediated Presence." *Studies in Documentary Film* 12(2): 119-131. https://doi.org/10.1080/17503280.2017.1340796.

Parker, Laura (2016). "Inside Controversial Game That's Tackling the Holocaust". *RollingStone*. https://www.rollingstone.com/culture/culture-news/inside-controversial-game-thats-tackling-the-holocaust-251102/ (last accessed 04-01-2021).

Popescu, Diana I. (2015). "Introduction: Memory and Imagination in the Post-Witness Era." In *Revisiting Holocaust Representation in the Post-Witness Era*, edited by Tanja Schult and Diana I. Popescu, 1-7. London: Palgrave Macmillan.

Pinchevski, Amit (2012). "The Audiovisual Unconscious: Media and Trauma in the Video Archive for Holocaust Testimonies." *Critical Inquiry* 39(1): 142-166. https://doi.org/10.1086/668053.

Pinchevski, Amit (2019). *Transmitted Wounds: Media and the Mediation of Trauma*. London and New York: Oxford University Press.

Rancière, Jacques (2011). *The Emancipated Spectator*. London: Verso.

Rangan, Pooja (2018). *Immediations: The Humanitarian Impulse in Documentary*. Durham, NC: Duke University Press.

Raz, Gal (2019). "Virtual Reality as an Emerging Art Medium and Its Immersive Affordances." In *The Palgrave Handbook of the Philosophy of Film and Motion Pictures*, edited by Noel Carroll et al., 995-1013. London: Springer International Publishing.

Reich, Aaron (2020). "New Holocaust app puts players in shoes of Jewish boy in 1930s Berlin". *Jerusalem Post*. https://www.jpost.com/diaspora/new-holocaust-app-puts-players-in-shoes-of-jewish-boy-in-1930s-berlin-632318 (last accessed 04-01-2021).

Scharf, Isaac and Horowitz, Audrey (2019). "Instagram story of young Holocaust victim Eva aims at new generation." *Times of Israel*. https://www.timesofisrael.com/instagram-story-of-young-holocaust-victim-aims-at-new-generation/ (last accessed 04-01-2021).

Slade, Giles (2007). *Made to Break: Technology and Obsolescence in America*. Cambridge, MA: Harvard University Press.

Tait, Sue (2011). "Bearing witness, journalism and moral responsibility." *Media, Culture & Society* 33(8):1220-1235. https://doi.org/10.1177/0163443711422460.

Neta Alexander – Colgate University (US)

✉ nalexander@colgate.edu

Neta Alexander is Assistant Professor of Film and Media at Colgate University, New York. She has published articles in *Cinema Journal*, *Film Quarterly*, *Media Fields Journal*, and *Flow Journal*, among other publications. Her first book, *Failure* (2020; cowritten with Arjun Appadurai), studies how Silicon Valley and Wall Street monetize failure and forgetfulness.

Exploring Stories, Reading Environments: Flow, Immersion, and Presence as Processes of Becoming

Elisabetta Modena[*][a]   Francesco Parisi[**][b]

[a]   University of Milan (Italy)
[b]   University of Messina (Italy)

Abstract

The article aims to deal with flow, immersion, and presence and their relation with storytelling and the exploration of space. In sections 2 and 3, we introduce the three concepts both from a psychological and from a neurocognitive approach. In section 4, we analyse a particular video game genre, the "walking simulator," which focuses on immersion in a narrative and a space rather than in the mechanics of the game and which generates a profound user experience. In paragraph 5, we examine virtual reality artworks based on both storytelling and presence within a space, discussing their immersive nature. We hypothesise that the very concept of experience can be adopted as a key term to describe media engagement, since immersion is an essential requirement for an experience to take place. Finally, in section 6 we introduce and discuss the transformative character of experience, which is the mutual and co-constitutive cognitive becoming triggered by audiovisual media engagements.

Keywords: Flow; Immersion; Presence; Cognitive becoming; Video games; Walking simulators.

Acknowledgements

*   ✉ elisabetta.modena@unimi.it

**   ✉ fparisi@unime.it

1   Introduction

One of the most common experiences nowadays is certainly that which takes place in front of a screen. Be it a flat, framed screen, or a surrounding, simulated environment, we are constantly exposed to a multifaceted galaxy of audiovisual experiences: movies, video games, TV shows, social media, public installations, and so forth.

In this article, we will focus on video games and VR as particular cases of storytelling. In doing so, in section 2 we introduce and discuss three terms often adopted to describe video games and VR experiences, namely flow, immersion, and presence. In section 3, we try to make the same analysis but from a neuropsychological perspective and argue that both speculative and experimental studies fail to isolate these phenomena as if they were sharply separated in real media experiences. In our opinion, they fail because of the theoretical assumptions which usually frame the problem and also because of the extremely vast and heterogeneous supply of screen-mediated experiences.

In section 4, we start to illustrate such heterogeneity, particularly by presenting "walking simulators," audiovisual products which, even though designed and sold as video games, lack crucial elements traditionally found in videogames and which introduce storytelling experiences based on solitary explorations.

The importance of the connection between stories and environments is discussed in section 5 as a fundamental nexus in the creation of immersive experiences. By further exploring the concept of experience, we argue that those experiences which occur in image-worlds, such as video games and VR, reveal a "zone of becoming," which is a creative and transformative process where both agents and audiovisual products change and modify each other.

Finally, in section 6, we continue to develop this transformative view of experience-as-becoming by relating flow, presence, and immersion as cognitive outcomes disciplined by opportunities and constraints.

2   Flow, Immersion, and Presence

Let us start by establishing the main, irreducible difference between generic audiovisual stories and video games. This difference has been famously discussed, among others, by Espen Aarseth (1997), precisely in order to liberate the interpretation of video games from the close links connecting it to traditional texts. In his book, the author distinguishes between ergodic and non-ergodic texts. In non-ergodic texts, the relationship between the text and its reading is trivial, in the sense that the second directly comes from the first. In ergodic texts, in contrast, the relationship becomes non-trivial, in virtue of the active intervention of the reader, who chooses the path of the story will take: "The effort and energy demanded by the cybertext of its reader raise the stakes of interpretation to those of intervention. Trying to know a cybertext is an investment of personal improvisation that can result in either intimacy or failure. The tensions at work in a cybertext, while not incompatible with those of narrative desire, are also something more: a struggle not merely for interpretative insight but also for narrative control" (Aarseth 1997: 4).

Nevertheless, beyond this fundamental difference, many other aspects are shared by ergodic and non-ergodic texts. In particular, three terms seem to capture the multidimensional way audiovisual media engage users: *flow*, *immersion*, and *presence*.

The first term is *flow*. Sometimes used interchangeably with immersion (Michailidis et al. 2018), but certainly less ambiguous, flow was originally introduced by the psychologist Mihály Csíkszentmihályi (1975); it indicates a state of consciousness characterized by certain specific conditions: a challenging activity that requires skills; the merging of action and awareness; clear goals and feedback; concentration on the task at hand; the paradox of control; the loss of self-consciousness; the transformation of time; the autotelic experience (Csíkszentmihályi 1990). Some of the above conditions can also be attributed to immersion and presence, but others are exclusively specific to flow. One especially seems to be possible only for ergodic texts: clear goals and feedback. Admittedly, if goals can be pursued in non-ergodic texts, it does not make any sense to include feedback too. Only by *acting*, feedback can be expected. Flow is then the condition that seems highly specific for activities that engage the "reader" performatively.

The most problematic term is immersion, for two reasons: it is semantically vast and applicable to both ergodic and non-ergodic media (see Calleja 2011 for a discussion). In fact, if we assume the definition offered by Janet Murray, which is considered one of the most authoritative in game studies, immersion sounds like this: "Immersion is a metaphorical term derived from the physical experience of being submerged in water. We seek the same feeling from a psychologically immersive experience that we do from a plunge in the ocean or swimming pool: the sensation of being surrounded by a completely other reality, as different as water is from air, that takes over all of our attention, our whole perceptual apparatus" (Murray 2017: 99). Besides, Murray adds, immersion is a "participatory activity" that requires active involvement and complete attention.

Presented in this way, immersion seems to be something encompassing both physical and psychological dimensions. Being immersed in a story echoes the perceptual, environmental sensation of being physically immersed in it. Simultaneously, as Murray explicitly suggests, immersion is increased not by the mere suspension of disbelief, as S.T. Coleridge remarkably pointed out, but is empowered by the *creation of beliefs* concerning fictional world. Immersion is, therefore, an all-inclusive and vague concept, since it involves both physical and psychological aspects (McMahan 2003).

A way to reduce this vagueness consists in stressing the very physicality of immersion. A term that might fit this purpose and has an honourable tradition in game studies and computer sciences is *presence*. Derived from Marvin Minsky's concept of telepresence, strictly speaking this term applies to the physical, and ego-spatially referred sensation of *being somewhere*, not metaphorically, but concretely and sensomotorically. In a certain way, presence could be interpreted as a deeper kind of immersion, where the agent experiences the physical and spatial sensation of having abandoned his/her environmental surroundings. Gordon Calleja defined "immersion as absorption" and "immersion as transportation" respectively as the psychological condition of being enchanted by a story and as the physical projection into the mediated world (Calleja 2011: 26-7).

It is important to notice that these terms are frequently used interchangeably, often generating confusion and misunderstanding. As we will see, ambiguity and polysemy characterize their use. Relying on experimental evidence and psychological and philosophical speculations, we will try to offer a simplified picture of the problem.

3   Neurocognitive Data and Psychological Theories

There are mainly two ways through which video gaming can be studied: on the one hand, by checking the cognitive effects of this activity on human cognition (Green et al. 2003, Bavelier et al. 2011, Gozli et al. 2014, Boot 2015, Unsworth et al. 2015, Chabris 2017, Bediou et al. 2018, Dale et al. 2020), on the other hand, by trying to understand what characterizes the experience of game playing. Even though both ways are important for a full understanding of the phenomenon investigated, the aim of this paper is to address the second.

Being in the flow is a multifaceted experience difficult even to self-report. It is very hard, then, to model an experimental setting and to choose what to investigate and what to exclude (see Weber et al. 2009, and Khoshnoud et al. 2020 for a discussion of methodological issues). Besides, not every game is the same, so game variety can complicate things further. With this awareness in mind, the first problem consists in circumscribing the starting hypothesis. The study by Arne Dietrich (2004), for example, refers to the implicit/explicit dichotomy to differentiate between possible cognitive strategies: the explicit system is associated with the higher and temporally extended cognitive functions (flexibility), while the implicit system is associated with skill-based, and faster cognitive reactions (efficiency). By relying on this distinction, the author suggests that "optimal performance involving a real-time sensorimotor integration task is associated with maximal implicitness of the task's execution. [...] it follows from this proposal that a flow experience must occur during a state of transient hypofrontality that can bring about the inhibition of the explicit system." (Dietrich 2004: 757).

The term "hypofrontality" is relevant here. It echoes a lack of long-term planning, as well as reduced monitoring of conscious activity. Thus, it seems that you need to lose yourself to get in the flow. More precisely, as Csíkszentmihályi points out, you need to lose the "consciousness *of* the self" (1990: 64), meaning that you have to ignore the conscious representation of who you are, but not the immediate sensorimotor feeling of being you. Employing the terminology of embodied cognition, you have to forget your *body image*, but not

your *body schema*, and neither do you have to "lose your mind," as athletes and performers know perfectly well (Francesconi and Gallagher 2019, Gallagher 2018).

Active sensorimotor involvement seems to be a crucial component for getting into the flow. To test the degree and the extension of this involvement, Martin Klasen and colleagues tried to measure through fMRI brain network activations while users were playing specific game contents (a first-person shot fight game). This method assumes that a state of flow can be inferred by the game situation the user is involved in (low, medium, and high focus) and the success of the game session. A conjunction analysis confronting brain activations showed the emergence of a motor simulation network responsible for the insurgence of flow. The authors point out that "this sensorimotor activation reflects the simulation of physical activity in the game and that activation of this 'simulation network' contributes to the emergence of flow." (Klasen et al. 2012: 490)

The problem with the above experiment is that it relies on a specific game, or better on the experience caused by the game. To offer a more general and comprehensive description of flow, René Weber and colleagues shifted the core of the analysis from the content of the game to the working condition of the brain. Their definition runs as follows: "In the media context, flow is a discrete, energetically optimized, and gratifying experience resulting from the synchronization of attentional and reward networks under condition of balance between challenge and skill." (Weber et al. 2009: 412). The aim then was to describe the flow independently from the kind of content experienced by the user. In this case, though, even if the overall description of flow offered is more general and content-independent, nonetheless it can be strictly circumscribed to a given psychological domain. This is why the overlap between flow and other phenomena, mainly immersion, is a constant worry in every experimental setting.

A preliminary study conducted by Emily Brown and Paul Cairns (2004), for example, shows how slippery and hard to define the term immersion is. By using questionnaires administered to gamers, they found that immersion can be threefold: "engagement" is the first phase, corresponding to the willingness in terms of time and personal preference of the gamer to play a given game; after that, the gamer experiences "engrossment" if he/she is emotionally involved; finally, the gamer can experience "total immersion" if he/she has the illusion of being cut off from the surrounding space.

In another experiment designed to combine objective measures and subjective reports, Charlene Jennet and colleagues (2008) started separating immersion from flow and cognitive absorption. Although they conducted three experiments and developed a questionnaire designed explicitly to investigate immersion, unexpected results and a great degree of undefined variables at many levels (conceptual, practical, and instrumental), forced them to conclude that much work still needs to be done. A recent attempt to unify experimental evidence and conceptual framework seems to confirm the trend of this "conceptual challenge." In their study, Lazaros Michaidilis and colleagues (2018) conclude that immersion and flow should not be considered separate processes, at least for the moment, considering the degree of generalizability currently characterizing the debate. To justify a sharp separation between these concepts, they claim, we need more neuropsychological and experimental evidence.

As a further confirmation of the mutual permeability of the terms investigated so far, David Weibel and Bartholomäus Wissmath assert that "*flow* could thus be described as *immersion* into an activity (i.e., the gaming action), whereas *presence* refers to a sense of *spatial immersion* in a mediated world." (Weibel and Wissmath 2009: 3, italics added). Despite their relaxed use of the terms, we agree with the authors in considering flow as dependent on the agent's activity and presence on the kind of technological artefact employed. As the term clearly suggests, in fact, the feeling of presence occurs when the agent experiences a spatial and sensorimotor sensation of being in a place. The sensation is clear to all of us because it defines our daily life, but it can be simulated by the deployment of technical artefacts if the media engagements produced satisfy specific conditions.

It is no accident, then, that the concept of presence has been investigated in virtual reality (VR), the only technological equipment that can allow a sensorimotor alienation/distancing away from the physical environment towards a digital one. Mel Slater and Sylvia Wilbur (1997) proposed a model that has been influencing the debate enormously. Once again, immersion and presence are presented as similar psychological states. In their paper, they think of presence as "an increasing function of immersion in all its aspects" (Slater and Wilbur

1997: 606). But what creates the concrete shift from immersion to presence is the reconstructed physicality of both the virtual environment and of the body, which is transporting experience from one place to another, and not just/simply metaphorically. A virtual body has to enact a virtual environment: the more lawful (in a Gibsonian sense) virtual reality responds to the agent's intentions, the higher the feeling of presence experienced (Sanchez-Vives and Slater 2005, see Slater and Sanchez-Vives 2016 for an updated discussion).

Flow, immersion, and presence are thus three interconnected and mutually permeable concepts referring to a vast array of psychological and behavioural states. Both theoretical and experimental research seem incapable of isolating such terms unequivocally, and the approaches that try to do that fail, in our opinion, in the enterprise. As we will see, this failure is motivated by the heterogeneity and hybridization of interactive experiences available and the theoretical assumptions which frame the problem. We are going to discuss them both.

4   Immersive Stories and Walks

In recent years, the video game market has seen the birth and rise of products created by individuals or smaller development teams that have put immersive space exploration at the centre of their projects. More precisely, many of these video games have transformed the exploration of space into a game mechanic, indeed into the only mechanic possible within a three-dimensional space. Strictly under a mode of classification of video games based on mechanics — at least traditionally, although not exclusively (for a debate on video game genres see: Crawford 1984; Myers 1999; Bittanti 1999; Apperley 2006; Arsenault 2011) — these games have been called in a derogatory way "walking simulators." Therefore, the focus is placed on interaction methods rather than on the other elements which characterize these "games" (Montembeault and Deslongchamps-Gagnon 2019). Additionally, as we will see, most of these video games enhance the role of storytelling and "environmental storytelling" (Jenkins 2004) in order to increase the flow. In this respect, these are challenging examples to add some remarks to the topics we introduced above.

In *Gone Home* (Fullbright 2013) for example, I search "my" empty house looking for my family. Room by room, objects and short texts help me understand what happened to my sister while I was away, where she went and why. I take pleasure in unravelling the story from a first-person perspective. I feel immersed in this abandoned house, and I perceive its deep sadness.

Dear Esther (2012) and *Everybody's Gone to the Rapture* (2015) are productions of the English game development studio The Chinese Room. The first is set on an island in the Hebrides and consists of an exploratory "immersion" in the place, which corresponds to the progressive unravelling of an apparently disconnected story read by a man's voice. An enveloping soundtrack makes this journey even more immersive in the approximately two hours of play. *Everybody's Gone to the Rapture* is once again based on exploration and the mystery surrounding a deserted town in which the environment itself becomes the bearer of memories and clues.

In *Proteus* (Key and Kanaga 2013), the exploration takes place on a pixelated island. The seasons follow one another and the nature of the randomly generated environment changes shape. It is an almost abstract experience, in which there is no real story apart from the narratives created by our immersion in space and by the objects and events we perceive.

Other games from the same period are occasionally considered walking simulators, for example *Journey* (Thatgamecompany 2012). In this award-winning game, "Alone and surrounded by miles of burning, sprawling desert, you soon discover the looming mountaintop is your goal. The passage will not be easy, but this experience of a lifetime will help you discover who you are, what this place is, as you arrive at your purpose" (Journey 2012).

David O'Reilly's *Everything* (Double Fine Productions 2017) presents the idea of exploration with an assortment of possible points of view thanks to the use of different avatars. The player takes the form and point of view of different animals, plants, minerals, microorganisms, and more in order to experience different interactions with the environment, from the microscopic to the macroscopic.

Exploration of the environment is not a prerogative of these games. More and more often even large Triple AAA productions have opted for forms of ever-greater freedom of movement in the typical form of the sandbox and open world games, from the *GTA (Grand Theft Auto)* and *Assassin's Creed* sagas to *Death Stranding* (2020). However, what characterizes this specific type of game, the "walking simulator," is placing at the centre of the experience immersion within a particular environment (also recalling the distinction between mechanical and narrative immersion suggested by Mason 2013).

Nevertheless, this new type of video game has put the very definition of "video game" into serious question, because of its lack of goals and challenges. Game Studies scholar Jesper Juul recently addressed this topic in an article in which he analyzes these games. Juul points out the absence of challenges and gameplay. On this, he builds an idea based on different aesthetic layers in which the third level ("Aesthetics III: Aesthetics of the aesthetics of the aesthetics of video games") would correspond to "walking simulators" such as the already mentioned *Gone Home*, *Proteus*, *Dear Esther* and *The Path* (Tale of Tales 2009) or *Firewatch* (Campo Santo 2016).

In a radical departure in game history, walking simulators, therefore, reject the gameplay and strategy optimization which characterize most games, but in doing so, walking simulators present a quite conservative and traditional idea of aesthetics, in order to create video games that can fit in art gallery settings (Juul 2018).

Therefore, Juul notes the rejection of gameplay strategies as the main element of these experiences. As evident from our previous description, this was not the first characteristic we noted: our first reaction was not related to the absence or the rejection of strategy optimization, as Juul suggested.

Our impression was the one we described above: *immersion within a space*. It is no coincidence that in these video games, the interface is minimal or even absent while it is perceived as an element that structures and masks the relationship with a world which is instead intended to be as fluid as possible. Therefore, in most cases, the user is catapulted without information into an environment in which she does not find precise indications or specific goals.

Does it make sense to ask whether or not it is a video game? From Juul's perspective, it certainly does, considering his position in the debate about video games and narration and the importance he assigned to interaction (Juul 2001).

In his article significantly titled *Games telling stories?*, the scholar entered the debate between "narratologists" and "ludologists," which can be ascribed to the origin of a new discipline dedicated to studying video games. One of the most debated cases was that of *Tetris* (Aleksej Leonidovič Pažitnov 1984). If video games tell stories, what story could *Tetris* ever tell, a game in which there appeared none of the minimal elements that give rise to a narration in the traditional sense? Some said that even *Tetris* had a story (Murray 2017), and some claimed that it did not have it at all (Eskelinen 2001). Today, twenty years later, the question of whether a video game tells a story appears almost rhetorical, considering the development of narration through the video game medium. Still, at the time, this question was useful in identifying specific tools to study this interactive medium.

However, this debate may suggest a question about the role of narrative in these games. We could provocatively put these video game experiences at opposite poles: on the one hand only gameplay and no story (*Tetris*); on the other hand, minimal game mechanics and only narrative (*Gone Home, Dear Esther, Everybody's Gone to the Rapture*) or the so-called "environmental storytelling" (Jenkins 2004) as in *Journey, Proteus, Everything*.

However, no one questioned that *Tetris* was a video game, while the very nature of *Gone Home* or *Proteus's* has been questioned. According to Juul, this "rejection of the gameplay" would, therefore, involve an attempt to present these games as artistic forms of an aesthetic nature in the most conservative sense of the term.

5   Immersive Experiences

Actually, what Juul claims could be proved correct by the fact that recently many artists have created similar *experiences* by designing *immersive* artworks, with the sole purpose of putting the user at the centre of an environment and some form of narration.

We are thinking in particular of works created using Virtual Reality technology such as *Endodrome* (2019) by Dominique Gonzalez-Foerster, *Chalkroom* (2017) and *To the Moon* (2018) by Laurie Anderson & Hsin-Chien Huang, or *It Will End in Stars* (2018) by Nathalie Djurberg and Hans Berg.

Endodrome, presented at the latest Venice Biennale in 2019 by French artist Gonzalez-Foerster "immerses audiences in an abstract and meditative environment" (Endodrome 2019). *Chalkroom* is "a virtual reality work by Laurie Anderson and Hsin-Chien Huang in which the reader flies through an enormous structure made of words, drawings and stories. Once you enter you are free to roam and fly. Words sail through the air as emails. They fall into dust. They form and reform" (Chalkroom – Laurie Anderson 2018). In *To the Moon*, a 15-minute VR experience, the viewer is shot out from earth to the surface of the moon on which she can walk and interact. According to the Director's statement published on the Venice Biennale website, "*To The Moon*, allows the viewer to literally walk into a work of art" (To the Moon | Biennale Cinema 2019).

Finally, Djurberg and Berg VR experience is a modern version of a fable with the big bad wolf:

> Viewers begin their journey deep in a forest, entering a clearing to discover a wooden cabin. Inside, a wolf sits in front of a glowing fire — the building's chintz interior undercut by a creeping sense of unease. Hand-written text, which appears hanging in mid-air, conveys the wolf's thoughts, merging digital technology with an aesthetic closer to silent cinema. He describes the virtual environment as the "shadowside," delivering a confession that merges themes common in Djurberg's practice; fear, guilt and animalistic impuls (Acute Art | Nathalie Djurberg & Hans Berg 2018).

We have not mentioned these VR productions by chance although we could have cited other examples of experimental three-dimensional immersive environments made by other artists such as *The Night Journey* (2007-2018) by Bill Viola. In fact, we believe that this new technology and the debate that has arisen around it, help shed light on an increasingly widespread phenomenon. Indeed, the design of these new products must be linked to a broader field that sees the growing demand for increasingly immersive forms of narratives in all areas, especially in entertainment, and beyond (for example in non-fictional products and art). Each experience promises to be *immersive*, to envelop the viewer and make her feel involved. In fact, Fabienne Liptay and Burcu Dogramaci — in the introduction to the book edited by them, with the title *Immersion in the Visual Art and Media* — note that:

> the term immersion (derived from Latin "immersio") may refer to any act or experience of plunging into something, without necessarily applying to a computer-generated virtual environment. Due to the term's wide variety of uses, especially in the English language, a baptismal font or a swimming pool, a chemical solution or a medicinal bath, the shadow of a planet or a foreign language can equally serve as immersive "media" (Liptay and Dogramaci 2016: 1).

The video game sector is no exception, and this goal has been pursued — and in part achieved well before others — through two main objectives: the creation of coherent curated environments and narrations with which to interact. As far as consistency is concerned, this is an even more important quality than photorealism. As abstract as it is, a game world works if it is credible as a place where the narratives occur. The same goes for the narrative, more or less present and detailed; it must necessarily be coherent to the world so as not to break the contract with the user.

But the point we would like to focus on when describing these products, which are so different and created in apparently distant contexts, is that there is a leitmotif in the way we describe them. As we saw above, more and more often we speak, in fact, of "immersive experiences." But what is an "experience"? And why does an experience have to be immersive?

Still, today, thinking about the media, we never describe with this word the act of reading a novel or watching a film. However, we continuously do so when we refer to a video game, an installation or a virtual reality environment. Indeed, as Ruggero Eugeni has pointed out, the concept of *experience* is a crucial concept of our contemporaneity. Eugeni describes the experience starting from its double dictionary definition as a patrimony of acquired knowledge, and as "the course of the events of consciousness that take place starting from the concrete and living placement of the subject within a world" (Eugeni 2010: 25, our translation). Being of

an interior and personal nature, therefore, every experience requires an interpretative action, a "hypothetical process." This aspect reflects the etymological meaning of "experiment" (the verb *experiri* means to search through tests and attempts), and so the idea of something involving repetition and effort as in a video game.

Experience is based on interpretation. It is dynamic and made of three layers: after a survey of the sensitive data of what is present around her, the subject proceeds to a narrative ordering of what she perceives by comparing it with the experiences of other people (relational harmony). Therefore, considerable importance is assigned to the "design of the experience," or rather to the construction of the experience itself, the real goal of the semiotic approach. Indeed, from a semiotic and media perspective, Eugeni describes the video game as an "environmental experience," in contrast to the closed experience of the text. From the point of view of the relationship with the everyday world, however, it is difficult to catalogue, since it can result both in continuity and in discontinuity with this world: it can therefore be "factual" as much as "fictional," "participatory" and "aesthetic" (Eugeni 2010: 293). A few years later in the book *La condizione postmediale*, Eugeni (2015) tackles a crucial issue for us, namely that of the first person shot as an emblematic post-media figure as the interpreter of a subjectivisation of experience.

Thus, it seems unsurprising to read how products created with the purpose of placing the user inside an environment are defined as "immersive narrative experiences" such as what happens in VR where you enter an image-world (Pinotti 2020). And the same happens for these "walking simulators." Therefore, for instance, *Gone Home* puts you within "An Immersive Place: Return to the 1990s by visiting a home where every detail has been carefully recreated, and the sounds of a rainstorm outside wrap you in the experience" (Gone Home on Steam 2013) and *Dear Esther* is "a first-person game about love, loss, guilt and redemption. Driven by story and immersion rather than traditional mechanics, it's an uncompromisingly emotional experience" (Dear Esther – The Chinese Room 2012); *Proteus* "is a game about exploration and immersion in a dream-like island world where the soundtrack to your play is created by your surroundings. Played in first-person, the primary means of interaction is simply your presence in the world and how you observe it" (Proteus on Steam 2012).

However, it is surprising to see how even games based on mechanics are now offered as emotional experiences. *Tetris* in its reinterpretation by Tetsuya Mizuguchi entitled *Tetris Effect* and also available in VR "amplifies this magical feeling of total immersion by surrounding you with fantastic, fully three-dimensional worlds that react and evolve based on how you play" (TETRIS® EFFECT 2018).

The fact that a series of events happen in an environment where we (or our avatar) can move and that their meaning is dynamically constructed through our interaction, transforms these new forms of storytelling into experiences. Precisely for this reason, we believe that in a narratological language it will be increasingly important to consider the concept of "experience" as a new tool not only for *ekphrasis* (from Ancient Greek ἐκ "outside" and φράζω "to speak;" to designate an inanimate object with a name) — as already happens — but above all in terms of design and analysis.

In this respect, analysing the concept of agency in video games and its relationship with immersion, Souvik Mukherjee proposes a new definition of how the player relates to the text which seems very close to the concept of the experience. For him, "the process of choice-creation and the actualisation of possibilities (in the action-image) is not explainable as agency but is more aptly described as a 'becoming'". Moreover: "Instead of the carefully predetermined agency of conscious human thought, the action in the computer game develops as a result of the process of 'becoming' in the interaction of the 'thought' of both the human and the computer. Therefore, 'becoming' not only explains the development of the action in the computer game; simultaneously, the development of the subject is described" (Mukherjee 2015: 167-168).

Experience design as the design of this "zone of becoming" (Mukherjee 2015: 168), therefore, constitutes an articulated approach to a multimedia product that aims to be immersive, both for video games and VR.

6   Agency as Immersive Becoming: Insights from 4E Cognition

What we have said so far can be summarized as follows: Being in the flow is a condition which is task-dependent, and necessarily produced by active sensorimotor involvement; immersion is a broad, all-encompassing phenomenon that can be achieved in different (all?) media contexts, whilst presence is a kind

of immersion that is environmentally and ego-spatially characterized. From the perspective of the product, flow requires feedback and then is achievable during video gaming; presence is obtained only if a proper environmental simulation is capable of creating the illusion of being physically elsewhere (VR); immersion can be experienced in different audiovisual products (ergodic and non-ergodic texts), as well as through different technological supports (books, movies, video games, VR).

Even though our proposal maintains the terminological distinction between the three terms discussed, it questions the possibility of their being discretely separated and investigated as "pure" cognitive phenomena.Importantly, this does not mean that they are medium-specific either, or dependent on the bare materiality of the medium. They depend on the *relation* between the agent, the medium, and the environment. When we play video games, watch movies, wear a head-mounted display to interact, and so forth, we are not just doing something, we are *becoming someone* (Di Paolo 2020). For this perspective to be maintained, a different conception of cognition is needed. One that does not assume the subject as the immutable starting point of the process, but as a *peer element* of the whole system.

Such a conception can be found in 4E cognition (Newen et al. 2018, Menary 2010). To understand what "E" stands for, we have to start from the first of them: *embodiment*. Roughly speaking, "embodiment" is the label defining the epistemological predisposition to deem cognition as inextricably tied to the cognizer's body. It is impossible, embodied cognitive scientists claim, to fully understand cognition if the body is not part of the formula. Put in other way, the point is that the explanation of cognitive phenomena cannot rely on the brain alone (Gallagher 2005, Shapiro 2019). This predisposition is now mainstream and has influenced media research too (Nannicelli 2014, Fingerhut 2021). In general, this approach has offered a clear, direct explanation, supported by experimental data philosophically investigated, of some neurocognitive mechanisms involved in the appreciation of fictional worlds. The approach has received much attention worldwide, and now is also applied to music (Schiavio et al. 2017) paintings (Freedberg and Gallese 2007), literature (Wojciehowski and Gallese 2011, Kukkonen 2019), moving pictures (Eugeni and D'Aloia 2014, Smith 2017, Gallese and Guerra 2020), and video games (Gregersen and Grodal 2009).

If embodiment has had the merit of recognizing the importance of the body, another theoretical shift acknowledged that the environment and the things included in it *play a role* in defining cognition. Beyond being embodied, then, cognition is *extended*, *embedded*, and *enactive*: Three more "Es" to highlight the prominent role that material artefacts and social institutions play in the cognitive behaviour of the agent, who was traditionally pictured, at the beginning of the cognitive revolution in mind sciences, as being one with his/her subpersonal brain processes.

It is impossible and far beyond the space remaining even to introduce the nuances that define the differences between the Es. Instead, we prefer to draw attention to what they have in common: cognition does not occur just in the head but involves — more or less constitutively — the surrounding world (Durt et al. 2017). Even if our sensorimotor skills evolved for natural purposes, our condition as *Homo faber* (Ihde and Malafouris 2019) became astonishingly evident at a certain point in our history. We are organisms whose natural condition is to be retroactively shaped by the things we have made. In this scenario, audiovisual media occupy a special place, since they strongly stimulate components of this ancient sensorimotor engagement by creating *alternative simulated or recorded worlds* that can be explored.

We contend that if framed inside this epistemology, the terms traditionally used in game studies — flow, presence, and immersion — reveal the different ways the agent's experience *is transformed* by audiovisual media. The point stressed more or less radically by 4E cognition is that there is not a pre-given agent who watches, interacts with, or explores pre-defined mediated worlds, but there are *relations* between audiovisual worlds and bodies which can be understood only by scrutinizing the effects they exert "metaplastically" (Malafouris 2013) on each other.

The transformative effects of this becoming occur on multiple time scales and to different degrees. They affect personal and social dimensions of life: "Human becoming is not a genetic setup or an evolutionary stage, but an open and ongoing process of creative engagement with the material world" (Malafouris 2021). If we adopt this perspective, it becomes clearer how and why specific psychological behaviours can be expected or are impossible to get; it is like a "dance" between opportunities and constraints.

For instance, flow is constrained by the need for feedback. It is not by chance that the term has had a considerable impact on video games and sports psychology. Both video gaming and sports are activities based on performing actions and adequately reacting to stimuli. In addition, they require systems of measurement and evaluation which confer value to the actions performed. Agentive involvement, constant feedback, and evaluation, are therefore key features of video games. An example of the transformative effect potentially induced by long-lasting exposure to video games, intensified by states of flow, is the so-called "Proteus Effect": "Users who are deindividuated in online environments may adhere to a new identity that is inferred from their avatars [...] they conform to the behaviour that they believe others would expect them to have" (Yee and Bailenson 2007: 274).

To elicit virtual presence, on the other hand, the mediated environment has to offer the agent the opportunity to satisfy what Kevin O'Regan and Alva Noë called "sensorimotor contingencies" (O'Regan and Noë 2011). In the context of media engagement, it occurs only when a (virtual) body interrogates a (simulated) environment: "Presence is defined as the non-mediated (prereflexive) perception of successfully transforming intentions in action (enaction) within an external world" (Riva 2009: 160). The transformative effect in this case has the character of illusion. The out-of-body experience is the phenomenological illusion that one's body is dislocated out there in a virtual space provided by a head-mounted display (Ehrsson 2007, Lenggenhager et al. 2007, Maselli and Slater 2013, Parisi 2021). The feeling of being elsewhere is so strong that a highly stable phenomenological state such as identifying with one's body can be disrupted.

Finally, immersion presents no absolute constraints: it may arise in many different circumstances because it does not require direct physical activity reinforced by congruent feedback. We can be immersed in our thoughts while lying on our couch. This is why we believe that immersion is a critical element of media engagement. In a certain way, it is a precondition for (or an implication of) the other two: if you feel present somewhere, this automatically implies that you feel immersed too; the same can be said when you are in the flow. Consequently, we want to emphasize the centrality of immersion and point out that the narrative aspect of any media engagement enhances immersion. We can conceive stories as expedients for entering the fictional world and for the maintenance of long-lasting, shareable experiences. A story immediately brings us into the fictional world, possibly facilitating engagement with the gameplay. It also may create an emotional bond and provide the opportunity to relive (reenact) the story, especially with other people.

References

Aarseth, Espen J. (1997). *Cybertext: Perspectives on Ergodic Literature*. Baltimore: JHU Press.

Acute Art | Nathalie Djurberg & Hans Berg (2018). https://acuteart.com/artist/nathalie-djurberg-and-hans-berg/ (last accessed 07-01-2021).

Anderson, Laurie (2018). "Laurie Anderson. Telling Stories in Virtual Reality. Laurie Anderson in conversation with Bonnie Marranca." *Performing Arts Journal*, 120: 37-44. https://doi.org/10.1162/PAJJ_a_00432.

Apperley, Thomas (2006). "Genre and game studies: Toward a critical approach to video game genres" in *Simulation & Gaming*, 37(1): 6-23, https://doi.org/10.1177/1046878105282278.

Arsenault, Dominique (2011). *Des typologies mécaniques à l'expérience esthétique. Fonctions et mutations du genre dans le jeu vidéo* (Doctoral dissertation at the Université de Montréal). https://papyrus.bib.umontreal.ca/xmlui/handle/1866/5873 (last accessed 07-01-2021).

Bavelier, Daphne, C. Shawn Green, Doug Hyun Han, Perry F. Renshaw, and Michael M. Merzeich (2011). "Brains on Video Games." *Nature Reviews Neuroscience* 12(12): 763-768, https://doi.org/10.1038/nrn3135.

Bediou, Benoit, et al. (2018). "Meta-Analysis of Action Video Game Impact on Perceptual, Attentional, and Cognitive Skills." *Psychological Bulletin* 144(9): 978-979, https://doi.org/10.1037/bul0000168.

Bittanti, Matteo (1999). *L'innovazione tecnoludica. L'era dei videogiochi simbolici (1958-1984)*, Milano: Jackson Libri.

Boot, Walter R. (2015). "Video Games as Tools to Achieve Insight into Cognitive Processes." *Frontiers in Psychology* 6. https://doi.org/10.3389/fpsyg.2015.00003.

Brown, Emily, and Paul Cairns (2004). "A Grounded Investigation of Game Immersion." *Conference on Human Factors in Computing Systems - Proceedings*. 1297-1300. https://doi.org/10.1145/985921.986048.

Calleja, Gordon (2011). *In-Game: From Immersion to Incorporation*. Cambridge, MA: The MIT Press.

Chabris, Christopher F. (2017). "Six Suggestions for Research on Games in Cognitive Science." *Topics in Cognitive Science* 9(2): 497-509. https://doi.org/10.1111/tops.12267.

Chalkroom – Laurie Anderson (2018). https://laurieanderson.com/?portfolio=chalkroom (last accessed 07-01-2021).

Crawford, Chris (1984). *The Art of Computer Game Design*, New York: McGraw-Hill-Osborne Media.

Csikszentmihalyi, Mihaly (1975). *Beyond Boredom and Anxiety*. San Francisco: Jossey-Bass.

Csikszentmihalyi, Mihaly (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper & Row.

Dale, Gillian, Augustin Joessel, Daphne Bavelier, and C. Sahwn Green (2020). "A New Look at the Cognitive Neuroscience of Video Game Play." *Annals of the New York Academy of Sciences* 1464(1): 192-203. https://doi.org/10.1111/nyas.14295.

Dear Esther - The Chinese Room (2012). http://www.thechineseroom.co.uk/games/dear-esther (last accessed 07-01-2021).

Dietrich, Arne (2004). "Neurocognitive Mechanisms Underlying the Experience of Flow." *Consciousness and Cognition* 13(4): 746-761. https://doi.org/10.1016/j.concog.2004.07.002.

Ehrsson, H. Henrik (2007). "The Experimental Induction of Out-of-Body Experiences." *Science* 317(5841): 1048. https://doi.org/10.1126/science.1142175.

D'Aloia, Adriano and Ruggero Eugeni (eds.) (2014). "Neurofilmology. Audiovisual Studies and the Challenge of Neuroscience." *Cinéma&Cie. International Film Studies Journal* 22/23.

Di Paolo, Ezequiel (2020). "Enactive becoming." *Phenomenology and Cognitive Sciences*. https://doi.org/10.1007/s11097-019-09654-1.

Endodrome (2019). https://www.institutfrancais.com/en/work/endodrome-by-dominique-gonzalez-foerster (last accessed 07-01-2021).

Eskelinen, Markku (2001). "The Gaming Situation." *Game Studies* 1(1).

Eugeni, Ruggero (2010). *Semiotica dei media. Le forme dell'esperienza*. Roma: Carocci.

Eugeni, Ruggero (2015). *La condizione postmediale*. Brescia: Editrice La Scuola.

Fingerhut, Joerg (2021). "Enacting Media. An Embodied Account of Enculturation Between Neuromediality and New Cognitive Media Theory". *Frontiers in Psychology* 12 (Article 635993): 1-22. https://doi.org/10.3389/fpsyg.2021.635993.

Francesconi, Denis and Shaun Gallagher (2019). "Embodied Cognition and Sport Pedagogy." In *Handbook of Embodied Cognition & Sport Psychology*, edited by Massimiliano Cappuccio, 249-272. Cambridge, MA: The MIT Press.

Freedberg, David, and Vittorio Gallese (2007). "Motion, emotion and empathy in esthetic experience." *Trends in Cognitive Sciences* 11(5): 197-203. https://doi.org/10.1016/j.tics.2007.02.003.

Gallagher, Shaun (2018) "Mindfulness and mindlessness in performance." *Reti, saperi, linguaggi* 1: 5-18.

Gallagher, Shaun (2005). *How the Body Shapes the Mind*, Oxford: Clarendon Press.

Gallese, Vittorio, and Michele Guerra (2020). *The Empathic Screen: Cinema and Neuroscience*. Oxford - New York: Oxford University Press.

Gone Home on Steam (2013). https://store.steampowered.com/app/232430/Gone_Home/ (last accessed 07-01-2021).

Gozli, Davood G., Daphne Bavelier, and Jay Pratt (2014). "The Effect of Action Video Game Playing on Sensorimotor Learning: Evidence from a Movement Tracking Task." *Human Movement Science* 38: 152-162. https://doi.org/10.1016/j.humov.2014.09.004.

Green, C. Shawn, and Daphne Bavelier (2003). "Action Video Game Modifies Visual Selective Attention." *Nature*, 423(6939): 534-537. https://doi.org/10.1038/nature01647.

Gregersen, Andreas, and Torben Grodal (2009). "Embodiment and interface." In *The Video Game Theory Reader*, edited by Bernard Perron and Mark J.P. Wolf, 65-83. London: Routledge.

Jenkins, Henry (2004). "Game Design as Narrative Architecture." In *First Person: New Media as Story, Performance, and Game*, edited by Noah Wardrip-Fruin and Pat Harrigan, 118-130. Cambridge, MA - London: The MIT Press.

Jennett, Charlene, et al. (2008). "Measuring and Defining the Experience of Immersion in Games." *International Journal of Human-Computer Studies* 66(9): 641-661. https://doi.org/10.1016/j.ijhcs.2008.04.004.

Journey (2012). https://thatgamecompany.com/journey/ (last accessed 07-01-2021).

Juul, Jesper (2001), "Games Telling Stories? A Brief Note on Games and Narratives." *Game Studies*, 1(1). http://www.gamestudies.org/0101/juul-gts/ (last accessed 28-11-20).

Juul, Jesper (2018), "The Aesthetics of the Aesthetics of the Aesthetics of Video Games: Walking Simulators as Response to the problem of Optimization." 12th International Conference on the Philosophy of Computer Games Conference, Copenhagen. https://www.jesperjuul.net/text/aesthetics3/ (last accessed 28-11-20).

Khoshnoud, Shiva, Federico Alvarez Igarzábal, and Marc Wittmann (2020). "Peripheral-Physiological and Neural Correlates of the Flow Experience While Playing Video Games: A Comprehensive Review." *PeerJ* 8(1): e10520. https://doi.org/10.7717/peerj.10520.

Klasen, Martin, René Weber, Tilo T. J. Kircher, Krystyna A. Mathiak, and Klaus Mathiak (2012). "Neural Contributions to Flow Experience during Video Game Playing." *Social Cognitive and Affective Neuroscience* 7(4): 485-495. https://doi.org/10.1093/scan/nsr021.

Kukkonen, Karin (2019). *4E Cognition and Eighteenth-century Fiction: How the Novel Found its Feet*. Oxford: Oxford University Press.

Lenggenhager, Bigna, Tej Tadi, Thomas Metzinger, and Olaf Blanke (2007). "Video Ergo Sum: Manipulating Bodily Self-Consciousness." *Science* 317(5841): 1096-1099. https://doi.org/10.1126/science.1143439.

Liptay, Fabienne and Burcu Dogramaci (eds.) (2016). *Immersion in the Visual Arts and Media*, Leiden I Boston: Brill Rodopi.

Malafouris, Lambros (2021). "Mark Making and Human Becoming." *Journal of Archaeological Method and Theory*. https://doi.org/10.1007/s10816-020-09504-4.

Malafouris, Lambros (2013). *How Things Shape the Mind.* Cambridge, MA: The MIT Press.

Maselli, Antonella, and Mel Slater (2013). "The Building Blocks of the Full Body Ownership Illusion." *Frontiers in Human Neuroscience*, 7(83): 1-15. https://doi.org/10.3389/fnhum.2013.00083.

Mason, Stacey (2013). "On Games and Links: Extending the Vocabulary of Agency and Immersion." *Interactive Storytelling. ICIDS 2013. Lecture Notes in Computer Science* edited by Hartmut Koenitz, Tonguc Ibrahim Sezen, Gabriele Ferri, Mads Haahr, Digdem Sezen, and Güven Çatak, 25-34. Cham: Springer.

McMahan, Ann (2003). "Immersion, Engagement, and Presence." In *The Video Game Theory Reader*, edited by Mark J.P. Wolf and Bernard Perron, 67-86. London: Routledge.

Michailidis, Lazaros, Emili Balaguer-Ballester, and Xun He (2018). "Flow and Immersion in Video Games: The Aftermath of a Conceptual Challenge." *Frontiers in Psychology* 9: 1-8. https://doi.org/10.3389/fpsyg.2018.01682.

Montembeault, Hugo, and Maxime Deslongchamps-Gagnon (2019). "The Walking Simulator's Generic Experiences." *Press Start* 5(2): 1-28.

Murray, Janet (2017). *Hamlet on the Holodeck. The Future of Narrative in Cyberspace*. New York: Free Press.

Myers, David (1999). "Computer Games Genres." *Play & Culture* 3(4): 286-301.

Nannicelli, Ted, and Paul Taberham (2014). *Cognitive Media Theory*. London: Routledge.

O'Regan, J. Kevin, and Alva Noë (2001). "A sensorimotor account of vision and visual consciousness." *Behavioral and brain sciences* 24(5): 939.

Parisi, Francesco (2021). "Enacting Virtual Reality." In *Meaningful Relations: The Enactivist Making of Experiential Worlds*, edited by Alfonsina Scarinzi, 245-262. Baden-Baden: Academia-Verlag.

Pinotti, Andrea (2020). "Towards an-iconology: the image as environment." *Screen* 61(4): 594-603.

Proteus on Steam (2012). https://store.steampowered.com/app/219680/Proteus/ (last accessed 07-01-2021).

Riva, Giuseppe (2009). "Is Presence a Technology Issue? Some Insights from Cognitive Sciences." *Virtual Reality* 13(3): 159-169. https://doi.org/10.1007/s10055-009-0121-6.

Sanchez-Vives, Maria V., and Mel Slater (2005). "From Presence to Consciousness through Virtual Reality." *Nature Reviews Neuroscience* 6(4): 332-339. https://doi.org/10.1038/nrn1651.

Schiavio, Andrea, Dylan van der Schyff, Julian Cespedes-Guevara, and Mark Reybrouck (2017). "Enacting musical emotions. Sense-making, dynamic systems, and the embodied mind." *Phenomenology and the Cognitive Sciences* 16(5): 785-809.

Shapiro, Lawrence (2019). *Embodied cognition. Second edition*. London: Routledge.

Slater, Mel, and Sylvia Wilbur (1997). "A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments." *Presence: Teleoperators and Virtual Environments* 6(6): 603-616. https://doi.org/10.1162/pres.1997.6.6.603.

Slater, Mel, and Maria V. Sanchez-Vives (2016). "Enhancing Our Lives with Immersive Virtual Reality." *Frontiers in Robotics and AI* 3 (Article 74): 1-47. https://doi.org/10.3389/frobt.2016.00074.

The Night Journey. Bill Viola (2007-2018). https://www.thenightjourney.com/ (last accessed 07-01-2021).

TETRIS® EFFECT (2018). https://www.tetriseffect.game/ (last accessed 07-01-2021).

To the Moon | Biennale Cinema (2019). https://www.labiennale.org/en/cinema/2019/venice-virtual-reality/moon (last accessed 07-01-2021).

Unsworth, Nash, Thomas S. Redick, Brittany D. McMillan, David Z. Hambrick, Michael J. Kane, and Randall W. Engle (2015). "Is Playing Video Games Related to Cognitive Abilities?" *Psychological Science* 26(6): 759-774. https://doi.org/10.1177/0956797615570367.

Weber, René, Ron Tamborini, Amber Westcott-Baker, and Benjamin Kantor (2009). "Theorizing Flow and Media Enjoyment as Cognitive Synchronization of Attentional and Reward Networks." *Communication Theory* 19(4): 397-422. https://doi.org/10.1111/j.1468-2885.2009.01352.x.

Weibel, David, and Bartholomäus Wissmath (2011). "Immersion in Computer Games: The Role of Spatial Presence and Flow." *International Journal of Computer Games Technology* 2011: 1-14. https://doi.org/10.1155/2011/282345.

Wojciehowski, Hannah and Vittorio Gallese (2011). "How stories make us feel: Toward an embodied narratology." *California Italian Studies* 2(1). https://doi.org/10.5070/C321008974.

Yee, Nick, and Jeremy Bailenson (2007). "The Proteus effect: The effect of transformed self-representation on behavior." *Human communication research* 33(3): 271-290.

Elisabetta Modena – University of Milan (Italy)

✉ elisabetta.modena@unimi.it

Elisabetta Modena is a PhD in History of Art (University of Parma 2010) and a postdoctoral fellow within the ERC Advanced Grant "An-Iconology. History, Theory, and Practices of Environmental Images" coordinated by Andrea Pinotti at the University of Milan. Her main research topics are contemporary art, museology, digital humanities and archives, and video games. She has been research fellow at CSAC (Centro Studi e Archivio della Comunicazione) of the University of Parma (2017-2018) as well as an adjunct professor at the Accademia di Belle Arti SantaGiulia in Brescia (2011-2019), University of Milan (2019-2020) and University of Bologna (2020-2021). As a curator, she has organized national and international exhibitions (MAXXI, Rome; CSAC, Parma; MSU, Zagreb; Galleria del Premio Suzzara). Together with Marco Scotti, she is the founder and curator of MoRE, a digital museum dedicated to unrealised contemporary art projects.

Francesco Parisi – University of Messina (Italy)

✉ fparisi@unime.it

Francesco Parisi is associate professor in Cinematography, Photography and Television at the University of Messina. His principal areas of interest concern media theory and visual culture, investigated by adopting a cognitive approach. In particular, he tries to apply the enactive approach to media theory, by focusing his research on the ways cognitive possibilities of an embodied and extended agent are transformed by media engagement. He was visiting scholar at Nottingham Trent University (2017) and University of Memphis (2018). Among his publications: *Temporality and Metaplasticity. Facing Extension and Incorporation Through Material Engagement Theory*, Phenomenology and the Cognitive Sciences; *Filosofia della fotografia*, Raffaello Cortina, Milano, 2013 (with M. Guerri); *La tecnologia che siamo*, Codice, Torino, 2019.

Directorial Style for Interactive Storytelling and the Fallacy of Ownership: The Case of *Resident Evil 7*

Nicolas Bilchi*

Roma Tre University (Italy)

Abstract

This article discusses some of the issues affecting storytelling in an immersive and interactive medium such as Virtual Reality. Interactive works which reconfigure their images as three-dimensional environments bearing affordances seems able to convey a proper sense of "spatial presence" – that is, the perceptive and cognitive illusion of being physically immersed in a digital environment, rather than in the material one which actually surrounds the body. However, I will show that VR technology is doomed to produce "breaks in presence": moments which rise awareness of the mediated nature of the experience, shattering the illusion of presence, and which represent undesirable side-effects for the aesthetics of immersion generally promoted by VR works. In order to do so, I will use the VR game *Resident Evil 7* as a case study. First, I will analyse the sophisticated formal solutions employed by the game to create a terrifying illusion of presence, highlighting their connection with cinematic strategies common to the horror genre; then, I will focus on sections of the interactive experience which nonetheless devaluate the effects of these stylistic gears by bringing consciousness about the impalpable and disembodied nature of the virtual body during the (simulated) physical interaction with the environment.

Keywords: Virtual Reality; Presence; Body ownership; Affordances; Embodiment.

∗ ✉ nicolas.bilchi@uniroma3.it

1   Introduction

In an issue dedicated to the topic of storytelling in Virtual Reality (VR), discussing the VR game *Resident Evil 7: Biohazard* (2017; from now on, *RE7*) can prove very useful in order to stress virtues but also weaknesses of interactive narratives, because I argue that this work represents, at the moment, the state-of-the-art in design of interactive experiences: widely praised by both players and critics,[1] for what its VR version is concerned — in fact, the game may as well be played like a traditional videogame, on a flat 2D screen and without the use of a head-mounted display (HMD) — *RE7* provides a visceral and terrifying first-person[2] experience by unfolding a complex and extended plot (no less than nine hours of interaction, which become many more if we consider the reiterate failures occurring when the player faces hard challenges, and the additional down-loadable contents prolonging the storyline) and allowing the user to traverse a wide and detailed simulated environment with a seeming total freedom of movement and exploration. The player enjoys all the so-called six degrees of freedom, namely she is able not only to direct her gaze by rotating around her own axis, but to walk in any direction she wants,[3] while interacting with a virtual world whose elements are responsive in real time to her actions. Such freedom, coupled with the responsivity of the simulation, overcomes Eugeni's (2018) complaints about the asynchrony in the relationship between the temporal unfolding of the user's actions in many VR experiences, and the fixed and pre-recorded nature of their images, which are, then, unable to react accordingly to the user's choices. Therefore, *RE7* would seem a brilliant work of interactive design, capable of immersing its player in a frightening narrative environment and of making her feel spatially present in it.

Nevertheless, the purpose of this essay is to justify my claim that no matter how perfect the simulation may be from a mimetic standpoint, the illusion of presence is doomed to be shattered because VR is ontologically unable to match the sense of agency it arouses — in ways unparalleled in non-interactive media — with a tantamount sense of actual ownership of one's body,[4] thus, hampering the narrative efficacy of its works. Precisely due to the high realism and apparent believability of its environment, *RE7* stands as a paradigmatic case to highlight the problems affecting storytelling practices in VR: in what follows, I will analyse the sophisticated formal solutions employed by the game in order to create a terrifying illusion of presence (demonstrating their connection with cinematic strategies common to the horror genre), then I will focus on sections of the interactive experience which nonetheless devaluate the effects of those stylistic gears by bringing consciousness about the impalpable and disembodied essence of the virtual body during the (simulated) physical interaction with the environment.

But before that, it is important to clarify, briefly, the conceptual framework encompassing my interpretation of *RE7* as a narrative experience and of the flaws of VR storytelling in general; starting from the assumption that terms like "flaws" or "problems" bear a negative meaning which is legitimate only on the basis of the premise that the purpose of interactive narrative must be to replicate events in a realistic way. If one assumes that, as designers seem to do, then the properties of *RE7* I will discuss in this essay can be interpreted as structural

---

1. A brief overview of the major international game review sites would demonstrate the general appraisal of *RE7* (though reviews do not always focus on the "2D" and VR versions as distinct experiences, the latter is usually intended as a further enhancement of the qualities of the former): on the review aggregator Metacritic, the game is rated 86 out of 100 (the vote is based on 100 reviews by professional critics) and 8 out of 10, based on 3261 ratings by players (https://www.metacritic.com/game/playstation-4/resident-evil-7-biohazard); 10 out of 10 on Destructoid (https://www.destructoid.com/stories/review-resident-evil-7-biohazard-413909.phtml), 4,5 out of 5 on GamesRadar+ (https://www.gamesradar.com/resident-evil-7-biohazard-review/), 8,5 out of 10 on Game Informer (https://www.gameinformer.com/games/resident_evil_7_biohazard/b/playstation4/archive/2017/01/23/a-familiar-taste-of-blood.aspx), 8 out of 10 on GameSpot (https://www.gamespot.com/reviews/resident-evil-7-biohazard-review/1900-6416603/; last access for all the sites is 11-05-21).

2. The employment of a first-person perspective marks a significant shift from the third-person point of view tipically used in the previous games of the *Resident Evil* franchise, fostering direct embodiment in the protagonist of the story, Ethan Winters, and, thus, making the game suitable for the aesthetics of VR.

3. Actually, to physically move one's body is not required, because forward and backward movements are produced from manipulation of the analog sticks of the PlayStation 4 controller used by the player. So, the common problem of setting VR experiences inside large and empty locales (so that the user does not hit objects or walls) is bypassed, and, nonetheless, the illusion of complete movement is preserved.

4. This is not to say that the theme of agency is unproblematic in interactive media. Quite the contrary: their inadequacy to satisfy the stimuli for action elicited by the virtual environment can weaken the experience as well. Anyway, such topic is beyond the scope of this essay, and it will not be explored further here.

flaws preventing the accomplishment of such a goal. Clearly, mimetism — or better, in the case of immersive media, the convincing replication of the phenomenological preconditions of our embodied experience of an event — is not the only aesthetics that could be pursued, but currently, it is indeed the most valorised one in VR storytelling. That is, the majority of VR works strives to hide the traces of their own "metatextuality" (Metz 2015), to erase the signs revealing the mediated nature of the experience, in order to provide a seamless effect of presence in the virtual environment — as I will try to explain in the next section from the perspective of ecology of perception — only to unintentionally let such signs resurface as factors affecting the overall realistic illusion. Because of that, it could prove useful to analyse the shortcomings of mimetic interactive storytelling made apparent by an exemplary case such as *RE7*.

2   Feeling present in a virtual environment: a matter of ecological validity

First of all, it is useful to remark — although it may seem somehow obvious — that narrative in an interactive medium is, by definition, a performative practice involving at the same time both the (more or less preorganized) flux of enveloping images and the human subject of the experience, who is driven by the medium to recognize herself less as a traditional viewer than as actor and co-creator of the "story," whose developments and outcomes are going to be influenced by her choices. However, the issue that is crucial to address is what distinctive shape the performance takes when moulded by an audiovisual and immersive medium such as VR. What I mean is that the embodied experience enacted in *RE7* can not be equated to that, for example, of a movie like *Bandersnatch* (2018) or a gamebook, though all three can legitimately be labelled as interactive works in every respect. A method to explain where the difference between them lies is to differentiate the concept of interactivity from an updated version of that of ergodicity theorized by Espen Aarseth, so that the former would account for those experiences forcing the user to perform a limited set of actions aimed at preventing interruptions in the narrative unfolding of the text. According to the Norwegian scholar, the core feature of ergodic texts is not just that "[a] nontrivial effort is required to allow the reader to traverse the text" (Aarseth 1997: 1); it is, also, their "multicursality" (ivi: 8), a term which, if referred to ergodic media like videogames and VR, can not be merely equated to that of multilinearity. I propose to interpret it as synonym for multidimensionality, pointing to how ergodic media — in tune with the "an-iconic" tendencies of contemporary images (Pinotti 2018) — strive to hide their preorganized essence by reconfiguring their images as three-dimensional environments surrounding the user's body from every side. According to hypertext theory, *RE7* would be as much a hypertext as a gamebook is (i.e., all the possible outcomes to the user's actions are already predetermined), but the enviromental semblance assumed by the former foster the illusion of being immersed in a space of unforseeable virtualities whose actualization, through the user's complete freedom of choice, nourishes ever-changing experiential dimensions;[5] therefore, *RE7* would belong to a very specific category of hypertexts, defined by Maietti as "spatiotemporally thick hypertexts" (2017: 95), which conceal the hypertextual logic of a system of links connecting blocks of information with the simulation of an environment demanding interaction through one's own body (being it the physical body of the user or the prosthetic body of the avatar in videogames). Although such a claim may be problematic, because it does not take into account that random generation of events allowed, to a certain extent, by the combinatory nature of the code of three-dimensional digital ergodic texts, it highlights the fact that the apparent free will and casuality they promise are an illusion: all the possible developments and outcomes of the experience are embedded in a "context of crontol" (Myers 2017: 105) determining what the user and the environment can or can not do, and what events con occur in the latter.

So, the environmental likeness of virtual worlds requires us to move from the theories of hypertexts to ecology of perception, which, I argue, represents a fruitful tool to understand the limits of mimetic storytelling for VR. In fact, by re-shaping themselves as enveloping environments, these images replicate the perceptive conditions regulating how human beings experience the real world. That is, they become bearer of affordances, a concept coined by James J. Gibson (2014) and whose definition has been the subject of a great debate, that is impossible to recall in detail here. Suffice to say, affordances are possibilities for action produced by the encounter between a specific animal species and the elements of a specific environment, both generating

---

5.   The main reference is the philosophical inquiry about the notion of virtuality, although I can not further discuss this theme here. See Lévy 1995.

what Stoffregen (2003) has defined an "animal-environment system." Therefore, I reject Turvey's (1992) classic reading of affordances as stable features or natural dispositions of objects, instead embracing Stoffregen's — but also Chemero's (2003) and Heft's (2003) — idea that they are emerging properties of this relational and dynamic system. Such is the basis of our existence in the world as human beings: by recognizing affordances in the objects surrounding us, meaning is conferred on our interaction with the environment we inhabit. A situation (i.e., a certain asset of the animal-environment system) varies when an affordance is actualized, so that affordances themselves may change and be reorganized in unpredictable ways, always opening new conditions for interaction.

I argue that to apply these notions to the digital worlds of VR can offer a useful interpretative key in order to explain our embodied experience of the latter. I consider the reproduction of affordances (or, better said, of the perceptive conditions for meaningful interaction with the environment) in the simulation to be one of the main reasons behind the occurrance of what has been theorized as one of the most important media-specific qualities of VR, namely the cognitive and perceptive illusion of being present in the virtual world. A specialised field of research (virtual presence studies) has been devoted to the sense of presence in mediated environments but, in attempting to account for every trait of such a complex phenomenon, it has led to manifold and heterogeneous definitions. The one I am referring to more directly here is that of "spatial" presence, which can be described as the illusion of being physically immersed in a digital environment, rather than in the material one which actually surrounds the body: when we have to deal with two environments (the physical and the virtual) at the same time, it can happen, if the sensory stimuli and the cognitive processes produced by the virtual world are able to match those characterizing our existence in the real world, that we feel our body immersed and present in the simulated environment, as if it was actually in the space of the images (for a comprehensive review of the literature on this topic see Hartmann et al. 2015).

However, presence in ergodic media is very unstable, because there are factors which can lead to what Slater and Steed (2000) call "breaks in presence": moments which rise awareness of the mediated nature of the experience and represent undesirable side-effects for the aesthetics of immersion generally promoted by VR, therefore weakening also its narrative and emotional scope. According to these scholars, breaks in presence are born from factors internal or external to the medium, the former related to flaws in the technological apparatus, and the latter to events happening in the real world which bring our attention back to it; but I claim that Slater and Steed miss the point of what is truly important for the occurrence of breaks in presence, because the reasons they discuss are just mere accidents, or shortcomings of the technology which will be fixed soon by technical improvements. By stating that spatial presence is a matter of ecological validity, I am pointing to more structural (i.e., ontological) factors, arising from the paradoxical coexistence, in ergodic media, of environmental semblance (with its promise of total freedom for the user) and textual boundaries which entangle the user's agency within an always limited set of options. Much could be said about how the unsuitability of the simulation to satisfy the affordances that the user, nonetheless, perceives in the virtual environment can shatter the illusion of presence; but this is not the focus of my essay.

The broad theoretical stance that can be drawn out of these considerations is that to understand spatial presence "an *action-based* framework according to which presence is dynamically achieved and maintained by acting in that environment" (Gamberini and Spagnolli 2015: 102) is required. The prominence of (possibilities for) action is a key element to make a person feel present in an environment, to such an extent that Riva and Waterworth can claim that presence is "a core neuropsychological phenomenon the effect of which is to produce a sense of agency and control: subjects are 'present' if they feel themselves able to enact their intentions in an external world" (2014: 206). But actions (and, hence, presence) are possible only if we are embodied beings who perceive affordances in the world and use their bodies to actualize them. Therefore the sense of agency, albeit paramount to human relationships with an environment, is not the only cause for the illusion of presence in virtual worlds; it is complemented by a corresponding sense of ownership of one's own body, namely the consciousness that to act through a physical body can also mean to suffer the effects of other beings' actions on that body: "we are agents that influence the world, and we may also be patients, that is: objects of other agents' actions or events unfolding around us" (Gregersen and Grodal 2009: 65).

In the rest of this essay I will discuss the — mostly successful — stylistic strategies developed by *RE7* in order to prevent breaks in presence resulting from the discrepancy between perceived affordances and factual actions

allowed by the text, and then I will demonstrate that the game is not equally capable of compensating for the impalpable and disembodied nature of the diegetic virtual body controlled by the player; so that the emotional and narrative engagement with the (story)world of *RE7* ends up severely compromised by such inescapable flaws of immersive simulations of the ecological asset of environments.

3   *RE7*: style and embodied narrative

The impossibility to satisfy all the affordances perceived by the user is a problem that every audiovisual ergodic work must face. The style of *RE7*, which heavily relies on features drawn from cinematographic (the horror genre) and videogame (the survival horror genre) traditions, strives to diminish the undesired impact of the shortcomings in the user's agency by strengthening the immersive quality of the experience. It is remarkable that, in order to do so, *RE7* builds a virtual world whose illusive charge is produced not primarily by the visual spectacle, instead by capitalizing on the allusive power of sound.

The main trait is the use of binaural audio, which successfully simulates the spatiotemporal unfolding of sounds in the environment: at first, the user perceives the sound as closer to one ear and then, shortly after, to the other, so that it seems that the sound wave propagates from a specific point towards the user's spatial location. So, binaural audio, which "is able to produce a significantly more convincing sense of localisation" (Garner 2018) compared to other techniques, enhances the impression of embodiment in the digital environment, making the latter "thicker" than what visual perception alone can provide; moreover, such technique is important from a gaming standpoint, because "in computer games, it is essential to determine the approximate location of the sound generators" (Roux-Girard 2011: 200) in order for the player to infer dynamic spatial relationships between her body and the objects and living beings inhabiting the environment. Furthermore, this function is paramount in *RE7* because it is both a survival horror game, in which the role of sound "is increased tenfold as sound becomes the engine of the gamer's immersion within the horrific universe" (ivi: 192), and a first-person shooter, an aesthetic form which "uses sound to immerse the player within the game environment in a way that a 2-dimensional platform game [...] or a variety of role playing games (RPGs) do not typically attempt" (Grimshaw and Schott 2008: 2): the possibility to clearly localize an impending threat as, for example, coming from behind the player's back is a viable way to make her feel present in a three-dimensional environment full of stimuli for action and characterized by a mood of constant danger.

However, it would be a mistake to believe that the sense of presence is reinforced only by means of realistic strategies: *RE7* largely employs other gears — typical of survival horrors — which generate markedly expressive and anti-mimetic effects. For example, one of the recurring goals of survival horrors is to immerse the player in an uncanny atmosphere, and the intangible essence of sound can better help fullfilling such aim than the concreteness of the visual. *RE7* relies on what Jørgensen labels "transdiegetic" sounds (2011), namely sounds blurring the boundary between the diegetic and extra-diegetic domains in order to destabilize the player's perception of a situation: the designers of RE7 have inserted in its soundtrack many sounds resembling the grunts and screams of the terrifying monsters populating the virtual world, therefore "lur[ing] the gamer into thinking that there are more threats than there actually are" (Roux-Girard 2011: 207). The player, concerned about the possibility of being attacked from a direction that is out of her visual field, experiences a condition of instant alarm, only to discover that the frightening sound is just an extra-diegetic trick. Apparently, this moment of awareness of the mediated nature of the experience, arising from the revelation of a technical dimension beyond the narrative one, is supposed to lead to breaks in presence; but I argue that, rather, it is employed to cast an ontological doubt about what belongs to the narrative and what does not that serves as a reminder of the player's being "inside" a treacherous environment over which she can not exercise any form of actual control and monitoring, due to her embodied and imperfect perceptual access to the environment. So, no matter if previous hearings of a deceptive transdiegetic sound led to recognize its extra-diegetic origin, any time the player will hear one of these sounds, it will be impossible to rule out with absolute certainty the possibility of the specific sound being related, this time, to a diegetic creature. The player is kept in a state of high warning and physical responsiveness (which can prove to be very stressful in the most disturbing moments of the experience), and the illusion of immersion and presence is indeed enhanced, rather than shattered.

The predominance of sound in the aesthetics of *RE7* may be connected also to what Hanich defines as "sug-

gested horror" (2010), a concept that the scholar refers to the style of horror films, but which can be success-
fully applied to all audiovisual forms of horror narratives. According to Hanich, "suggested horror relies on
intimidating imaginations of violence and/or a monster evoked through verbal descriptions, sound effects or
partial, blocked and withheld vision" (ivi: 109). The common feature of the stylistic solutions included in the
notion of suggested horror is precisely the core role played by sound, whose purpose is to encourage in the
viewer emotional responses that are more lasting and intense than those elicited by "direct" horror; this latter
term is more generally connected, in Hanich's analysis, to visual presentations of horrific contents, which are
estimated to be less effective because "due to the externality and exactitude of perceptions the frightening
aspect of direct horror quickly wears out. [...] The viewer facing violence and monstrosity *directly*, after a
while becomes 'enlightened': he or she stops fearing what was once unseen" (ivi: 115). In the case of *RE7*,
the allusive power of suggested horror is even intensified, because the ergodic nature of this work engages its
user with her body and from a first-person perspective, so that the basic element common to the set of stylis-
tic strategies promoted by suggested horror, namely that "the viewer does not observe from a secret vantage
point with perfect vision, but often suffers from visual lack" (ivi: 110), is staged in a very direct manner: a flawed
and partial visual faculty, the resultant relevance of imaginative processes in interpreting an ongoing situation,
plus the vulnerability of the body acting from a position that is internal to the environment, are but essential
prerequisites of human embodied existence in the physical world which VR is able to reproduce accurately.

However, the sophisticated solutions employed by *RE7* do not address the sphere of sound alone. As men-
tioned, direct horror is affected by the quick decreasing of its frightening effects because the more a viewer
stares at horrific contents, the more she grows accustomed to them and feelings of fear vanish. To suggest
threats through sound is one solution to such an undesired comprehension of the fictive nature of horror, but
it can not be enough for a first-person shooter, which necessarily requires moments of intense direct battling
against various species of repulsive creatures;[6] *RE7* must face the risks related to a prolonged interaction with
monstrosity from a visual standpoint too, and it succeeds in that thanks to a brilliant design choice. The game
realizes the dynamic counterpart of the typical trick used by direct horror, consisting in editing short shots of
horror content, so that the viewer can watch it only for a brief amount of time. Obviously, in VR it is impossible
to manipulate the point of view of the user; thus, *RE7* has to focus its efforts towards diegetic characters. For
example, one of the creepiest segments of the experience is the fight against Marguerite, the spider-woman.
The battle takes place inside a crumbling building that the player, as well as Marguerite, can traverse in its en-
tirety in any moment of the fight; Marguerite's AI is programmed in such way that she tends to hide over and
over behind the remnants of the building, eventually attacking the player by surprise. Such attitude is coher-
ent, in diegetic terms, with the beast side of Marguerite's personality (like a spider, she retreats when harmed
and then organizes a new strategy), but it is also part of a "directorial" project activating a fruitful alternation
between moments of growing tension — when the player has to explore the environment in order to localize
the enemy — and adrenaline rushes produced by Marguerite's attacks. So, the narrative style of this fight is
based on a sort of internal editing which prevents (at least momentarily) that its frightening charge decreases
as the player stares at the monster.

4   The fallacy of ownership

The formal strategies discussed in the previous paragraph testify to the remarkable aesthetic efforts made by
RE7 in order to enhance the overall horrific mood of the experience and, thus, to cope with the possible
breaks in presence generated by the limitedness of the player's agency. But in spite of that, there are other
aspects of the ergodic practice enabled by *RE7* which hamper the illusion of presence and the believability
of the simulation. Besides, they represent ontological properties of VR as a medium in general, as mentioned
above; thus, I argue that *RE7* has a paradigmatic value, since by studying it, one can highlight many obstacles
that immersive narrative is unable to overcome.

Whereas the game improves the realistic features of its environment, instead it fails to successfully face the

---

6.   Moreover, VR is a medium that generally does not relies on editing techniques and, therefore, it gives its user almost complete
      freedom to choose what to see and for how long. So, the process of normalizing horror is even more likely to occur in VR than in
      non-ergodic media.

crucial problem of providing the player with an adequate impression of ownership of her own body. As anticipated by citing Gregersen and Grodal at the beginning of this essay, ownership means that the player feels that she possesses a physical body inside the virtual environment; but therefore, it is important to understand that the sense that a virtual body is one's own is not born from the agency bestowed upon the player, rather from the possibility to perceive the effects of others' actions over her body. Said it best, agency is related to the active dimension of the interaction, while ownership to the passive one, in which the player recognizes herself as suffering the consequences of the agency exercised by the environment itself.

Such issues are addressed by Slater et al. (2009) in a series of three experiments, of whom the first two it is useful to mention here. In the first, they studied variations in the sense of ownership of a virtual arm felt by the participants of the experiment in two different conditions: when the digital arm was touched by a digital ball and at the same time the physical arm was touched by a device — called the Wand — regulating the movements of the ball too, and when the contact between the digital arm and the ball was pre-recorded, so that it did not correspond to a physical stimulation of the real arm. Results revealed that in the former situation the participants experienced a strong sense of ownership of the arm, which instead was much weaker in the latter. While the first experiment demonstrates the link between sense of ownership and passive role of the body as "acted," the second one draws misleading conclusions: participants wore a data glove which registered the movements of the physical hand and arm, and decoded them as corresponding movements of their digital counterparts. The researchers assumed that such synchronicity between real and virtual movements improved the sense of ownership, but I argue that this claim is affected by a basic semantic error, namely that what participants feel when experiencing synchronic movements is not an impression of ownership, but the sense of agency: in fact, the second experiment puts its subjects in an active condition by allowing them to use their body so that a coherent reaction in the image is provoked, while in the first experiment participants' limbs are constrained in a state of passivity, in which the sense of ownership is proved to be dependent on the effects of an external agency.

Of course, considered the violent content of the most part of the experience, in the case of *RE7* tactile stimuli that are internal to the virtual environment are not matched with tactile stimulation of the physical body; but this is a structural problem usually affecting all VR works, and therefore, according to the results of the experiments discussed above, one can argue that the ontological properties of VR technology make the sense of ownership precarious in virtual environments, and the more it becomes unstable, the more the illusion of presence diminishes too. Ergodic media are intended, first af all, as forms of entertainment, and the realism they promise has the only purpose of increasing the spectacular charge of the experience;[7] designers rarely dare to push realistic simulation to an extent which would turn the exciting value of the interaction into its opposite, namely a complex and tiring practice strictly dependent on laws of physics. This is the problem highlighted by Gregersen and Grodal in their analysis of Nintendo Wii, which is a sort of hybrid, halfway between a traditional videogame console and a VR system because it requires a motor activation of the whole body but without enveloping the player in a virtual environment like HMDs do. The player lives an apparently less mediated experience, due to the likeness between her movements and the actions performed by the avatar on screen, but she recognizes also the lack of adherence of the simulation to the laws of physics. This makes clear that it is too easy to execute the actions programmed, meaning that the system is unable to reproduce the energetic efforts that a certain action would require in the physical world; for example, during the action of hitting a digital tennis ball with a digital tennis racket by actually swinging the material arm, it will be impossible for the medium to reproduce those physics parameters, like velocity, amount of muscle contraction or strenght, which elicit in us the knowledge of being subjects whose bodies suffer the "action" of laws of physics and who need to react appropriately to any specific circumstance. Therefore, "a basic problem with the Wii-remote and many other game controllers of this kind" — and with ergodic technologies in general — "is that true force feedback is impossible to implement in controllers of this kind, and in a nutshell, this yields a dissociation of sensory experience" (Gregersen and Grodal 2009: 76).

In *RE7*, such a dissociation occurs due to two reasons: the first — and less strong one — is about the fact that,

---

7. Clearly, I am talking about common mainstream ergodic works, like commercial videogames, on a 2D screen or in VR; there are relevant exceptions to the rule of mimetic spectacle, exceptions exploring different aspects of human interactions with virtuality: see, for example, a "classic" VR work like *Osmose* (1995) by Char Davies or, more recently, *Carne y Arena* (2017) by Alejandro G. Iñárritu, as discussed by Montani 2017.

from a diegetic perspective, the protagonist Ethan has to carry a variety of weapons (knives, guns, rifles, hand grenades ecc.) to fight against the monsters, but what the player holds in her hands is but the PS4 controller, whose control system is programmed in such a way that it settles all the activities related to the use of the weapon, like pointing and firing. This is a common feature of videogame controllers which, on the one side, is not so disruptive of the immersive illusion because players are largely accustomed to perform certain operations on screen via much less complex actions (like pressing a button); but, on the other side, recent efforts to translate the "semiotic system" of controllers into more mimetic forms (culminating with the design of the rifle-shaped Aim Controller) testify to a desire for realism spread at all levels of ergodic practices (Blomberg 2018).

The second issue with the sense of ownership in *RE7* is related to the impalpable nature of the virtual body unintentionally made evident by the game during interactions. Consider again the "directorial style" of the fight against Marguerite: when she suddenly attacks, the first reaction in the player is like a traditional jumpscare: a very intense fright at the beginning, but doomed to run out shortly; however, such fright could be prolonged by the consciousness that in ergodic media the scary creatures can also directly act on her body, threatening to harm it. But when she hits, her claws go through the player's body instead of encountering its material resistance; likewise, when a mold monster rapidly approaches the player, it creates a climax of tension which fades away when it attacks and its arm fluidly traverses the screen from top to bottom, instead of stopping where Ethan's body is supposed to be. One can take for granted the sense of ownership when the text does not put the player in the position of suffering the actions of other beings: in this case, sense of ownership and sense of agency become blurred, but the former is shattered when simulated physical contact haptically solicits the body. Therefore, the promises of realism, immersion and presence of ergodic media are ultimately betrayed.

5 Conclusions

By analyzing *RE7* as an ergodic text, I hope to have shown that mimetic storytelling for interactive media such as VR can develop brilliant directorial styles, but that at the same time it is affected by many structural flaws in simulating the embodied experience of an environment. But as pointed out in the introduction, I argue that mimetic simulation of how human beings perceive the world and act in it is not the only way — and neither the most useful — for ergodic media to tell stories and create meaning; if one assumes that to tell a story is not just to present a logically organized chain of causal events, then those same features framed as flaws can become fruitful resources for alternative modalities of storytelling, which would reveal brand new ways of interaction with (virtual) reality.

Although a vast literature has conceptualized VR as an immersive medium, my hypothesis for future research is that VR can express its aesthetic potential at its best only if it shrugs off the burden of mimetic reproduction. Reimagined in such a manner, VR can prove to be a great tool for a "disembodied" narrative experience, meaning an aesthetic form fostering both critical and reflexive attitudes, and a no less emotionally intense engagement in its marvelous worlds.

References

Aarseth, Espen (1997). *Cybertext. Perspectives on Ergodic Literature*. Baltimora: The John Hopkins University Press.

Blomberg, Johan (2018). "The Semiotics of the Game Controller." *Game Studies* 28(2). http://gamestudies.org/1802/articles/blomberg (last accessed 28-11-20).

Chemero, Anthony (2003). "An Outline of a Theory of Affordances." *Ecological Psychology*, 15(2): 181-195. https://doi.org/10.1207/S15326969ECO1502_5.

Eugeni, Ruggero (2018). "Temporalità sovrapposte. Articolazione del tempo e costruzione della presenza nei media immersivi." In *La cultura visuale del ventunesimo secolo*, edited by Andrea Rabbito, 33-51. Milano: Meltemi.

Gamberini, Luciano and Anna Spagnolli (2015). "An Action-Based Approach to Presence: Foundations and Methods." In *Immersed in Media. Telepresence Theory, Measurement & Technology*, edited by Matthew Lombard, Frank Biocca, Jonathan Freeman, Wijnand IJsselsteijn, and Rachel Schaevitz, 101-114. New York-London: Springer.

Garner, Tom (2018). *Echoes of Other Worlds: Sound in Virtual Reality. Past, Present and Future*. London: Palgrave Macmillan.

Gibson, James J. (2014 [1979]). *The Ecological Approach to Visual Perception*. London: Routledge.

Gregersen, Andreas and Torben Grodal (2009). "Embodiment and Interface." In *The Video Game Theory Reader 2*, edited by Mark J.P. Worlf and Bernard Perron, 65-83. Abingdon-New York: Routledge.

Grimshaw, Mark and Gareth Schott (2008). "A Conceptual Framework for the Analysis of First-person Shooter Audio and its Potential Use for Game Engines." *International Journal of Computer Games Technology* 5: 1-8. https://doi.org/10.1155/2008/720280.

Hanich, Julian (2010). *Cinematic Emotion in Horror Films and Thrillers. The Aesthetic Paradox of Pleasurable Fear*. London and New York: Routledge.

Hartmann, Tilo, et al. (2015). "Spatial Presence Theory: State of the Art and Challenges Ahead." In *Immersed in Media. Telepresence Theory, Measurement & Technology*, edited by Matthew Lombard, Frank Biocca, Jonathan Freeman, Wijnand IJsselsteijn, and Rachel Schaevitz, 115-135. New York and London: Springer.

Heft, Harry (2003). "Affordances, Dynamic Experience, and the Challenge of Reification." *Ecological Psychology*, 15(2): 149-180. https://doi.org/10.1207/S15326969ECO1502_4.

Jørgensen, Kristine (2011). "Time for New Terminology? Diegetic and Non-diegetic Sounds in Computer Games Revisited." In *Game Sound Technology and Player Interaction. Concepts and Developments*, edited by Mark Grimshaw, 78-97. Hershey: IGI Global.

Lévy, Pierre (1995). *Qu'est-ce que le virtuel?* Paris: La Découverte.

Maietti, Massimo (2017). *Semiotica dei videogiochi*. Milano: Unicopli.

Metz, Christian (2015 [1991]). *Impersonal Enunciation, or the Place of Film*. New York: Columbia University Press.

Montani, Pietro (2017). *Tre forme di creatività*. Napoli: Cronopio.

Myers, David (2017). *Games Are Not. The Difficult and Definitive Guide to What Video Games Are*. Manchester: Manchester University Press.

Pinotti, Andrea (2018). "Immagini che negano se stesse. Verso un'an-iconologia." In *Ambienti mediali*, edited by Pietro Montani, Dario Cecchi, and Martino Feyles, 231-243. Sesto San Giovanni: Meltemi.

Riva, Giuseppe and John Waterworth (2014). "Being Present in a Virtual World." In *The Oxford Handbook of Virtuality*, edited by Mark Grimshaw, 205-221. Oxford: Oxford University Press.

Roux-Girard, Guillame (2011). "Listening to Fear. A Study of Sound in Horror Computer Games." In *Game Sound Technology and Player Interaction. Concepts and Developments*, edited by Mark Grimshaw, 192-212. Hershey: IGI Global.

Slater, Mel and Anthony Steed (2000). "A Virtual Presence Counter." *Presence* 9(5): 413-434. https://doi.org/10.1162/105474600566925.

Slater, Mel et al. (2009). "Inducing Illusory Ownership of a Virtual Body." *Frontiers in Neuroscience*, 3(2): 214-220. https://doi.org/10.3389/neuro.01.029.2009.

Stoffregen, Thomas (2003). "Affordances as Properties of the Animal-Environment System." *Ecological Psychology* 15(2): 115-134. https://doi.org/10.1207/S15326969ECO1502_2.

Turvey, Michael (1992). "Affordances and Prospective Control: An Outline of the Ontology." *Ecological Psychology* 4(3): 173-187. https://doi.org/10.1207/s15326969eco0403_3.

Nicolas Bilchi – Roma Tre University (Italy)

✉ nicolas.bilchi@uniroma3.it

Nicolas Bilchi (1992) earned his Ph.D. at Roma Tre University in "Paesaggi della città contemporanea. Politiche, tecniche e studi visuali". His research is primarily focused on interactive media such as videogame and Virtual Reality. Among his publications, he is author of the book *Cinema e videogame. Narrazioni, estetiche, ibridazioni* (Milano: Unicopli 2019) and has published for the journal *Imago. Studi di cinema e media* the articles "L'esperienza videoludica e l'immersione" (15, 2017) and "Immersione o emersione? L'attrazione e il superamento dello schermo-soglia, tra cinema e videogame" (20, 2020).

Stage Magic as a Performative Design Principle for VR Storytelling

Christopher Maraffi[*]

Florida Atlantic University (United States)

Abstract

This article examines The VOID's *Star Wars: Secrets of the Empire* (2017) VR arcade attraction, and analyzes the intermedial magic principles employed by co-founder and magician Curtis Hickman to create the illusion of a fictive world with impossible space and liveness. I argue that The VOID (Vision of Infinite Dimensions) functioned like nineteenth century magic theaters run by Georges Méliès and others, by employing magic principles of misdirection that directed player attention towards the aesthetics of an illusion, and away from the mechanics of the effects generating technology. Narrative framing and performative role play transported multiple players into a believable Star Wars immersive experience, creating an aesthetics of the impossible that reflected the goal of many stage magic tricks, and was foundational to trick films in the cinema of attractions of the early twentieth century. Using game studies concepts like Huizinga's magic circle and theatre arts concepts like Craig's über-marionette, this article suggests that The VOID and other stage magic approaches to VR, like Derren Brown's *Ghost Train* (2017), are a new medium for participatory theatre that incorporate immersive features from both cinema and games.

Keywords: VR Magic Circle; Impossible Aesthetics; Immersion; Space in VR; Liveness.

∗ ✉ cmaraffi@fau.edu

1   Introduction

Before they closed their doors in 2020 due to the COVID19 pandemic, one of the most popular virtual reality arcade attractions was The VOID (Vision of Infinite Dimensions) VR Theaters. Co-founder and Chief Creative Officer Curtis Hickman has spoken extensively about how stage magic was central to adapting transmedia blockbuster franchises like Ghost Busters, Star Wars, and Marvel's Avengers into believable VR experiences. Other popular VR attractions have used stage magic, such as Derren Brown's *Ghost Train* (2017) in the UK, but The VOID theaters were unique in scope and quality, with small theaters popping up in high-end malls across the US, Canada, and the UK. Given that stage magicians were foundational to the early development of film as an entertainment spectacle, their trick films and cinema of attractions influencing visual effects in blockbuster movies throughout the twentieth century, it seems more than a coincidence that magicians are again center stage in the development of VR as a new kind of immersive attraction. Using an intermedial lens of video game and performing arts studies, I will examine The VOID's *Star Wars: Secrets of the Empire* (2017) VR experience, and the stage magic principles Hickman employed to create the illusion of transporting visitors to an alien world in the Star Wars universe. I argue that performative mise-en-scene design principles from stage magic create an aesthetics of the impossible, and that the embodied first-person perspective of VR is particularly suited to such theatrical illusions, especially for fantastic worlds and characters that are the staple of blockbuster transmedia narratives like Star Wars.

2   Stage Magic's Influence Beyond the Cinema of Attractions

The influence that nineteenth century stage magicians had on early cinema is well documented as trick films (Gunning 1989), "up-to-date" magic that incorporated film (Solomon 2006), and actuality films of live stage magic performances (Solomon 2010). Gunning's cinema of attractions (Gunning 2006: 381-388), where a Vaudevillian series of performative attractions like trick films and live acts were the main draw over dramatic narratives, was pioneered by the silent films of Georges Méliès and other magicians, and continued by non-magicians like Buster Keaton (Gilhooly 2016). Gaudreault noted that Méliès used cinema in the service of magic principles by not revealing the trick (Gaudrault 2007), and Barnouw argued that the phantasmagoria and other themes of magicians became media (Barnouw 1981). North showed how cinema magic as visual effects evolved from the techniques developed by magicians for trick films, and that blockbuster movies from King Kong to Star Wars have foundations in stage magic illusions, including the illusion of liveness in animated digital characters (North 2008). Holmberg points out that early cinema was particularly concerned with the illusion of immersion, and that each cinematic development from wide screen to Smell O' Vision to VR has continued towards that aesthetic goal, including video games (Holmberg 2003). Leddington argued that the "antinomic" illusions of stage magicians create an "aesthetics of the impossible" for spectators, resulting in a "logical conundrum" that produces "mental excitement" (Leddington 2016: 254-261).

Stage magic principles and aesthetics have been studied much less in relation to video games and interactive media experiences than in cinema. However, magic principles have been advocated for interface design (Tognazzini 1993), interaction design (Marshall et al. 2010), and games (Kumari et al. 2018). Though Murray's *Hamlet on the Holodeck* called for a theatrical approach to VR storytelling (Murray 1997), and VR was considered an "illusion machine" by early VR theatre researchers (Dixon 2006: 24), the platform has been underutilized for live performance, and little VR research has been done on magic theatre applications that specializes in portraying illusions. Most VR research on immersion and interaction has been from a psychological perspective, and has emphasized that immersion is a perceptual illusion (Slater 2018: 432). The psychological effects of stage magic have been studied since the nineteenth century (Thomas et al. 2016), and magic theatre simulations that hide the mechanism through dissimulation have been the subject of social science technology studies (Smith 2015: 326). Popular VR experiences like The VOID and Derren Brown attractions have only been publically available since 2017, so there is a need to study these recent applications of stage magic. Kumari et al. did look at the narrative framing of Brown's *Ghost Train* experience, and how it misdirected the player's attention from the technology to enhance the illusion (Kumari et al. 2018: 2), which aligns with the simulation-dissimulation practices of nineteenth century magicians. Recent work by Bakk advocates the science of magic as a framework for creating impossible state transitions in VR that have immersive qualities and creates wonder (Bakk

2020: 329-330), and that putting on the VR headset is a performative act similar to live action role play (LARP) to enter a storyworld. This impossible state transition approach is echoed by Smith et al.'s logic-based analysis of how conjuring tricks are constructed (Smith et al. 2016: 3).

3   Conjuring an Über-marionette in the Magic Circle

Because The VOID seemed to be designed as a VR magic theatre in order to create an aesthetics of the impossible, my analysis of *Secrets of the Empire* will focus on how principles of stage magic were used to design a performative experience of being transported to an alien world populated by Star Wars characters. The latest virtual production technologies for real-time interactive media require the convergence of several artistic mediums, including cinema, video games, and live theatre, so my approach will be interdisciplinary. There are two focus points for my analysis: 1) how magic principles like misdirection were used to perceptually expand a room-scale space into an impossibly scaled but tangible VR world, 2) how performative stage magic principles cast the player as a protagonist in a fictive narrative with uncanny life-sized automatons. My main focus will be on understanding how stage magicians approach illusions of impossible space and character liveness, and how their mise-en-scene design assigns a performative role for the player in the illusion. This is a very different approach to VR interaction and immersion than most psychology studies because I am focusing on the artistry involved. Stage magic has a puzzle-game play dynamic: where there is a competition between the magician to hide the mechanics of a trick from a volunteer-player who is challenged to solve the mystery. I will apply concepts from game design such as the MDA framework to consider the mechanics, dynamics, and aesthetics of magic principles like misdirection, and also use game studies concepts such as Huizinga's magic circle to show how magicians invite the player into a playful space to experience illusions for entertainment. Since stage magic is a subset of theatre, I will also apply performing arts concepts like Craig's über-marionette or super puppet to show how performing life-sized avatars in a VR world with game AI controlled non-player characters (NPCs) is like masked or puppet theatre, and is in line with the magic tradition of displaying automaton attractions that have an uncanny illusion of liveness.

I attended The VOID's *Star Wars: Secrets of the Empire* attraction at Disney Springs in Orlando during the summer of 2018. The experience started as most stage magic tricks do, with myself and three others being invited onto the stage to play a central part in the illusion. In this case, we were cast as protagonists in the VR storyworld through a video transmission from Star Wars actor Diego Luna portraying Cassien Andor from *Rogue One* (2016). Cassien urgently recruited us for a mission to infiltrate Darth Vader's base on the volcanic planet Mustafar. As rebel spies disguised in stormtrooper armor, we were asked to retrieve classified stolen cargo needed to defeat the empire. The transmedia narrative framing cast us as protagonists in the Star Wars universe, and reinforced our role in the narrative with a gamified goal. The physical weight of wearing a VR headset and backpack reinforced the feeling of wearing stormtrooper armor in the VR simulation, and was a good example of dissimulation where misdirection and spectacle obscured the mechanics of the technology (Smith 2015: 326). The effect was enhanced by real-time tracking of your group in stormtrooper armor, and hearing chatter through the headsets with other diegetic sounds. While walking through each scene, we were prompted to open doors and touch virtual objects that had physical counterparts in the real world set, which reinforced our embodied presence and agency. In addition, when we ventured outside the base in one scene, the temperature on the lava planet of Mustafar felt hot and smelled of sulfur. As we interacted with virtual characters like droids, stormtroopers, and even a larger-than-life Darth Vader, the NPCs reacted to our blaster shots and seemed to perform with us, producing a performative liveness that was beyond film or video game characters. It felt like a new kind of participatory theatre, as echoed in many online reviews, "...legitimately feels like starring in a Star Wars movie or TV show of your very own" (Bishop 2017), and "I don't feel like I went on a ride, I feel like I stormed an imperial base...but if you'll forgive the cross-franchising, this is some real-life holodeck stuff we're playing with here" (Silliman 2019).

4   Staging Impossible Transmedia Worlds in VR Theaters

Scale matters in both VR and games because it changes the perspective of players, which shifts the aesthetics of their play. A thematically appropriate example is wizard's chess in *Harry Potter and the Sorcerer's Stone*

(2001), where the change in scale of the chessboard has a dramatic effect on the perspective of Harry and his companions. When playing on a regular sized board in the Great Hall, Harry and Ron were outside the field of play, moving pieces from a God's eye point of view. Their movements were analytical and detached, displaying a casual style of play. But later in the film when the board became larger-than-life, the players became immersed in the action, and their movements became more performative as embodied combatants in the game. The rules of the game did not change, but the style of their play shifted with the change in perspective. VR experiences also shift the perspective of players compared to other screen-based media like cinema and video games, where instead of being outside the scene looking in through a window, you are transported to the middle of the 3D world. This immediately makes VR more performative and theatrical, because the embodied perception of the player shifts to center stage in a full-scale scene.

Perspective is also important in the believability of stage magic illusions, and visual effects on any stage set, because most optical tricks must be viewed from specific angles to look convincing. The Pepper's Ghost effect originally used in nineteenth century magic theatres and made popular by Disney's *Haunted Mansion* (1969) ride, was done on a dark stage by an angled piece of glass reflecting a lit figure in the orchestra pit (Barnouw 1981: 27), and could only be seen at the angle perpendicular to the reflection. In The VOID's VR theater experiences, former magician turned visual effects artist Curtis Hickman used magic principles to create the illusion of VR worlds that were "bigger on the inside than on the outside" (Hickman 2016), meaning a tangible embodied experience of playing inside a virtual space that was scaled larger than the physical theater. Hickman and The VOID engineers designed a new kind of participatory theatre space, where multiple players would experience synchronized perceptions of space in two realities, the room-scale physical and the impossibly-scaled virtual, targeting different senses but choreographed for a unified multisensory aesthetic they called "hyper-reality" (Pancrazio 2017). This theatrical VR effect aligns with Smith's research into the technologies of nineteenth century magicians that created supernatural illusions through simulation-dissimulation (Smith 2015: 326), by making the mechanism absent in the design of the apparatus. By separating The VOID's magic theatre apparatus from the VR media simulation, they applied dissimulation by hiding the mechanics that created the illusion of a tangible world.

The problem with room-scale VR is that players can only move around naturally in a small space, which breaks the effect of an expansive world to explore. Most VR games must resort to teleporting or gliding for locomotion in the world, which is unnatural and can lead to VR motion sickness. To solve the room-scale space problem, Hickman used the concept of a magic box that creates the illusion of being bigger on the inside than on the outside. He demonstrated this trick on stage by pulling a box out of another box, and then appeared to place the bigger box inside the smaller box (Hickman 2016). Using this stage magic principal, he designed the "infinite hallway" illusion, which has players walk along a curved wall in physical space while appearing to be a straight wall in virtual space by subtly pivoting the virtual 3D perspective. This perceptual effect allowed the VOID designers to create an elaborate maze of hallways and rooms in a very small theatre space, giving players the perception of moving in a much larger space than they were actually inside. To make the world feel real, they created a narrative that forced the players to touch objects and structures in the virtual environment that had physical props in the theater space.

Hickman describes misdirection as "That which directs the spectator away from the method and towards the effect" (Hickman 2016), or guides your perception away from reality to a fantasy. He breaks misdirection down to both physical and psychological types, with the magician controlling how information is perceived and believed. Physical misdirection is created by the VR hardware and theatrical apparatus, including the tracking and system software that make the infinite hallway effect possible. The trick utilizes redirected walking and touching, which was an active area of research demonstrated at SIGGRAPH in 2016 (Robertson 2016), but not previously applied by magicians. This follows the tradition of magicians using new inventions to facilitate a trick before the technology is widely known to the public. Hickman showed that using a one quarter circle of curved hallway that can be rotated around the central perspective of the player in VR will double the space of a room-scale experience, and that "It looks correct, it feels correct, it is virtually completely correct, but it is physically contained" (Hickman 2016). Since the theatrical space is a skinless shell, multiple virtual environments can exist in the same physical space, allowing The VOID to misdirect movement through an entire Star Wars base in a small theater.

Psychological misdirection is "The arguments that convince you that the virtual is real" (Hickman 2016), such as setting up the hyper-reality scene so players simultaneously experience media effects with physical effects like temperature, fans, smell dispensers, and solid props. Hickman called these "5D effects" that make the mundane parts of a VR world feel believable:

> A big portion of creating the illusion of this new reality is convincing your mind that it's actually happening. If there is a storm, then we want to have wind and moisture. If you're in a pine forest, we want you to smell pine trees. It doesn't have to be a myriad of things; we don't have to replicate everything. It just has to be enough to make a simple argument for your brain to be convinced. If you can do this consistently, you're able to establish a world that is much more immersive and impactful than just seeing it with your eyeballs (Pancrazio 2017).

In the history of magic, this would be the performative patter or showmanship the magician portrays when setting up a trick. But in VR, even a bottle of soda sitting on a table has no physical reality, "nothing is there, it's all impossible. So our first job is to convince people, when they walk into the VOID, is that normal stuff is real" (Hickman 2016). So simple performative actions like having players push a physical button to open a virtual door, but then feeling wind rush in through the opening, or sitting down in a spaceship that is transporting you to Mustafar, creates an accumulation of perceptual illusions or "convincers" that make a cognitive argument for surrendering disbelief in the theatrical sense. This dynamic of The VOID can be framed as a literal interpretation of the play and game studies' magic circle concept as "world building activities" (Stenros 2012: 6) in VR, by using magic principles to build belief in the reality of an impossible 360 space. As Hickman puts it, "Because people have been conditioned so much that the normal is real, that they start to believe the impossible is real too" (Hickman 2016).

Johan Huizinga originally described his magic circle concept as a consecrated space marked off by ritual, for "performance of an act apart," which pertains to both games and theatre:

> The arena, the card-table, the magic circle, the temple, the stage, the screen, the tennis court, the court of justice, etc., are all in form and function play-grounds, i.e. forbidden spots, isolated, hedged round, hallowed, within which special rules obtain. All are temporary worlds within the ordinary world, dedicated to the performance of an act apart (Huizinga 1955: 10).

Bakk frames wearing a VR headset as ritualistic behavior to conjure an "impossible act" which creates "body illusions as a mode of immersive spectatorship." The experience may override cognitive disbelief, "...even if the experiencer is fully aware of the illusory nature of the immersive environment, she nevertheless produces some responses as if she took the environment as not virtual but real" (Bakk 2020: 330).

Huizinga considered a games arena, theatrical stage, or cinema screen to be magic spaces where participants agree to play by sacred rules, but makes it clear that the rules are an illusion. A player who breaks the rules "robs play of its illusion — a pregnant word which means literally 'in-play' (from inlusio, illudere or inludere)" (Huizinga 1955: 11). Live theatre has a long tradition of illusions and game-like "what if" interactions, with performers using what theatre anthropology theorist Eugenio Barba termed "extra-daily" techniques that are an act apart, conveying stage presence (Barba 1995: 9). A "spoil sport" would enter the theatre but not engage in the illusion, either by believing in supernatural magic or by discounting the experience as "nothing but a trick" (Gunning 1989: 3). An aesthetics of the impossible can only be created in stage magic if the audience perceives a contradiction they cannot explain. Illusionists in the tradition of Robert-Houdin, such as contemporary magicians Penn and Teller, do not represent magic as existing in the real world. They create the illusion of everyday realism in the framing of their tricks, much like The VOID first establishes the mundane in VR, and make a point to inform their audience that the trick is theatrical deception. This creates a gamified puzzle dynamic that challenges the spectator to catch the magicians in the act of trickery, or explain the real mechanics that are behind the impossible aesthetics of a trick. Leddington prefers Teller's "unwilling suspension of disbelief" that magicians cultivate in their audience, so that if the illusion is successful, the result is a "conflict of belief" between what spectators are perceiving and what they know to be impossible, which can generate a deep emotional reaction (Leddington 2016: 257).

The psychological effects of stage magic on spectators has been studied since the 1890s, when French psychologist Alfred Binet published "The Psychology of Prestidigitation" (Binet 1894). Binet interviewed and

used chronophotography to study magicians of the "Golden Age" of magic who performed at the Theatre Robert-Houdin, after the venue was acquired by aspiring illusionist Georges Méliès, who went on to explore the modern style of magic in early twentieth century cinema. More recently there has been renewed interest in the psychology of magic principles like misdirection (Thomas et al. 2016), and the aesthetics of spectator engagement in suspension of disbelief (Leddington 2016). Illusionists use misdirection to create "inattentional blindness" in the spectator "to prevent people from noticing the method of a magic trick whilst still experiencing this effect" (Thomas et al. 2016: 317). Robert-Houdin explained misdirection as using gestures and gaze to "attract the audience's attention to a point far away from the place where the prestige is taking place," and through "patter" or miscommunication "he says what he doesn't do, doesn't do what he says, and does what he is careful not to say" (Robert-Houdin 1864: 88, 94). Other techniques of misdirection include manipulating spectator's expectations, perceptual anticipation through repetitions, and mechanisms like physical occluders that hide a key part of the trick (Thomas et al. 2016: 317).

Méliès was especially prolific and influential in popularizing magic illusions using cinema effects, creating up to 1200 trick films from 1895-1913 (North 2001: 74), starting in the Theatre Robert-Houdin and then in 1896 moving to a new film production studio in Montreuil, just outside of Paris. His Montreuil studio was the first of its kind, constructed out of glass to take advantage of natural light, and modeled after the Theatre Robert-Houdin with trap doors and other stage technology to facilitate both theatrical and cinematic illusions:

> Méliès built a studio for the production of his indoor fantasies, enabling an increased level of control over the mise-en-scene, in stark differentiation from the Lumière aesthetic of exploratory, globe-trotting quasi-actualities (North 2007: 184).

Méliès most famous and influential trick films were "feerie" pictures that went beyond just representing stage magic in cinema, but instead added narrative elements of fantasy, comedy, and horror as a vehicle for the visual effects. Méliès was "an artist who blended story and spectacle in a way which can be seen as prescient of today's cinematic special-effects attractions" (North 2001: 74). The most famous Méliès' feerie film was *Le Voyage Dans la Lun* (1902), which portrayed an impossible voyage to the moon populated by aliens, and was the inspiration for a century of science fiction films, including blockbusters like Star Wars.

Trick films by Méliès and other magicians were shown on the larger Vaudeville theatre circuit at the turn of the twentieth century with animated films and live acts. Some performers seamlessly combined film and live action with staged interaction between the mediums, such as magician Horace Goldin's 1907 act where he stepped out of a filmed taxi arriving to the theatre, and then proceeded to argue over the fair with the cinematic cabby. Solomon writes "Goldin's illusion seamlessly merged film and performance, suggesting both the permeability of the boundary between the respective media and their reciprocal relationship to each other" (Soloman 2006: 595). Animator Winsor McCay appeared on stage with his hand-drawn animated character *Gertie the Dinosaur* (1914), wearing evening clothes and snapping a whip to command Gertie to perform tricks for the audience. Other animators like the Fleischer Brothers and Walt Disney created trick or "gag" films that portrayed cartoon characters stepping out of the page to play with real actors shot on camera.

The Fleischers invented new rotoscoping technology in 1914 to facilitate experiments that resulted in their *Out of the Inkwell* animated series (1918-1927). Rotoscoping, the technique of tracing or painting on top of each frame of a filmed performer, created a more realistic aesthetic for animated characters similar to the effect of motion capture technologies today. In *The Tantalizing Fly* (1919) a stop-motion fly prompted comedic interaction between animator Max Fleischer and his drawing of a clown, by rotoscoping his brother Dave who had worked as a stage clown at Coney Island. The magic was to create believable interaction between the live scene and animated page, with the frame of the drawing board serving as a virtual cartoon stage for sight gags. Continuity between the filmed simulation of the real and the animated world of the clown required cutting from one character reaction to the other, such as when the clown sprayed cartoon ink from a pen and the animator jumped back with real ink on his face.

Animator Walt Disney reversed the dynamic established with Fleischer's popular *Out of the Inkwell* shorts by placing a filmed girl inside of a cartoon world in *Alice's Wonderland* (1923). In this short, Disney himself plays the magician role, and child actor Virginia Davis as Alice represents the audience volunteer when she asks for a tour of his Kansas City studio. However, Disney's main innovation is when Alice dreams of traveling

into Cartoonland as a live girl and appears to interact with all the drawn characters there. Disney employed Ub Iwerks to animate the characters, whose fluid hand-drawn style lent itself to impossible transformations and sight gags (Merritt and Kaufman 2000). The animated shorts by Disney, Fleischer, and others in the early twentieth century display a mutability of objects and figures that extend the transformation illusions of stage magic and trick films. In Disney's *Alice On the Farm* (1926), when Alice enters the magic circle of Cartoonland, the tail of an anthropomorphic cat functions as a magic wand, transforming itself into a sword, a hand crank, a telegraph wire, or a fly swatter as needed:

> So the wand's "meaning" (which might conventionally be thought of as metonymic symbol of the magician's power), is embedded within its very thing-ness, with what it does or is seen to do. Within a highly specialized and (stylized) setting, the theatrical magic act retains a conception of objects as intrinsically meaningful, agentive and fluid (Gilhooly 2013: 4).

The VOID continued the tradition of nineteenth century magic theaters that involved spectators in the illusion, and employed the impossible aesthetics that early cinema and animation artists developed to portray the illusion of traveling to fantasy worlds. VR hyper-reality experiences like *Secrets of the Empire* used simulation and dissimulation (Smith 2015: 326) to hide the theatrical apparatus through the immersive effect and narrative framing of the VR technology, similar to Hecker's game design concept of decomposing structure from style (Hecker 2008). The VR simulated world created the experiential style, and the dissimulation misdirected attention away from the structure of The VOID's hyper-reality apparatus. A game design interpretation of *Secrets of the Empire* using the MDA framework (Hunicke et al. 2004) is that The VOID used magic principles with narrative framing and role play to hide the mechanics of world building and body illusions, affording players RPG and FPS game dynamics that generated the impossible aesthetics of performing in a cinematic Star Wars adventure.

5   Performing Avatars and Automatons in VR Narratives

If the first major illusion in The VOID's *Secrets of the Empire* was creating the perception of an impossibly scaled Mustafar that felt believable, the second was populating the world with iconic figures from the transmedia Star Wars universe that seemed impossibly live. Narrative framing combined with the first-person perspective of a stormtrooper avatar situated the player's perception at the center of the VR space, a literal magic circle, where players performed with life-sized Star Wars characters as a protagonist in the storyline. Everyone who entered The VOID knew that droids, stormtroopers, and Darth Vader only existed in fantasy and science fiction media that was not live, so when these full scale figures moved like live actors in VR, it had a magical effect. Nineteenth century stage magicians like Robert-Houdin featured automatons in his live shows for a similar uncanny effect,[1] and the theatrical history of humans performing through automata and puppets should inform our understanding of how VR figures can display an illusion of liveness. VR real-time NPCs use game AI to trigger source animation from performance capture data of live actors, but there are many layers of refinement that happen in the process. The base acting data is iteratively refined by animators, who manipulate a virtual puppet rig according to principles of animation originally developed by Disney cell animators. Therefore, the aesthetic lineage of the VR characters portrayed in *Secrets of the Empire* include automata, animation, puppetry, stop motion, animatronics, and live acting. The performance of such real-time characters can be refined until it consistently reflects the director's vision, even when interacting with live players improvising a role through an avatar. British theatrical director-designer Edward Gordon Craig predicted this type of refined puppetry in 1907, when he made the argument that theatrical acting will not become an art form until live actors are represented on stage by "über-marionettes," or life-sized super puppets that remove the actor from direct view and only leave the refined character portrayal.

Edward Gordon Craig was not a stage magician, but he understood the importance of illusions for creating art: "A great poet has told us that all Art is a trick; therefore do not despise tricks" (Craig 1919: 197). Craig was an influential English theatrical designer, practitioner, and theorist working at the turn of the twentieth century to establish theatre as high art, like painting or music, for which he proposed removing actors in his controversial

---

1.   "Robert-Houdin's Antonio Diavolo." Vintage Magic Archives, 2014. https://youtu.be/Y4ktw1GFewA.

essay "The Actor and the Über-marionette" (Craig 1907). For Craig, the 'Theatre of the Future' would be expressive and symbolic, with gigantic mutable sets derived from moving screens and sculpted with light, and performed to perfection by a life-sized puppet which he called the über-marionette. Craig understood that his vision was impossible with existing theatre technology, and required a new invention:

> If you can find in Nature a new material, one which has never yet been used by man to give form to his thoughts, then you can say that you are on the high road towards creating a new art. For you have found that by which you can create it. It only remains for you to begin. The Theatre, as I see it, has yet to find that material (Craig 1907).

Though Craig tried to build the über-marionette throughout his lifetime, conventional puppets always fell short of his original concept. "What the wires of the Über-marionette shall be, what shall guide him, who can say?" (Craig 1919).

As a director, Craig became frustrated with actors that relied more on personal charisma than faithfully portraying the role of a character in a performance. He drew from East Asian shadow puppetry and avatars to describe the über-marionette as displaying "a deathlike Beauty while exhaling a living spirit" (Craig 1907), being manipulated by a skilled artist that showed no stray emotions or accidental gestures. Craig wanted the same control over an actor as he did over his stage drawings, making the performance both iteratively refined and repeatable. Some have speculated that Craig was using a metaphor for a disciplined actor or a Decroux-style mime, but after thoroughly examining Craig's notes and correspondences in the National Library of France Craig Collection, curator Le Boeuf points out Craig indicated it was a performer in a full-body mask. In his writings, Craig describes a "Performer. Face and form hidden from gaze," between 4.5 to 6.5 feet tall, and an "actor or manipulator" who "is so highly skilled in his whole being that he no longer exhibits himself upon the Stage" (Le Boeuf 2010: 106, 112-113).

Early Disney animators known as the Nine Old Men were also trying to develop acting as an iterative art form, and developed twelve animation principles to give their characters a believable "illusion of life" (Thomas and Johnston 1981). Some of Disney's animation principles pertain to the mechanics of portraying living figures through a sequence of poses (timing, arcs, solid drawing, straight ahead/pose to pose, follow through, and slow-in/slow-out), while other principles are based on performative and expressive acting techniques from stage and screen (staging, exaggeration, appeal, anticipation, secondary action, squash/stretch). The squash and stretch principle is the bridge to the fluid mutability of forms seen in the early Disney and Fleischer cartoons, while the other expressive principles address what magicians considered showmanship and what Barba termed "extra-daily" acting technique:

> In an organized performance the performer's physical and vocal presence is modelled according to principles which are different from those of daily life... These principles, when applied to certain physiological factors — weight, balance, the use of the spinal column and the eyes — produce physical, pre-expressive tensions. These new tensions generate an extra-daily energy quality which renders the body theatrically "decided," "alive," "believable," thereby enabling the performer's "presence" or scenic bios to attract the spectator's attention before any message is transmitted (Barba 1993: 9).

While Craig would have never classified Disney's animated characters as über-marionettes because they lacked interaction with live spectators, Disney animators were working on character-acting problems similar to what Craig was trying to achieve with puppetry, by simulating expressive liveness in an iteratively refined visual representation. Craig with puppetry, Disney with animation, and Robert-Houdin with his automatons, were all using different mediums to portray an aesthetic of impossible liveness in a dead figure. Disney's principles of animation became an industry standard and were applied to 3D digital characters by former Disney animator John Lasseter (Lasseter 1987), in some of the earliest Pixar shorts like *Luxo Jr* (1986). Pixar was a spinoff of Industrial Light and Magic (ILM), the company George Lucas founded to create the special effects for *Star Wars: A New Hope* (1977), and whose logo was a classic stage magician waving a wand. ILM transformed traditional stop-motion creatures to virtual dinosaurs performed by Phil Tippet's puppeteers in Steven Spielberg's *Jurassic Park* (1993), which created the puppetry and animation foundations for today's 3D digital characters, including the NPCs in The VOID's VR experiences.

There has been a steady development of the technology and techniques for representing impossibly live fig-
ures in a believable manner since Disney animators developed the principles of animation and Pixar applied
them to digital characters. Reaction shots of spectators to a virtual young Mark Hamill as Luke Skywalker
revealed at the end of *The Mandalorian* season 2[2] display cognitive dissonance followed by excitement that
is a common reaction to magic. In each reaction, there is a moment when the spectators know that what they
are seeing is impossible but cannot quite understand how it was done, and then surrender disbelief with the
acknowledgement that it was a sophisticated trick. This was the reaction that Robert-Houdin's automatons cul-
tivated and Craig envisioned from über-marionettes in the theatre of the future. Performance-capture driven
digital figures are starting to create this illusion in non-interactive media, and even some video games, but AI
driven NPCs in VR have the most potential for fulfilling Craig's vision because of their scale and presence with
performative players in virtual space.

When a VOID player put on VR equipment to become a stormtrooper in *Secrets of the Empire*, they started role
play immersion in a magic circle, which has been compared by game researchers to a social contract (Stenros
2012: 13). Players "take on roles that are very dissimilar from themselves" that allow a "discontinuation of the
self," so that they perform extra-daily character actions that may be "awkward or strange" (Sihvonen 1997: 7).
This socially constructed contract of losing oneself in a character role required trust, something magicians like
Hickman designed into the mise-en-scene experience of The VOID simulation using convincers. The role
was reinforced aesthetically by wearing VR equipment that was perceived by the player as a full-body mask or
costume of a stormtrooper in the simulation. Kumari et al. note that other magic-based VR games have used
"narrative framing" in a similar way, like in British magician Derren Brown's *Ghost Train* (2016), which framed
the VR headset as a gas mask to protect players from poison fumes on a subway car ride, and that it "offers
a nice demonstration of how magic techniques can be implemented in a game environment to help enhance
the user illusion" (Kumari et al. 2018: 2).

Narrative framing asks the player to willingly ignore the mechanics of an illusion, suspending disbelief by fram-
ing the headset as a stormtrooper helmet or gas mask, so that it became part of the narrative. By making the
player perceive the VR equipment as stormtrooper armor in the Star Wars world, the illusion supported aes-
thetic immersion on both a narrative and perceptual level. Sunderland calls being transported to a virtual
world in cinema "diegetic immersion," and that it is a "transmedial aesthetic ideal" that is "central to our en-
gagement with art" (Sunderland 2019: 8-9, 13). Cinematic magic created by visual effects can contribute to
perceptual immersion, while cognitive engagement with a cinematic narrative, including identification with a
character role, can trigger narrative immersion:

> The spectator's immersion in the scene is therefore activated by two immersive narrative re-
> sponses — empathy and suspense — which stimulate the spectator's involvement with the drama
> unfolding on screen. Where perceptual immersion is primary and immediate, narrative immer-
> sion is secondary and conceptual, operating largely through cognitive processes resulting from
> the temporal development of narrative (Sunderland 2019: 11).

A VR cinematic experience like *Secrets of the Empire* incorporated perceptual and narrative immersion in a
Star Wars adventure where the player was the protagonist, which was enhanced by gamified tasks that required
fighting and puzzle solving that have been associated with Mihaly Csikszentmihalyi's psychology concept of
flow (Csikszentmihalyi 2014). Sunderland notes the shared psychological aspects between flow and diegetic
immersion, but Csikszentmihalyi's work was associated with interactivity and goal-directed behavior, and
did not necessarily involve fictive worlds (Sunderland 2019: 14). While flow has been a focus of video game
design research (Chen. 2007), it has also been studied in theatrical acting (Martin and Cutler 2002), with similar
experiences reported for actors getting into a role. When reviewers of *Secrets of the Empire* claim they felt like
they were in a Star Wars movie or that the experience was too short, these reactions may indicate experiences
of immersion and flow.

The main difference between immersive VR and screen-based media like cinema and video games is the
embodied performativity afforded to players within a 360 degree virtual space. The performativity of being

---

2. "Reactors Reaction to Seeing Luke Skywalker on *The Mandalorian*, Season 2 Episode 8." *Mixed Reactions*, 2020. https://youtu.be/
BTSsul8tPvU.

cast as a Rebel spy on a Star Wars mission may produce narrative immersion and psychological flow through multimodal play factors, reinforced by the illusion of interacting with uncanny figures in impossible worlds. The latest virtual production technology used for the Star Wars live-action television series *The Mandalorian* (2019) is an LED soundstage called The Volume that transports the actors literally within a Star Wars magic circle. Rather than using a green-screen where performers have to imagine the impossible world around them that will be composited in post-production, their bodies are immersed within the volume of a game engine scene that also illuminates everything. Actors have reported that the new technology helps them to play their roles in the scene. The VOID created a similar magic circle in VR, for players to perform with other live actors and NPCs through avatars. Role play connected the narrative arc to gamified objectives, so that the multi-modal play experience avoided Hocking's "ludo-narrative dissonance" (Hocking 2007). As long as the player accepted their character role and performed as a Rebel spy on a Star Wars mission, the game play supported the narrative and vice versa.

6   Conclusion

Using the popular *Star Wars: Secrets of the Empire* VR arcade experience as an example, I have shown that The VOID functioned as a contemporary magic theater, creating an aesthetics of the impossible in a cinematic multi-sensory illusion. This room-scale VR entertainment application of stage magic principles created the twin effects of simulation and dissimulation through misdirection, effectively hiding the mechanics of the world building and character controls using the VR interface, role play dynamics, and narrative framing. This approach required the design of a physical magic theater with highly choreographed practical effects, synchronized with the VR system, to build the illusion of a believable world. The theatrical stage design employed perceptual and physical convincers to persuade players that the virtual space was real in order to suspend disbelief in impossible world scale and figurative liveness. The VOID served a similar design purpose as nineteenth century magic theaters run by magicians like Robert-Houdin, and incorporated immersive cinema magic pioneered by Méliès and continued by animators and visual effects artists throughout the twentieth century. I also analyzed *Secrets of the Empire* according to game design and performing arts concepts, and argued that the experience placed the player in a literal interpretation of Huizinga's magic circle, and character role play began to fulfill Craig's theatre of the future performed by über-marionettes. Reviews of *Secrets of the Empire* suggest that The VOID achieved aesthetics that were more immersive than typical VR entertainment, transporting players bodily into a tangible Star Wars world that approached a holodeck-style interaction with iconic characters.

Though I have focused on fantasy VR entertainment applications of stage magic, my analysis implies that room-scale VR installations should be researched as a new medium of participatory theatre arts composed in multiple acts. In both The VOID's *Secrets of the Empire* and Derren Brown's *Ghost Train*, a pre-VR staged performance invited players to accept a role in the narrative, which cognitively primed them for entering the magic circle of the VR storyworld. In *Secrets of the Empire*, video of a popular Star Wars actor recruited players as stormtroopers, while in *Ghost Train,* a projection of Darren Brown told visitors about fracking disasters. Other innovative VR installation experiences have designed pre-VR spaces that cast visitors into a performative role in the narrative. Alejandro Iñárritu's *Carne y Arena: Virtually Present, Physically Invisible* (2017), an academy award-winning VR edutainment experience on undocumented immigrants, had a pre-VR space designed as an immigrant detention room. Immigrant shoes and other real objects found in the desert near the Mexico-US border were theatrically displayed, and guests were asked to remove their shoes before going into the main VR dark room, which was covered in cold sand and looked like a desert at night. The performative act of taking off their shoes physically cast guests as immigrants in the main VR scene, which according to reviews had an embodied and emotional impact. These examples indicate that performative role play can serve as a bridge to narrative immersion, and that designers can approach VR experiences like a multi-act theatrical production where the players perform on a virtual stage.

References

Bakk, Ágnes Karolina (2020). "Magic and Immersion in VR." In *Interactive Storytelling. ICIDS 2020. Lecture Notes in Computer Science*, edited by A.G. Bosser, Millard D.E. and C. Hargood, 327-331. Cham: Springer. https://doi.org/10.1007/978-3-030-62516-0_29.

Barba, Eugenio (1993). *La Canoa di carta*. London - New York: Routledge.

Barnouw, Erik (1981). *The Magician and the Cinema*. New York: Oxford University Press.

Bishop, Bryan (2017). "With Star Wars: Secrets of the Empire, virtual reality is finally ready for prime-time." *The Verge*. Nov 20: https://www.theverge.com/2017/11/20/16678438/star-wars-secrets-of-the-empire-virtual-reality-disney-the-void-ilmxlab.

Chen, Jenova (2007). "Flow In Games (and Everything Else)." *Communications of the ACM* 50(4): 31-34.

Craig, Edward Gordon (1907). *The Actor and The Über-marionette*. Florence: The Mask (self-published).

Craig, Edward Gordon (1919). *The Theatre Advancing*. Boston: Little, Brown, and Co.

Csíkszentmihályi, Mihaly (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper & Row.

Di Pancrazio, Amanda (2017). "POV: Curtis Hickman on the real magic behind The VOID." *Journey to VR*, Autodesk Area: https://area.autodesk.com/blogs/journey-to-vr/the-real-magic-behind-the-void/.

Gaudreault, André (2007). "Méliès the Magician," *Early Popular Visual Culture* 5(2): 167-174. https://doi.org/10.1080/17460650701433822.

Gilhooly, Jonathan (2016). "Spectacles of Deception: Residual Magic in the Films of Buster Keaton." *The Fifth Annual London Film and Media Conference*, London.

Gunning, Tom (1989). "Primitive Cinema: A Frame-up? Or the Trick's on Us." *Cinema Journal* 28(2): 3-12.

Hecker, Chris (2008). "Structure VS Style." *Game Developers Conference Proceedings*. San Jose. http://www.chrishecker.com/Structure_vs_style.

Hickman, Curtis (2016). "The VOID: Creating the Illusion of Reality." *Augmented World Expo*. https://www.youtube.com/watch?v=Ebwtq1HZJ2A.

Hickman, Curtis (2019). "Making the Impossible Possible." *Future of Storytelling Summit*. https://futureofstorytelling.org/speaker/curtis-hickman.

Hocking, Clint (2007). "Ludonarrative Dissonance in Bioshock." *Click Nothing*. Oct. 07: https://clicknothing.typepad.com/click_nothing/2007/10/ludonarrative-d.html.

Holmberg, Jan (2003). "Ideals of Immersion in Early Cinema." *Cinémas* 14(1): 129-147. https://doi.org/10.7202/008961ar.

Houzinga, Johan (1955). *Homo Ludens: A Study of the Play-Element in Culture*. Boston: Beacon Press.

Hunicke, Robin, Marc LeBlanc and Robert Zubek (2004). "MDA: A Formal Approach to Game Design and Game Research." *Game Developers Conference Proceedings*, San Jose. https://www.aaai.org/Papers/Workshops/2004/WS-04-04/WS04-04-001.pdf.

Kumari, Shringi, Christoph Deterding, and Gustav Kuhn (2018). "Why Game Designers Should Study Magic." *13th International Conference on the Foundations of Digital Games*. New York, NY: ACM Press.

Lasseter, John (1986). "Principles of traditional animation applied to 3D computer animation." *ACM SIGGRAPH Computer Graphics* 21(4): 35-44. https://doi.org/10.1145/37402.37407.

Le Boeouf, Patrick (2010). "On the Nature of Edward Gordon Craig's Über-Marionette." *New Theatre Quarterly* 26(2): 102-114.

Marshall, Joe, Steve Benford, and Tony Pridmore (2010). "Deception and Magic in Collaborative Interaction." 28th International Conference on Human Factors in Computing Systems, Atlanta. https://doi.org/10.1145/1753326.1753410.

Merritt, Russell, and J.B. Kaufman (2000). *Walt in Wonderland: The Silent Films of Walt Disney*. Baltimore: John Hopkins University Press.

Murray, Janet (1997). *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Cambridge, MA: The MIT Press.

North, Dan (2001). "Magic and illusion in early cinema." *Studies in French Cinema* 1(2): 70-79.

North, Dan (2007). "Illusory Bodies: Magical performance on stage and screen." *Early Popular Visual Culture* 5(2): 175-188.

North, Dan (2008). *Performing Illusions: Cinema, Special Effects, and the Virtual Actor*. London - New York: Wallflower Press.

Robert-Houdin, Jean-Eugene (1868). *Les secrets de la prestidigitation et de la magie*. Paris: Michel Lévy Frères.

Robertson, Adi (2016). "Here's how you could walk forever in an infinite VR hallway." *The Verge*. Aug 1: https://www.theverge.com/circuitbreaker/2016/8/1/12344702/siggraph-virtual-reality-redirected-walking-unlimited-corridor.

Silliman, Brian (2019). "A Journey Inside the Star Wars: Secrets of the Empire VR Experience." Dec 3: https://www.syfy.com/syfywire/a-journey-inside-the-star-wars-secrets-of-the-empire-vr-experience.

Slater, Mel (2018). "Immersion and the illusion of presence in virtual reality." *British Journal of Psychology* 109: 431-433.

Smith, Wally (2015). "Technologies of stage magic: Simulation and dissimulation." *Social Studies of Science* 45(3): 319-343.

Smith Wally, Frank Dignum, and Liz Sonenberg (2016). "The Construction of Impossibility: A Logic Based Analysis of Conjuring Tricks." *Fronteirs in Psychol*. 7 (Article 748): 1-17. https://doi.org/10.3389/fpsyg.2016.00748.

Solomon, Matthew (2006). "Up-to-Date Magic: Theatrical Conjuring and the Trick Film." *Theatre Journal* 58(4): 595-615.

Solomon, Matthew (2010). *Disappearing Tricks: Silent Film, Houdini, and the New Magic of the Twentieth Century*. Chicago: University of Illinois Press.

Stenros, Jaakko (2012). "In Defence of a Magic Circle: The Social and Mental Boundaries of Play." *DiGRA Nordic Conference: Games in Culture and Society*.

Sunderland, Paul (2019). *The Virtual Worlds of Cinema: Visual Effects, Simulation, and the Aesthetics of Cinematic Immersion*. PhD Thesis. University of Sydney.

Thomas, Frank, and Ollie Johnston (1981). *The Illusion of Life: Disney Animation*. New York: Walt Disney Production.

Tognazzini, Bruce (1993). "Principles, Techniques, and Ethics of Stage Magic and Their Application to Human Interface Design." *INTERCHI Conference*, Amsterdam. ACM, New York.

Christopher Maraffi – Florida Atlantic University (United States)
✉ cmaraffi@fau.edu
Christopher Maraffi is an Assistant Professor in the School of Communication and Multimedia Studies at Florida Atlantic University. He teaches courses in video game studies, 3D video game design, and extended reality for the Film, Video, and New Media BA program and Media, Technology, and Entertainment MFA program. https://tophermaraffi.com

Traversing the Boundary of the Screen: Contextualizing the Influence of Cinema and Virtual Reality in Artificial Environments

Joseph Fischer*

Columbia University (United States)

Abstract

Within the last decade, the entertainment industry has witnessed an exponential growth in the production of immersive theme park lands based on popular movie franchises. The diegetic worlds that these environments produce not only endeavor to immerse guests into their favorite films but also to actively involve the spectator and position them as if they are the frame of a camera exploring and creating their own stories within the multi-acre diegesis. These groundbreaking and innovative forms of immersive storytelling have received little attention from scholars in film and media theory and necessitate a thorough contextualization in terms of post-cinematic storytelling. Notably, the hybridity and interdisciplinary nature of the aesthetics and technologies espoused and repurposed for constructing these areas and their respective rides parallel that of conventional filmmaking and post-cinematic media. This paper examines *Pandora—The World of Avatar* and *Star Wars: Galaxy's Edge* — two of the most popular immersive lands located at Disney World in Orlando, Florida — in terms of the cinematic aesthetics and technologies that are employed to guide a spectator while allowing them to experience their own subjective story. Notably, unlike many previous theme park attractions and themed "lands," these immersive environments are rooted in an underlying conceptual narrative. These forms of "real-time storytelling" parallel the concurrent advent of VR experiences as a means of personal post-cinematic storytelling. However, this paper considers these immersive environments to be a form of a physical, tactile alternative reality—a virtual reality that is multi-sensorial and requires no headset.

Keywords: Post-cinema; Storytelling; Theme parks; Artificial reality; Cinematic Virtual Reality.

---

* ✉ jaf2255@columbia.edu

1   Introduction

As described by Jason Jerald (2015), virtual reality is "a computer-generated digital environment that can be experienced and interacted with as if that environment were real" (9). While the late 2010s have been marked by the rise of commercial implementations of virtual reality experiences and entertainment, a compelling shift in the entertainment industry has presented itself within the space of the theme park amidst the emergence of realistic artificial environments based on recognized film franchises that can be experienced and interacted with yet eschew a wholly digital essence. These novel and unorthodox forms of moving image exhibition are effectively engaging the ontological definition of virtual reality while also stimulating reconsideration about the nature of the moving image in a digital, post-cinematic landscape. While "virtual" connotes an immaterial essence of the environment, the novel form of cinematic, immersive, manufactured atmospheres operating within various prominent theme parks can more reasonably be defined as an artificial reality that amalgamates physical and computer-generated environments. The mounting popularity of these unprecedented modes of entertainment originated in the early 2010s with *The Wizarding World of Harry Potter* at Universal's Islands of Adventure theme park. The park's prosperity conceivably led to Disney's aggressive pursuit of long-term, exclusive licensing rights for *Avatar* (2009).[1] Disney then spent over five years creating *Avatar — The World of Pandora* as a section of Disney's Animal Kingdom theme park that immersed guests into James Cameron's ethereal world and opened to the public in the summer of 2017. Subsequently, Disney capitalized on their acquisition of the Star Wars franchise and, in the fall of 2019, opened *Star Wars: Galaxy's Edge* within Disney's Hollywood Studios in Orlando, Florida, and Disneyland located in Anaheim, California. The expansive projects relate to a historical genealogy of immersive entertainment, such as panoramas, stereoscopic cinema, visual effects-driven cinema, and digital cinema, but share a striking similarity with the prevailing advent of virtual reality systems. Throughout this paper, Disney's brand-new immersive lands will be examined through a cinematic scope that derives from their cinema-oriented establishments in terms of their source material, creative personnel, and the artistic principles informing their conception, while also contemplating how these aspects are in dialogue with principles and aesthetics of virtual reality. Essentially, this manuscript advances that these novel case studies testify to a more comprehensive theoretical bridge between virtual reality and the notion of post-cinema that has yet to be elucidated as moving-image exhibition with the absence of traditional modes of projection and reception.

Given the cinematic purview of this analysis, the term Cinematic Virtual Reality (CVR) aptly operates as a parameter for further contextualizing these artificial realities. According to visual effects producer and scholar John Mateer (2017), CVR "can generally be conceived as a type of immersive VR experience where individual users can look around synthetic worlds in 360-degree, often with stereoscopic views, and hear spatialised audio specifically designed to reinforce the veracity of the virtual environment"(15). Fundamentally, cinematic artificial environments and CVR utilize pre-rendered pictures and audial components to realize a 360-degree environment that allows the participant/spectator to control their own viewpoints and positions within the manufactured space. While there are VR elements that comprise these theme park environments, the physicality of the environment offers a substantial degree of sovereign movement and autonomy for the individual, unlike the slightly restrictive spatial form of CVR projects that manifest through the confines of an HMD (Head Mounted Display). The material, three-dimensional essence drastically shifts the virtual experience into a more aptly titled, artificial experience that still commands the implications of "presence" and "suspension of disbelief" affiliated with CVR.

Mateer interjects the ostensibly disparate terms of "presence" and "suspension of disbelief" to parse how CVR is constructed through formal means and aesthetics. The notion of "presence" correlates with VR as a tool for assessing the extent of transportation prevailing in a VR experience. Frank Biocca describes the concept as "a state where our awareness of the medium disappears, and we are pushed through the medium to sensations that approach direct experience" (qtd. in Mateer 2017: 19). "Suspension of disbelief" associates with cinema and principally entails a conscious inclination by the spectator to suspend speculation and rationality when

---

1.   While the creation and subsequent surge in the production of immersive lands in theme parks are undoubtedly for financial reasons, this project engages with these forms from a perspective grounded in cinematic aesthetics, technology, and history. There is definitely a critique to be had with the exploitative, capitalistic tactics operating in these immersive lands. Perhaps this will be expanded on in a future article.

observing a film and "give themselves" to the screen. Mateer attempts to link the rift between 'presence' and 'suspension of disbelief' by interpolating the concept of transportation, as delineated by Green and Brock, to be "absorption into a story (entailing imagery ... and attentional focus and an integrative melding of attention, imagery, and feelings" (qtd. in Mateer 2017: 17). This transportation theory reasonably constitutes a total engagement with and "full transportation" into the artificial space, consequently enabling a more thorough acquisition of both experience and narrative. Conclusively, Mateer advocates the work of Joseph Bates in maintaining "the need for a 'deep structure' for the virtual world to enable users to fully engage with the experience as well as the importance of 'suspension of disbelief'" and that "the development of VR production techniques and grammars is analogous to that of technical filmmaking methods used in areas such as lighting, camera positioning, and sound" (16). Thus, this paper engages with these notions as theoretical and technical motives underpinning the creative production process of immersive cinematic lands; that, above all, the primary goal in the formation and reception of these environments is to thoroughly absorb the spectator and furtively guide them as if they were a 360-degree camera exploring the space and constructing meaningful narratives through the experience.

This philosophy driving the design and production of these immersive experiences is not so novel to Disney theme parks. Former Disney Imagineer Eddie Soto, reflecting on the original creation of Disneyland in 1955, claims:

> Disneyland is an experience involving many moving parts in harmony, like an orchestra. What you hear, what you smell, what you see, how you see it, the speed at which you assimilate it — all of that, just like a film, is all choreographed. But how do you choreograph if you don't control the camera? Because the camera is the viewer, it's you when you come to Disneyland.[2]

Aside from Hollywood VFX consultants, directors, and producers that characterize the current collaborations that produce immersive cinematic lands, Walt Disney Imagineering[3] prevails as the directors, producers, costume designers, scriptwriters, and artists that blur cinematic diegesis and reality. Throughout the years, the Imagineers have often traversed into cinematic practices and techniques. Markedly, it was art directors — at the time working in Disney animations — that delivered a formidable impression on the conception and development of Disneyland in the early 1950s, aiding in composing plausible scale in the themed lands and three-dimensional configurations of attractions and buildings. Art direction, just as it operated then, still functions as a means of "shaping an environment so that it becomes expressive of character and story and the moods, tones, and conflicts associated with them" (Prince 2011: 170). The last decade has presented a shift as the Imagineers continue cultivating this distinguished approach of the guest performing as a spectator/camera, yet now, further emphasizing one's diegetic agency within the fabricated, immersive environment.

The subsequent analysis of Disney's novel immersive "lands" is rooted in a cinematic position that ultimately strives to interpret how cinematic approaches concurrently affiliated with aesthetics of virtual reality and formal elements of filmmaking foster an eccentric mode of storytelling that inspires a rethinking of the digital, post-cinematic landscape. First and foremost, understanding the type of spectatorship operating within these environments and how the designers, engineers, and artists approach the formation of the project bearing in mind that notion of spectatorship, is pivotal. I will commence this analysis by defining a spectator/camera/character apparatus that underpins and guides the systems of form and design embedded throughout these multi-acre dieseses. An accurate interpretation of this notion will authorize a more absorbable exploration of the production and reception of these simulative environments that also considers the connection between cinematic approaches and the methods and forms underpinning CVR. Lastly, I will discuss the unique brand of storytelling that derives from these immersive environments and how the extensive artificial realities confer the means to create meaningful subjective narratives through ostensibly open-world opportunities.

---

2. *The Imagineering Story*. *Disney+*, dir. Leslie Iwerks, 2019.

3. Walt Disney Imagineering is the division of The Walt Disney Company that conceives and effectively produces theme park lands and rides in Disney Parks across the world. Essentially, Imagineering is what the play on words suggests: creative and imaginative vision and ideas actualized through practical engineering and construction practices. Those who serve in this department come from an eclectic variety of backgrounds, such as engineering, architecture, graphic design, writing, animation, etc. Those that work in Disney Imagineering are known as "Imagineers."

2   The Apparatus of the Spectator/Camera/Character

Negotiating the theme park guest as a spectator/camera/character within the diegetic, artificial environment is an approach grounded in theoretical constructs concerning genre, the concept of post-cinema, aesthetics of 3-D stereoscopic cinema, and formal components installed within VR experiences. These varying conceptions adroitly consolidate to develop a technical conceptualization concerning how these immersive lands can be received by guests, consequently leading the pre-production and production processes of design. As such, ascertaining and espousing this notion as both a theoretical and aesthetic framework guiding creation permits a sensible analytical approach to investigating the development and reception of immersive theme park lands.

Andrew Darley (2000) hints at the fundamental correlation between the photographic apparatus and the observer, claiming that "through the movie camera the spectator of the narrative film is assigned a delegated mobility which provides anonymous 'entry' to the fictional space or world of the story and its characters" (48). Although the additional dimension of diegetic persona remains elusive, traces of the spectator/camera as character manifest within theories surrounding the science fiction genre and aesthetics of stereoscopic film exhibition. If one considers these immersive lands as a rendition of science fiction, experiential cinema, they very much share what Scott Bukatman (1999) claims is the primary objective of science fiction in that the genre aims "to create the boundless and infinite stuff of sublime experience, and thus to produce a sense of transcendence beyond human finitude" (254). Furthermore, Bukatman contextualized visual effects sequences constructed by Douglas Trumbull[4] — which endeavored to create "some crazy illusion that looks so great that you can really hang on it like a big master shot of an epic landscape" — as spectacular illusions in which "the presence of the diegetic spectator stages an extended encounter with the sublime, rehearsing (and hyperbolizing) the filmic spectator's own experience" (259).

Avatar, upholding this essence of the science fiction genre fittingly, was a film that concurrently revitalized three-dimensional stereoscopic cinema as a means of immersing the spectator into the screen and generating a correlating identity between the spectator and the diegetic characters. Owen Weetch (2016) notes how the three-dimensional cinematography that marks the aesthetics of the film routinely functions so that "convergence and inter-axial depth are such that he [Jake Sulley] emerges out in the audience space" (21). Weetch also distinguishes how various sequences in the film testify to "3D's ability to put the character on the same spatial plane as the spectator, then, allows a literalised 'acentrality'[5] by intensifying alignment with a character — be it Sully experiencing the docks or a worker being briefed — to an unprecedented degree" (22). Both *Pandora* and *Galaxy's Edge* engage with this characteristic of three-dimensional stereoscopic cinema that *Avatar* conceivably fulfilled, as the design of various landscape constructions and monumental set pieces simulate a sense of depth within the space. Conclusively, these immersive lands fuse the fictive and theatrical space "as diegetic and cinematic spectators are, in a metaphorical sense, united" (261).

In terms of treating the guest as a camera within the digital, post-cinema landscape, the idea of a roaming camera is a concept espoused by David Bordwell (2002) in his notion of intensified continuity, a term that encompasses the style of contemporary mass-audience films today while also evoking post-cinematic sensibilities.[6] For Bordwell, one of the four primary traits of intensified continuity is a free-ranging camera (16). Over the years, as filmmaking equipment and technologies shrink in physical size, digital-centered renditions of the photographic apparatus allow for an almost uninhibited range of motion and placement. The concept of treating the spectator as the camera within an expansive, immersive area correlates with contemporary filmmaking aesthetics in that both forms implement Bordwell's free-roaming camera. Notably, the spacious

---

4. Douglas Trumbull is a prominent VFX supervisor and pioneer who worked on various Hollywood, science-fiction films such as the notable Stargate sequence in *2001: A Space Odyssey* (1968) and *Close Encounters of the Third Kind* (1977). Trumbull shifted the focus of his work to "special venue" attractions such as simulation rides, and continued to develop effects and technologies for World's Fair exhibitions and theme parks (Bukatman 1999: 250).

5. Weetch (2016) considers the notion of "acentrality" in terms of Murray Smith's sentiments regarding Richard Wollheim's concept "acentral imagining." Smith claims that "we comprehend the character and situation, and react... to the thought of the character in that situation... as opposed to the thought of being the character in that situation" (qtd. in Weetch 2016: 22). Weetch ultimately maintains that "blockbuster cinema often builds on this acentrality to heighten spectacle in ways that simultaneously incorporate that spectacle narratively" (22).

6. See Denson and Leyda 2016: 4.

environment that one can openly explore raises difficulties in terms of comprehensive immersion and directing the camera/spectator/character in order to evince a diegetic narrative. It is imperative to examine how the environments are constructed so that the "camera" can be directed, manipulated, and above all, immersed.

Conclusively, the theoretical characteristic regarding spectatorship concerning the science fiction genre, the utilization of 3-D as a means of immersing the spectator in films like *Avatar*, and Bordwell's notion of the "roaming camera" all coalesce with the foundation of Disney Imagineering's spectatorial aesthetics to crystallize an approach towards spectatorship that directs the viewer as if the vast environment were within the confines of a VR headset. Like VR experiences, these immersive lands' design and daily functioning are entrenched in the notion of positioning the visitor as a spectator/camera/character. I introduce this term as the means of hypothesizing that a tourist exploring one of these lands embodies all three roles in their exploration of the environment and effectively realizes a VR experience without the headset. The following sections will further analyze how the artificial environments are constructed to effectively engage with the spectator/camera/character so that story, theme, and message may properly manifest within the experience. Through analysis of the production and the experiencing of these immersive lands, I assert that these interactive environments are fundamentally achieved through a combination of accustomed, tangible cinematic means and digital cinematic methods that share a technical and theoretical relationship with the domain of virtual reality, in that they endeavor to achieve high degrees of 'presence' and 'suspension of disbelief.'

2.1   Production and Reception of Cinematic Theme Park Lands

Mateer delineates how CVR should be approached in a cinematic method so that the director of the production can effectively engage the viewer and enable them to experience the narrative and interpret a story. Initially, the director formulates an interpretation of the story and derives an overall theme or message rooted in that interpretation. Subsequently, the creative process propels the director to consider the technical methods regarding how the project will reveal information, tell the narrative, and visually manifest all of these constituents within an expansive environment. Moreover, Mateer also emphasizes the importance of one feeling 'presence' within the space and mentions interactive designer and scholar Carrie Heeter's three distinct types of presence (19):

1. Social presence: interacting with other characters and human beings

2. Environmental presence: the environment acknowledges that you are there

3. Personal presence: simulating real-world perceptions

These guiding principles and factors involved within VR's creative process are both informative and prevailing within the cinematic production and reception of *Avatar — The World of Pandora* and *Star Wars: Galaxy's Edge*, as the creators concurrently espouse these various aspects of immersion while still considering how to direct a wandering camera.

First, in formulating an interpretation of the story and establishing its themes, each land approaches its source material in different yet intriguing ways. Just as *Avatar* established a trailblazing criterion for utilizing digital 3-D aesthetics and digital visual effects, *Pandora — The World of Avatar* also crystallized a model for immersive practices and can be perceived as a precursor to *Galaxy's Edge* in terms of the land's degree of interactivity and its aptitude to relinquish narrative construction to the individual spectator. Essentially, *Pandora* and *Galaxy's Edge* attempt to direct the spectator through novel methods rooted in CVR exhibition while still appropriating the aspects of stereoscopic, 3-D cinema as well as surround sound, cinematographic lighting, and digital filmmaking exhibition to generate the environment and its respective attractions.

Avatar director James Cameron and producer Jon Landau were profoundly involved with the creation of the Valley of Mo'ara — a fictional, smaller environment within the world of Pandora. As such, the land is situated in relation to the *Avatar* cinematic universe — approximately over one-hundred years past any of Cameron's potential sequels and spin-offs. During one's visit to the Valley of Mo'ara, each guest is positioned as a tourist visiting a shared reservation amongst the Na'vi and humans that is being utilized for ecotourism and research. Not only does this backstory and timeline give Cameron the freedom to explore supplemental stories within *Avatar* sequels, but it also ties in with the themes and values of Disney's Animal Kingdom park.

As Joe Rohde[7] claimed, "If you think about the intrinsic value of nature, transformation through adventure, and personal call to action — these are the values of Animal Kingdom. But, if you say them again, those are the themes of the film *Avatar*." (Niles 2017: ?). Rohde also maintained that the narratives one develops and the interactions one encounters while visiting the land influence one's understanding of environmental issues in the real world.

Galaxy's Edge presents itself as a small village called the Black Spire Outpost located on one of the more unfamiliar planets in the Star Wars universe called Batuu.[8] Scott Trowbridge and the creative team for *Galaxy's Edge* sought to deviate from notable locations, endeavoring to interject novel stories and destinations within the *Star Wars* universe.[9] In terms of the film saga, the immersive land situates itself amongst the ongoing battle focused on in the most recent *Star Wars* trilogy between the First Order and The Resistance.[10] Moreover, Trowbridge alluded to further developing the sense of interactivity and storytelling in Pandora when he claimed that "our intent is to make it feel as if you just walked into one of the movies... Bringing *Star Wars* to life in the physical world gives us the opportunity to play with a whole bunch of things we've never done before... to really engage all of the senses" (Frye 2015: ?). In fact, Trowbridge — testifying to the current, overarching endeavors of Disney Imagineering, maintained that "all of this work we're doing is kind of geared towards this idea of creating emotionally meaningful transformative shared experiences in these environments and these places you can't otherwise do it on your own. And not in a virtual way. Not in a kind of VR, 'I'm wearing goggles' way..." (Trowbridge, *Scott Trowbridge — Unexpected Magic: Inviting the Audience to Drive the Story*). While not as centered on a particular "message" or "theme," the land strives for an unprecedented degree of subjective storytelling and interactivity.

Notably, these experiences are not exhibited through the standard means of virtual reality, but they are prominently informed by both the principles and technology of VR. In the production of *Galaxy's Edge*, a digital system known as BIM (Building Information Modeling) allowed the Imagineers to visually consolidate 2-D plans, 3-D models, infrastructure, and set dressing information into a comprehensive digital model that all departments could reference as they produced the project from the ground up. These digital renderings were imported into a virtual reality system that allowed engineers, architects, artists, and designers to observe and adapt their designs from the perspective of a visitor touring the area. Essentially, there is a quality of CVR direction transpiring through the artistic process and a foundation of VR underlying the production of these projects.

Theoretically, experiencing Black Spire Outpost or the Valley of Mo'ara is essentially an example of what Herbert Zettl calls "deductive sequencing" in cinema. The entrances for each land cinematically present the spectator with stunning wide shots of fantastical props and set pieces that establish the mood and setting of the environment. After these visual introductions, one can roam the area and — operating as the camera — select their own array of medium shots, close-ups, and movements that synthesize into a kind of one-shot, long-take throughout the land. Naturally, the guiding hand of Disney Imagineering is unknowingly present at all times, steering the spectator as camera and instigating various choices.

To properly contextualize the techniques of guidance and the ways in which personal presence manifest throughout one's encounter with the artificial environment, I espouse the work of Zettl, who sought to theorize "how moving images can not only be 'read' to understand their underlying creative structures... but how new moving images can be conceived and 'written,' to communicate with maximum effectiveness" (Frierson 2018: 4). One of Zettl's key concepts was that of vectors, which were rooted in contextualizing the film frame in terms of the Cartesian coordinate system of x, y, and z axes (Fig. 1).

---

7. Rohde is a veteran executive at Walt Disney Imagineering who was the lead designer for Disney's Animal Kingdom theme park. For the creation of "Pandora — The World of Avatar," Rohde operated as creative director.

8. The planet has only been previously mentioned in *Solo: A Star Wars Story* (2018) and was included as a backdrop in the Lucasfilm novel *Star Wars: Thrawn Alliances*.

9. *Scott Trowbridge – Unexpected Magic: Inviting the Audience to Drive the Story*, Future of Storytelling, 2015. http://www.youtube.com/watch?v=jhIOMjh0D3s.

10. Specifically, the land and the stories one can generate are implied to take place some time in between *Star Wars: Episode VIII — The Last Jedi* (2018) and *Star Wars: Episode IX – The Rise of Skywalker* (2019).
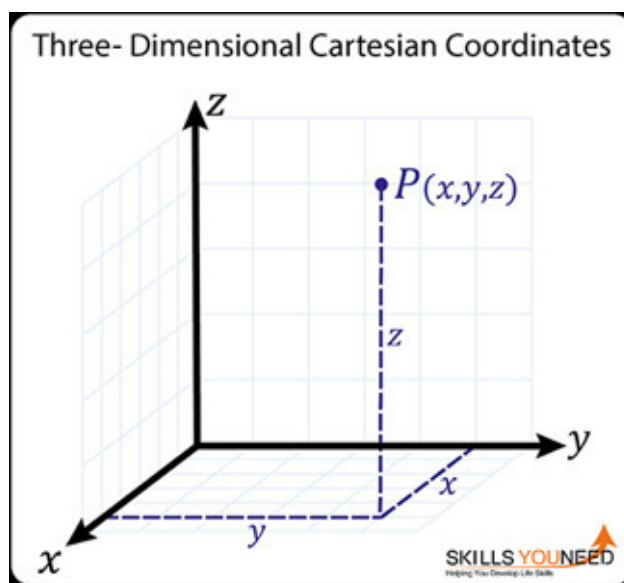
Figure 1. Three-Dimensional Cartesian Coordinates

Various components and set-pieces throughout each environment can be perceived as vectors influencing the spectator/camera/character's perception within this three-dimensional axis. For example, the main entrance to the Valley of Mo'ara utilizes a graphic and index vector in the form of a large, Pandora-native plant called a Flasca Reclonada. The plant's sheer size beckons the spectator's attention, and its interactivity — the plant spews water and mist from the top when it is touched — introduces a sense of environmental presence for the individual (Fig. 2).

The plant's positioning creates a graphic vector[11] that suggests a tilted vertical line that leads to the upper-left side of the subjective frame. Furthermore, if this is understood to be a real flower within the diegetic world that naturally grows in this direction, the giant plant becomes an index vector[12] that carries its inherent directionality into the frame. Considering this connotation of movement and directionality, the interactive prop functions as a cue directing the camera/spectator's perspective to veer towards a trail on the left while simultaneously calling attention to the ostensibly floating rock formation on the frame's z-axis. Succeeding this subtle manipulation, the camera/spectator follows the trail — with each side covered by dense foliage obscuring any views beyond the tree line — until it slightly curves to the right and unveils a spectacular wide-shot of the floating mountain range that hovers over the Valley of Mo'ara. The establishing wide shot of the magnificent floating mountain range, "held for enough screen for the audience to scan the frame, allows a complete 'mental map' of the space to register" (Frierson 2018: 41). Zettl also argued that "aesthetic impact increases with screen size" (41), which renders the 12-acre screen of *Pandora* a perfect example of how the wide shot generates affect for the spectator. The image of the floating mountain range not only establishes location but also "communicates the aesthetic energy of a space" (41). Furthermore, the water rapidly cascading down the rock formations creates vertical, high magnitude motion vectors[13] that solicits the gaze to look up.

Like the cinematic wide-shot of the floating mountain range, *Galaxy's Edge* contains cinematic "reveal" shots that are visual spectacles. Take, for example, the strategic placement of the life-size reproduction of the Millennium Falcon, situated amongst several buildings that conceal the spacecraft from anything but a close

---

11. Zettl's idea of a graphic vector is "one created by a line or screen elements arranged to suggest a line" (5). They can be predominantly horizontal, vertical, rounded, elliptical, etc. In this case, the prop appears to be predominantly vertical as a means of controlling vision to solicit curiosity in the ostensibly floating rock in the background.

12. Frierson (2018) delineates Zettl's notion of an index vector as a vector "created by something that clearly points in a specific direction" (6). Essentially, the spectator follows this line to the left, which is the way they are supposed to go.

13. Zettl claimed that each form of vector could also be categorized as low magnitude or high magnitude. Motion vectors that are comprised by quick motion are considered high magnitude.

Figure 2. The Flasca Reclonada greeting guests as they enter the environment

encounter. Each of the pathways to reach the ship are arranged around the corners of buildings, staging the camera/spectator to conduct pan-like movements that gradually reveal the spectacular shot. Spacecrafts from the Star Wars universe are also methodically situated in various parts of the land to entice particular actions or feelings of wonderment, like a multi-purpose transport shuttle that one can view from a distance as it is docked on top of Docking Bay 7 Food and Cargo — the area's primary dining location (Fig. 3-4).

As the spectator/camera/character absorbs these images, the implementation of forced perspective is persistently skewing the subjective perception of the land to extend farther beyond the actual size of the environment, implying that Pandora does further dwell beyond eyesight and connoting a sense of widespread exploration that encourages the guest to roam the space. Forced perspective — an illusionistic, three-dimensional stereoscopic visualization — is described by Boyle as "achieving a large space in a limited space. You bring the background up, and you force everything smaller" (qtd. in Prince 2011: 157). The implementation of "forced perspective" is often used to connote depth within a space, and it is realized through both architectural means and digital techniques. In terms of tangible manifestations of this perceptual illusion, miniature rock moldings are interspersed throughout the floating mountain range in the Valley of Mo'ara to make it appear as if the suspended formations extend far beyond into the distance. The smaller-sized models are also painted with a muted color palette and a blue tint to connote distance and render an aerial perspective.[14] This type of difference in color and scale alludes to the compositional tools that Mateer outlines as constituents of controlling audience attention in CVR (21) (Fig. 5).

In attractions such as "Star Wars: Rise of the Resistance" or "Na'vi River Journey," digital projections on screens are incorporated to extend space beyond the physical sets within various scenes and sequences. Take, for example, "Na'vi River Journey," in which digital projections of Pandora's environment and wildlife are interspersed amongst the material sets and animatronics that primarily constitute the experience. Each digital moving image projection is another instance of forced perspective, in which the background images of the forest scene become gradually smaller, manipulating the perception of the environment's z-axis to extend far beyond (Fig. 6).

---

14. Prince (2011) explains how various depth cues, such as aerial perspective operate to convey visual information regarding the positioning of objects in a three-dimension space. Aerial perspective is achieved as "hazing from the atmosphere and a color shift toward blue affect very distant objects" (199).
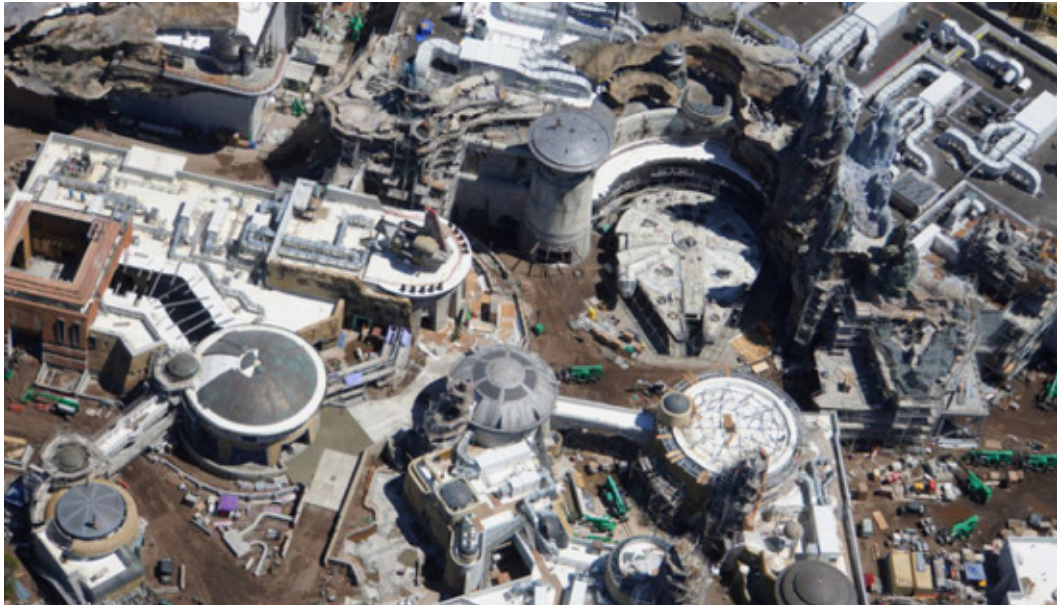
Figure 3. Aerial shot of the land during its construction. Note the strategic, concealed placement of the ship

Figure 4. Millennium Falcon close-up shot from the spectator's POV after they have arrived to encounter the ship

Figure 5. An example of forced perspective in the Valley of Mo'ara's floating mountain range

Figure 6. "Na'vi River Journey," Walt Disney World Resort. Digital projections amalgamate with set pieces to portray depth within the space

Similarly, "Star Wars: Rise of the Resistance" in *Galaxy's Edge* implements various digital moving image projections to sustain the illusionistic z-axis depth of the dynamic sets. When guests are apprehended by the First Order and disembark from their seized spacecraft into the launch bay of a Star Destroyer,[15] a massive, IMAX-Esque screen displays a digital projection of space as Tie-Fighters roam just outside the ship (Fig. 7).

As part of this experience, when Resistance fighters infiltrate the spacecraft and aid in the patrons' escape, the ensuing space battle unfolding just outside the Star Destroyer is exhibited through digital projections (Fig. 8). *Pandora* and *Galaxy's Edge* also utilize lighting techniques that allude to Mateer's emphasis on differences in visibility being utilized as a means of controlling audience attention. The lighting techniques executed are similar to those that *Avatar's* cinematographer, Mauro Fiore, implemented in the film. Fiore's cinematography relied on contrast and lighting instead of selective focus to direct the viewer's attention within the space on screen (Prince 2011: 211). While these techniques are not as prominent in the sunlight, nightfall brings the Valley of Mo'ara to life through an abundance of neon radiance pulsating from various plants and structures. Speaking from personal experience, walking through Pandora at night is a spectacular attraction in and of itself. But more importantly, the pulses of light and alternation between various illuminating surfaces also coerce the spectator/camera/character to notice particular "close-ups." Cameron himself noted how each bioluminescent plant is a guiding light source whose purpose is to manipulate a guest's attention to various special effects and stunning visual displays.[16]

---

15. Star Destroyer is the term referring to a kind of capital ship often used by the Galactic Empire or the First Order in the *Star Wars* films.

16. See *The Imagineering Story* 2019.

Figure 7. The large screen extending the interior space within the Star Destroyer

Figure 8. Digital projections exhibit the battle ensuing around the ship

Notably, the sound effects that radiate from the foliage of the Valley of Mo'ara are not a slapdash assemblage of various sounds. Rohde explains how the collection of sounds aim to further engage with the visitor while conveying auditory relationships. For Rohde and his team of Imagineers, it is not enough for a guest to only hear noises surrounding their every move, but rather, the goal is to generate eco-relationships between the creatures.[17] Just how sound engineers and designers purposely pinpoint each sound effect for a 5.1 surround sound system, each noise in Pandora is meticulously and specifically crafted to propose a symbiotic and interconnected ecosystem, testifying to the entire experiences' underlying message that implies peaceful cohabitation between humans and nature.

In *Galaxy's Edge*, surround sound expresses the boisterous vastness of the land and insinuates the direction of the spectator/camera/character. Periodically, one roaming the environment can hear the take-off of various spacecrafts hovering around the area. The movement of these spacecrafts is implied audibly as sound effects are administered through hidden speakers in a specific pattern to connote proper spatial organization and action. For example, one may hear an engine off in the distance to their right, followed by a woosh of that spacecraft zooming overhead as the audio resonates from right to left. In this sense, the land's 360-degree audial immersion correlates with surround sound and lossless audio data formats that "provide the full range of sound that filmmakers and sound designers have created" (Prince 2011: 192). The ability to place specific sounds within a 360-degree context manipulates the spectator/camera/character and capitalizes on one's natural tendency to locate diegetic sounds within a landscape (Mateer 2017: 21).

The respective rides in *Pandora* and *Galaxy's Edge* grant more control as ride vehicles (camera dollies and rigs) and rigid queue lines (predetermined scene blocking) construct a setting similar to that of a film set. Furthermore, the previously delineated visual and audio components and principles maintain the aesthetics of the broader environment. The designers espouse these principles and transition them into self-contained attractions while preserving a similar degree of guidance of the spectator/camera/character. For example, the queue line that guests must wait in for "Na'vi River Journey" is designed as a smooth transition from the expansive Valley of Mo'ara to the confines of an excavation site situated in a cave where the boats await for the aquatic journey. The ride takes a guest through an astonishing, glowing forest and depicts a series of vignettes that showcase the fantastical wildlife thriving amongst Pandora. Surround-sound effects encompass the self-contained environment, while the amalgamation of practical and digital effects connotes a higher sense of tactile realism while also maintaining the aesthetic continuity of the expansive land. The digital animals and Na'vi characters continue to cross side-by-side with the spectator/camera as every diegetic character moves on the z-axis within the three-dimensional space. These effects and motion vectors conjoin to espouse the style of continuity editing between shots. Passing through each scene and viewing digital projections moving in a continuous direction not only establishes temporal and spatial continuity like traditional film editing but also serves as a method for continuously directing the spectator's gaze on the x-axis through motion vectors as the physical sets gradually transition from scene to scene on the z-axis. Notably, the movement of each projection of moving images synchronizes and maintains continuity with the subject's physical motion. Even the footage comprising simulation rides is constructed to direct the rider's vision and perception. Such is the case for "Flight of Passage"[18] as Jupiter states that

> VFX design in this format is unique in that it is truly an experience design. Because of the immersive scale, every element has to be composed to support and control the audience's focus. They are able to look everywhere, but we want them to look where we want them to. Not only for storytelling purposes, but to visually support the illusion of flying on the back of a banshee (McGowan 2018).

To further immerse the spectator/camera/character and heighten the sense of social presence within a CVR context, each land's cast members[19] are perpetually role-playing as residents of Batuu or employees for ACE

---

17. *Populating Pandora — The World of Avatar with Plants & Animals*. Disney Parks, 20 Apr. 2017. http://www.youtube.com/watch?v=2TdhmjbQS2c.

18. For a more in-depth analysis of the ride experience, see: McGowan, Chris. "Avatar: Flight of Passage: A Cinematic, Multi-Sensory 3D Experience That Soars." *VFX Voice Magazine*, 24 June 2018, http://www.vfxvoice.com/avatar-flight-of-passage-a-cinematic-multi-sensory-3d-experience-that-soars/.

19. Employees at Disney Parks are not referred to as employees or workers. Rather, they are called cast members to suggest that they

— a fictional tourist company operating in partnership with the Na'vi. In *Galaxy's Edge*, stormtroopers roam the area monitoring the location and interacting with guests in various manners. In Pandora, an ACE employee might greet someone with "Oel ngati kameie" — a Na'vi greeting that translates to "I see you," they may point out various Pandora-native foliage and delineate facts about the environment, or they may also entice you to undergo the land's rides but only refer to them as experiences that coalesce with the diegetic setting. For example, the 4-D simulation ride, *Avatar – Flight of Passage*, is referred to as a vacationist attraction in which the guest participates in a Na'vi rite of passage through neuralink technology that ACE has implemented with the help of the Na'vi. Likewise, in *Galaxy's Edge*, attractions are not referred to by name. Instead, a local merchant could query if you would like to join a crew in piloting the Millennium Falcon on a secret mission.

While there does exist a degree of guidance in a guest's gaze, the environments do bestow what Darley (2000) calls a *vicarious kinaesthesia*, which he defines as "the impression of controlling events that are taking place in the present" (157). Darley's term is serviceable and relevant in considering the exchange of control and freedom one has in experiencing the environment, as the inclusion of the word 'impression' in Darley's definition connotes a sense of ostensible sovereignty. It is this degree of sovereignty that allows for subjective storytelling to manifest through exploration, as the artificial environments evokes one's ability to construct meaningful narratives.

3   Environmental Storytelling

As *Galaxy's Edge* provides the most interactive and narrative-centered example of this unique brand of storytelling, I will sketch how the land accommodates the guest's agency to manifest an immersive, interactive experience through one's experiencing of the environment. In attempting to contextualize this unique brand of storytelling, the term "environmental storytelling" aptly encapsulates this novel form of narrative formation. Environmental storytelling, as described by Henry Jenkins (n.d.), "creates the preconditions for an immersive narrative experience in at least one of four ways: spatial stories can evoke pre-existing narrative associations; they can provide a staging ground where narrative events are enacted; they may embed narrative information within their mise-en-scene; or they provide resources for emergent narratives."

Given the widely known *Star Wars* universe and its various established narratives, one can approach the land with pre-existing narrative associations. Both the overall environment and the singular attractions confer agency to the guest as they make their own decisions throughout their experience. For example, one can partake in the immersive experience of piloting the Millennium Falcon in the ride aptly titled "Star Wars: Millennium Falcon — Smugglers Run." This innovative motion simulation ride based on Lucas's cinematic franchise positions the spectator/camera/character as a pilot, engineer, or gunner rather than a passive traveler. The overall experience echoes that of a video game, positioning the guest as their own character embarking on a "smuggling mission." Each cockpit — situated within the confines of a domed screen — holds six people who serve as the ship's crew. As the ride ensues, each participant is given control over their station, as pilots veer left and right or up and down within the simulation utilizing basic joysticks as controls, while engineers and gunners press buttons to perform various actions as needed during the experience. The sensation of interactivity extends beyond your ride experience, beginning with the departure into the Falcon's corridors. As one departs from the cockpit, visual and audio effects such as wires short-circuiting and flashing sparks within the walls manifest the extent of the ship's damage. Above all, the company of guests is furnished with a score based on their performance. From there, a guest's performance on the ride accompanies them throughout the rest of their venture in Black Spire Outpost. While a personal experience cannot testify to the accuracy of this event, various blogs and articles suggest that an inadequate performance during the ride can lead to an interaction with a bounty hunter confronting the guest concerning payment of galactic credits to Hondo for the damage of the ship.[20]

Disney also utilizes a mobile phone app called "Play Disney Parks," in which visitors can create their own profile and collect virtual galactic credits and interact with various components of the multi-acre environment.

---

operating as a part of an imaginative production.

20. See "Star Wars: Galaxy's Edge Interactive Experiences – Bounty Hunters, Rebel Spies, and Space Creatures," https://blooloop.com/features/galaxys-edge-interactive-experiences/.

For example, *Galaxy's Edge* contains a collection of Datapads scattered throughout the land that any guest with the app can engage with — once again radiating a sense of environmental presence. These Datapads permit one to translate Aurebesh[21] texts inscribed on signs throughout the land, hack into various droids and devices, scan crates to discover the contents within them, or tune into communication signals in order to receive transcripts of conversations. All these interactions can be approached from the perspective of a rebel attempting to fight alongside the Resistance or as a proponent of the First Order seeking to sustain totalitarian control of the location.

While even more material could cover the extent to which *Galaxy's Edge* supplies the means for a continuous, cinematic adventure to ensue with every visit, the essential notion to preserve per this article is how the unique aspects of filmmaking and CVR interpolate to confer guests with the capacity to create their own stories and personas. One could "play" within the land, assuming various personas, achieving different missions, and essentially constructing their own narrative.

Conclusion

In conclusion, the advent of synthetic, interactive, cinematic environments situated in theme parks introduces an original mode of cinematic experiential entertainment that shares numerous characteristics and theoretical concepts with forms of virtual reality, namely Cinematic Virtual Reality. These innovative and unique forms of entertainment add to a diverse multi-media landscape that is persistently challenging and modifying traditional perceptions of various screen-centered disciplines that constitute the notion of post-cinema. The interdisciplinary nature of these projects testifies to a more comprehensive shift in moving image exhibition within the ever-evolving digital age that demands further consideration and discussion as the art form continues to submerge into an unprecedented moment of ontological query and spectatorial reconsideration. Essentially, while this article offers a starting point for investigating and studying an unorthodox mode of moving image exhibition, it is also fundamental to recognize a shift ruminating throughout these digital modes of immersion and simulation that fundamentally derives from cinema and perhaps recalls its origins in which physical settings fused with the projection of moving images to create crude modes of simulation, such as the infamous Hale's Tours. Above all, cinematic approaches to virtual reality and the associated methods of storytelling innately testify to an impression of post-cinema that privileges subjectivity and active spectatorship over the conventional passive spectator traditionally connected with cinema.

Returning to the concept of CVR, Mateer (2017) ends the article by interrogating various complications and questions that apply to the novel forms I have focused on in this paper. Questions such as "When does the artifice of cueing become apparent to users and affect transportation?"; "What is the relationship between the level of user autonomy and transportation within CVR?"; and "What techniques from other media, such as traditional stage-based or participatory theatre, are applicable to CVR and how can they be used effectively?" all are in conversation with the future of cinematic lands in theme parks. While the goal of these projects is to submerge the guest into the environment, it is irrational to assume that every individual feels the same degree of immersion. External factors such as the presence of other tourists or individual's refusing to suspend their inhibitions and remain self-aware of the artificiality of the environment complicate the endeavored outcome of these lands. Moreover, while this paper has examined the cinematic/VR aspects of these lands, to what degree do other media amongst the post-cinematic landscape influence their production and reception? Take, for example, video games that also share technical and qualitative characteristics with virtual reality and how interactivity within an experience such as piloting the Millennium Falcon emulates the experience of playing a first-person flight simulator.

As the entertainment industry surges forward with the utilization of exciting new technologies and practices, these entertaining and immersive environments deserve significant consideration within the contexts of cinema and media studies, as well as the burgeoning scholarship surrounding virtual reality. The post-cinematic landscape finds itself at the brink of systematizing this groundbreaking branch of cinematic practice as the hitherto success is reinforcing the standardizing of cinematic, immersive environments.

---

21. Aurebesh is the fictional language within the *Star Wars* Franchise and was specifically implemented in various ways throughout the land.

References

Bordwell, David (2002). "Intensified Continuity Visual Style in Contemporary American Film." *Film Quarterly*, vol. 55, no. 3, 2002, pp. 16–28., doi:10.1525/fq.2002.55.3.16.

Bukatman, Scott (1999). "The Artificial Infinite: On Special Effects and The Sublime." In *Alien Zone II: The Spaces of Science-Fiction Cinema*, edoted by Annette Kuhn, 249-275. London and New York: Verso.

Darley, Andrew (2000). *Visual Digital Culture: Surface Play and Spectacle in New Media Genres*. London and New York: Routledge.

Denson, Shane, and Julia Leyda, edited by (2016). *Post-Cinema: Theorizing 21st Century Film*. Falmer: RE-FRAME Books.

Frierson, Michael (2018). *Film and Video Editing Theory: How Editing Creates Meaning*. New York: Routledge.

Frye, Jim (2015). "Chewie, We're Home." *Disney Twenty-Three* 7(4): 20-23.

Jerald, Jason (2015). *The VR Book: Human-Centered Design for Virtual Reality*. San Rafael: Morgan & Claypool.

Jenkins, Henry (n.d.). "Game Design as Narrative Architecture." *Publications – Henry Jenkins*, http://web.mit.edu/~21fms/People/henry3/games&narrative.html.

Mateer, John (2017). "Directing for Cinematic Virtual Reality: How the Traditional Film Director's Craft Applies to Immersive Environments and Notions of Presence." *Journal of Media Practice* 18(1): 14-25. https://doi.org/10.1080/14682753.2017.1305838.

McGowan, Chris (2018). "Avatar: Flight of Passage: A Cinematic, Multi-Sensory 3D Experience That Soars." *VFX Voice Magazine*, 24 June, http://www.vfxvoice.com/avatar-flight-of-passage-a-cinematic-multi-sensory-3d-experience-that-soars/.

Niles, Robert (2017). "Joe Rohde: Why 'Avatar' Fits in Disney's Animal Kingdom." *Theme Park Insider*, 21 Feb.

Prince, Stephen (2011). *Digital Visual Effects in Cinema: The Seduction of Reality*. New Brunswick, NJ and London: Rutgers University Press.

Weetch, Owen (2016). "'I See You': *Avatar*, Narrative Spectacle and Accentuating Continuity," *Expressive Spaces in Digital 3D Cinema*. Palgrave Close Readings in Film and Television. Palgrave Macmillan, London. https://doi-org.ezproxy.cul.columbia.edu/10.1057/978-1-137-54267-0_2.

Joseph Fischer – Columbia University (United States)

✉ jaf2255@columbia.edu

Joseph Fischer is currently an M.A. student in Film and Media Studies at Columbia University in the City of New York. He received my Bachelor of Arts in Mass Communications, as well as his Bachelor of Arts in Psychology in May 2018 from the University of Arkansas at Little Rock. In 2018, he was one of fifty students accepted to the Telluride Student Symposium. He also currently works as a rapporteur for the Cinema and Interdisciplinary Studies Seminar at Columbia University.

Contemporary Art and Virtual Reality: New Conditions of Viewership

Francesco Maria Spampinato[* a]   Valentino Carticalà[** b]

[a]   University of Bologna (Italy)
[b]   Manchester Metropolitan University (UK)

Abstract

This article aims to respond to the lack of studies on the relationships between contemporary visual arts and VR, focusing on the role of "storytelling" and identifying what distinguishes VR art projects from other contemporary uses of VR, namely the criticism that they make of the VR medium itself. In the last five years, VR has developed a new language based on a specific visual grammar that has allowed for new forms of narration to arise. Visual artists have been attracted to VR in search of new modes of production and have exposed the negative impact of technology on our perception of reality, uncovering new mediated ways of seeing and distanced interaction with the world around us. The first part of the article will be dedicated to discussing Canadian artist Jon Rafman's *View of Pariser Platz* (2016) and American artist Jordan Wolfson's *Real violence* (2017), two of the first Oculus Rift-based art installations that developed a metalinguistic commentary on how VR, although promising immersion, produces, in fact, alienation, homogenization, brutalization and the loss of empathy. The article will continue with a discussion on the recent rise of tech companies that aim at producing contemporary artworks based on VR technology: Acute Art (London), Khora Contemporary (Copenhagen), and VIVE Arts (Taiwan). This is a new and expanding field that is changing the ontology of artmaking and redefining the artist's role, mainly in light of the cooperation with technicians and programmers.

Keywords: Contemporary Art; Virtual Reality; Visual Culture; Media; Dystopia; Empathy.

---

*   ✉ francesco.spampinato@unibo.it

**   ✉ valentino.catricala@gmail.com

1 Promises of Immersion: The Evolution of VR in Contemporary Art

Since the introduction of the Oculus Rift in 2016, VR has developed a new language based on a specific visual grammar, allowing new forms of narration to arise. Visual artists too have been attracted to VR but, unlike most applications of VR in other fields, their goal is frequently that of exposing the negative impact of technology on our perception of reality, as uncovering the new mediated ways of seeing and distanced interaction with the world around us. By adopting the tools of contemporary art history, this article aims to respond to the lack of scholarship on the relation between contemporary visual arts and VR and will be based on a phenomenological analysis of artworks, as well as the investigative tactics of media and visual studies concerning the growing impact of audiovisual technologies. To identify the specificity of VR art projects in comparison with other contemporary uses of VR, the article will focus on the role of "storytelling," highlighting how contemporary artists are less interested in exploring VR's illusionistic and immersive dynamics than deconstructing the VR medium itself.

The first part of the article will be dedicated to discussing Canadian artist Jon Rafman's *View of Pariser Platz* (2016) and American artist Jordan Wolfson's *Real violence* (2017), two of the first Oculus Rift-based art installations that developed a metalinguistic commentary on how VR, although promising immersion, produces, in fact, alienation, homogenization, brutalization and the loss of empathy. The article will continue with a discussion on the recent rise of tech companies that aim at producing contemporary artworks based on VR technology: Acute Art (London), Khora Contemporary (Copenhagen), and VIVE Arts (Taiwan). The artists discussed have perfected a characteristic type of VR storytelling that is based on micro-narratives, not so much a linear story that develops over time but an intense, sensational, and emotional condition for the viewer. While reconfiguring the viewer's experience in the exhibition space, these VR art projects also developed metalinguistic reflections on the very mechanisms of VR, reclaiming the mcluhanesque dictum that "the medium is the message" (McLuhan, 1966: 5).

Every time a new medium becomes available, artists adopt it enthusiastically, fascinated by its newness and motivated by the desire to establish more direct relationships with their audience, or to reach new ones. This is what happened with film, the radio, the telephone, video technologies, the personal computer, and the Internet. Usually, these processes were triggered by the commercialization of specific devices, a key example being the Sony Portapak camera which was released in the late 1960s and encouraged the birth of video art. Virtual Reality had a similar impact: not only were visual artists eager to experiment with it, some of them even contributed to the evolution of its technology. From 1977 to 1984 David Em, pioneer artist in American computer imaging, worked at NASA's Jet Propulsion Laboratory Graphics Lab and created the first navigable virtual worlds, interestingly reminiscent of the landscapes painted by Surrealist artists such as Salvador Dalí and Yves Tanguy.

American computer scientist, artist, and writer Jaron Lanier had a pivotal role in the advancement and popularization of VR, notably through the development of wearable devices such as the DataGlove, the EyePhone, and the DataSuit produced by VPL Research, a company he founded in 1984. Lanier considered VR an empowering technology that allowed for new forms of self-liberation and community-bonding, in line with the experiences that had emerged in American counterculture during the 1960s such as the Whole Earth Catalog, USCO, and E.A.T., and with contemporary computer idealists such as Apple leader Steve Jobs. In a 1989 interview, Lanier declared: "There are a few special things about Virtual Reality to keep in mind, the things that make it important. One is that it's a reality in which anything can be possible, provided it's part of the external world. It's a world without limitation, a world as unlimited as dreams. It's also a world that's shared, like the physical world is, no more, no less" (Lanier, 1989: 110).

As VR headsets started to circulate in the early 1990s in the videogame market (e.g., the Sega VR headset was commercialized in 1991) and be fantasized about in mainstream sci-fi cinema (e.g., *The Lawnmower Man*, 1992), more and more visual artists were attracted by the immersive potential of this technology. British computer artist William Latham explored the psychedelic dimension of VR, plunging viewers into computational ecosystems populated by organic life forms generated by algorithms (his is also a pioneering case of A.I. art), reminiscent of sea anemones, mushrooms, fossils, and viruses. He was influenced by fractals and Froebel's language of shapes, as well as by evolutionary theories. In the 1980s, together with programmer Stephen Todd,

Latham established the Mutator VR team, which is still active today. Their last installation, produced by VIVE Arts, was featured in the 2020 exhibition *Neurons: Simulated Intelligence* at Centre Pompidou, Paris.

Another key figure in the evolution of VR in contemporary art is Australian artist Jeffrey Shaw. Shaw emerged in the late 1960s in association with expanded cinema and radical architecture practices and approached computer technology in the 1980s. His *Virtual Sculpture* (1981) was a pioneering augmented reality installation: viewers could tilt a monitor implemented with a Fresnel lens and a semitransparent mirror and visualize computer-generated figures floating in the surrounding space. Shaw's most groundbreaking project with VR — this one too with no headset — is *Legible City* (1989–1991), an interactive installation that allowed visitors to navigate a computer-generated cityscape by riding a stationary bicycle in front of a screen. Although based on the maps of real cities (Manhattan, Amsterdam, Karlsruhe), 3D words and phrases took the place of buildings. Concurrently to exploring immersion, the work exposes the major role played by computer imaging in eliciting the epochal shift from a text-based to an image-based culture, what W.J.T. Mitchell famously termed "the pictorial turn" (Mitchell, 1994).

Scholars have identified various origins for VR, the most "recent" ones being 19th-century pre-cinema optical devices, such as the cyclorama, the stereoscope, and the kinetoscope. Some situated the earliest examples of VR in Renaissance perspective and Baroque illusionism. In his seminal book on the topic, *Virtual Art: From Illusion to Immersion*, German art historian and media scholar Oliver Grau goes back to the frescoes found in Roman houses (Grau, 2003). Nevertheless, a major shift from ancient forms of illusionism to current VR applications has been enacted by the evolution of computer technologies, notably the advent of wearable devices that offer users sensory immersion and the illusory capacity to interact with a virtual environment. Therefore, it would be more accurate to identify the roots of VR in American filmmaker and inventor Morton Heiling's *Sensorama* (1962) — the first machine to offer a proper multi-sensory immersion — and, more importantly, in Lanier's wearables of the 1980s.

Italian media scholars Francesco Casetti and Andrea Pinotti have identified three main axes of the contemporary immersive experience: unframedness, presentness, and immediateness. By "unframedness," they are referring to the loss of the frame. The screen and the frame — crucial elements of "traditional" forms of the filmic narrative experience — seem to vanish in VR. With a 360 degrees horizon, the edges of the frame collapse allowing the user to explore the field in its entirety. "Presentness," they suggest, "should be understood in a double sense: of the user feeling present in the environment (a condition frequently referred to through the formula 'being there'), and of the digital objects perceived as actually present in the space-time of the user" (Casetti and Pinotti, 2020: 204). By "immediateness" they refer to the feeling of being fully absorbed in a virtual world, a feeling destined to be increased the more technologies are connected with, or become an extension of, our body.

Early experiments in the use of VR in the visual arts were conducted from the 1970s to the 1990s by artists like Em, Latham, and Shaw, and were characterized — as was also the case with other technologies — by an investigative take on the aesthetic and narrative possibilities offered by the new medium. They were galvanized as much as those who adopted VR in other fields. Interest in VR waned during the late 1990s, but starting from 2016, in coincidence with the commercialization of the Oculus Rift — and the development of user-friendly software such as Unreal Engine and Unity — a new wave of VR art projects emerged. The Oculus Rift VR system, designed by American entrepreneur Palmer Luckey in 2010, was launched in 2012 through a Kickstarter campaign and famously purchased by Facebook in 2014 for $3 billion, thus entering the market in 2016. Its groundbreaking impact was due to the headset display's 90Hz frame rate coupled with low latency, allowing users an all-encompassing experience.

For Luckey and most of the early Oculus Rift adopters, VR was meant to intensify their gaming performance. "I've always loved games. They're windows into worlds that let us travel somewhere fantastic," asserts Luckey. "My foray into virtual reality was driven by a desire to enhance my gaming experience; to make my rig more than just a window to these worlds, to actually let me step inside them" (Luckey, 2014). Along with the videogame industry, the past few years have seen a growing use of VR in cinema, entertainment at large, and even medicine (e.g., VR programs used in the rehabilitation of Alzheimer patients). More and more museums and archeological sites have adopted VR too, so as to offer visitors immersions into painted scenes, strolls through Greek *polises*, or terrifying encounters with dinosaurs. However, most of these VR applications are nothing more

than intensified versions of ancient forms of illusionism, and follow the logic of entertainment, the market, and pedagogy.

2   Empathy Lost: Jon Rafman's and Jordan Wolfson's VR Installations

Rafman and Wolfson, who emerged in the late 2000s, are two of the best-known contemporary artists that deal with automation, alienation, and identity crises concerning technology and the Internet. Their works often induce anxiety, and confront the audience with the dehumanizing impact of virtual life with regards to work, education, and leisure activities. Rafman's prolific output includes appropriated Internet screenshots, CGIs (static, animated, or 3D-printed), and videos made up of found footage from various sources. His work is associated with the so-called post-Internet movement and the work of peers such as Ed Atkins, Camille Henrot, Oliver Laric, and Amalia Ulman. Wolfson is known for videos and kinetic installations that tackle issues of violence, sexism, and racism. Both artists have recurrently used body surrogates such as avatars, trolls, and animatronics to explore psychoanalytical dynamics related to identity fragmentation and issues of desensitization engendered by digital technologies.

Rafman's appropriationist approach is characterized by the same lo-fi style of artists that emerged in the early 2000s such as Cory Arcangel and Ryan Trecartin. With them he shares an interest in the psychopathologies associated with virtual communities of fans and gamers, the dynamics of self-representation on social media platforms based on user-generated content, and the standardizing impact of web applications. Rafman's best-known work is *Nine Eyes of Google Street View* (2008–ongoing), a collection of screenshots from Google Street View, presenting unusual scenes caught by the cold eye of the camera mounted on top of a Google Car: prostitutes, dying animals, criminal activities and so on. Throughout the 2010s he explored the growing online presence of memes, trolls, bots, and avatars, notably through works based on the virtual world Second Life, where he placed the Kool-Aid mascot in the role of tourist guide or two women avatars performing in situations prescribed by sexual fantasies in *Dream Journal* (2016–2019).

View of Pariser Platz (2016) was a site-specific VR installation Rafman made in collaboration with Samuel Walker for the 9th Berlin Biennale, which was curated by New York-based art collective and post-Internet networkers DIS. The work was installed on the terrace of the Akademie der Künste, which faces Pariser Platz and the Brandenburg Gate. A staff member instructed single visitors to wear the Oculus Rift (only one headset was available). The VR experience started with a panoramic CGI replica of Pariser Platz from the user's point of view. All of a sudden, the atmosphere became dark and foggy, the surrounding sculptures of animals eating other animals in one bite came to life (these too were works by Rafman), the terrace's floor began to crumble, and faceless, disarticulated, seemingly foam-filled dummies started to float around, falling. The square, usually crowded with tourists, was turned into a surreal universe controlled by a superior, invisible force (Figure 1).

As the terrace collapsed, the user precipitated into an abyss, becoming just another faceless dummy among impotent lookalike bodies, beings less sentient than lifeless corpses. The desire for an immersive experience that normally stimulates users to wear a VR headset led to apprehension: a commentary on how digital technologies produce, in fact, homogeneity and insensitivity. The work overturned and exposed the illusory feeling of omnipotence that one normally encounters in user-controlled navigation systems, two examples being GPS receivers and videogames. Borrowing the codes and aesthetics of dystopian sci-fi cinema, *View of Pariser Platz* produced an experience of immersion into a reality in which one is neither the protagonist nor identified with the hero: one is just another anonymous dummy falling; an image that also, inevitably, echoed the desperate "jumpers" of the World Trade Center during the tragic events of 9/11.

The abyss was physical as much as psychological: the metaphor of a mind losing control while deluded to be in control. Rafman has explored similar dynamics in other works too, although these are not VR-based. *New Age Demanded* (2009–ongoing), for example, is a series of faceless CGI sculptural heads, deformed by an accelerated, invisible force, simulating different materials and covered with textures that recall pictorial abstractions, an example being the head that appears in the 2014 remake of the cyberpunk movie *Robocop*. Their monumental celebration of dis-identity is particularly grasping when they are 3D-printed. In the multi-screen animations *Poor Magic* (2017) and *Disasters Under the Sun* (2019), we are also confronted with faceless beings which join crowds running and smashing against walls or each other, jumping off high spots, being

Figure 1. Jon *Rafman*, *View of Pariser Platz*, 2016 (still). Virtual Reality Installation. Courtesy the artist, Sprüth Magers. © Jon Rafman

squeezed through moving walls, as virtual crash test dummies are employed, or rather abused, to test how a human body can resist and survive violent impacts.

Rather than avatars, Wolfson employs Disneyesque animatronics to explore identity issues concerned with digital technologies. His most renown work, *(Female figure)* (2014), is a life-size animatronic of a scantily clad blonde woman, reminiscent of pop singer Lady Gaga, who wears a witch mask and has signs of dirt on her body. She performs sensual but robotic dance moves in front of a mirror, to which she is attached to via a metal bar that protrudes from her stomach. She is also equipped with facial recognition software that enables her to establish visual contact with the viewers. Another animatronic by Wolfson, *Colored sculpture* (2016), is a boy with a diabolical look, reminiscent of Huckleberry Finn and the MAD magazine mascot. In an enclosed arena, the disarticulated, larger-than-life figure is suspended by heavy chains. Viewers can only walk around the perimeter and observe the cartoonish character being dragged around by the head, an arm, or a leg, as the chains are pulled and released by motorized tracks.

As an extension of his work with animatronics, Wolfson adopted VR to comment on the numbing effect of current technology. Unlike for Rafman's work, many users took off their headset before the full two-minute and twenty-five-second video came to an end in Wolfson's *Real violence* (2017). This VR installation was presented at the 78th Whitney Biennial, where it was available to ten users at a time, with a restriction on those who were under 18 years of age, who were made to stand around a counter (Figure 2). Isolated by the VR headset and noise-canceling headphones, users were shown a view of the sky, as if one was lying on the ground, and were later confronted with an act of extreme and gratuitous violence: a man in jeans and grey t-shirt, the avatar of Wolfson, beating to death a kneeling man with a red hoodie on a Manhattan sidewalk. Initially, he struck him with a baseball bat, and later, hit his body and head with stomps and kicks. The victim is seen as silent and condescending. As blood increasingly flows, the executioner finishes the man off by smashing his skull against the pavement, while life around him proceeds indifferently.

A historical work of art which exhibited a gratuitous act of violence was Chris Burden's performance *Shoot* (1971), which consisted in Burden being shot in the arm by a friend with a rifle from 5 meters. Unlike Wolfson's VR, Burden's performance was not a simulation. Besides, while Wolfson plays the role of the attacker, Burden is the victim, although one who is responsible for putting himself in such a passive role. Passivity and indifference are key elements in both works, metaphors of the sadistic position of voyeurs in which spectators/users are placed in by the media. Admittedly, Burden was concerned with the spectacularization of the Vietnam War,

Figure 2. Installation view, Jordan Wolfson, *Real violence*, 2017. Virtual reality headsets, high-definition video, color, Sound; 2:25 min. Whitney Biennial 2017, Whitney Museum of American Art, New York, 17 March – 11 June 2017. Credit: © Jordan Wolfson. Collection of the artist. Courtesy David Zwirner, New York, and Sadie Coles HQ, London. Photo: Bill Orcutt.

ongoing at that time, on television. According to American art historian Frazer Ward, a meaningful element in *Shoot* was the position of the audience, who did not intervene in a situation that might eventually have turned into a homicide, a small audience "defined by the suspension of judgment and choice. What should I do, in this situation? *Watch*" (Ward, 2001: 130).

If the act of violence is not real but a hyperrealistic CGI simulation performed by avatars, what then is the "real violence" advertised in the title of Wolfson's work? The role of the audience, impotent but also voluntarily passive, plays a crucial aspect here too. However, while Burden was concerned with the passive telespectator, Wolfson is concerned with VR and, by extension, digital technologies and the Internet at large, or tools which delude us in thinking that we are active users. The "real violence," then, is less the one performed than that enacted by the media, which are blamed for anesthetizing spectators, making them apathetic even in front of scenes of violence, abuse, and murder. Sherry Turkle, the author of various recent books that analyze the psychological impact of technology, suggests that we are "being silenced by our technologies — in a way, 'cured of talking.' These silences — often in the presence of our children — have led to a crisis of empathy that has diminished us at home, at work, and in public life" (Turkle, 2015: 66). Silent and alienated behind screens, we have lost the curiosity for self-reflection and any form of empathy, even compassion towards other human life.

Rafman's and Wolfson's VR installations produce a particular type of storytelling, in antithesis with most VR uses in the fields of cinema, entertainment, education, and commerce. First, the setting: we are confronted with a replica of our surroundings — the terrace on which we stand in Berlin and a Manhattan street around the Whitney Museum — but we cannot explore or interact with it. Second, the narrative: in both cases, it elicits a metalinguistic reflection on VR technology itself. Third, the characters: faceless, lifeless dummies in one case and emotionless beings that perform a scripted act of violence, seemingly as an end in itself, in the other. Both artists are not interested in offering users an immersive experience to tell them a story (as in cinema), to navigate fictional worlds (as in videogames), or to explore life in another era (as in museum guides). They employ VR to expose the very effects of VR technology, as well as the alienating and at times dehumanizing impact of the mediated experience with virtuality that it offers.

3   The Rise of VR Art Production Companies: A New Hybrid Scenario

Proof of the recent interest in the relationships between visual arts and VR is the birth and increasing activity of companies aimed at producing VR art projects. Acute Art, Khora Contemporary and VIVE Arts, all born in the past five years, have steered their assets toward immersivity, opening new avenues for the convergence of art, technology, and innovation. Collaborations between visual artists, programmers, and technicians are not new in the history of art; the 1960s were a golden age, exemplified by the activities of the aforementioned E.A.T., a cooperative of artists and engineers. However, today's production of VR art projects indicates an unprecedented phenomenon, which is impacting the modus operandi of many visual artists and the mindset of tech field developers. What is particularly striking today is that we are not talking about one-off collaborations but of proper companies whose business is based on such relationships.

This emerging hybrid scenario immediately raises a crucial question: why would a tech company need visual artists? Vice versa, why would a visual artist need a tech company to make a work of art? Most of the visual artists doing VR projects today employ media technologies simply because they are available to them and in order to reflect on society through the same tools that are at the basis of its establishment. On the one hand, their experimental opening towards technology leads to new business applications that could potentially be developed for the market or other fields, including education and media. On the other hand, many of these artistic experiments with technology develop new critical approaches to these tools. A new hybrid type of artist emerges, one that is on one side increasingly concerned with innovation, involved in an ongoing dialogue with programmers and technicians, and on the other side brings a critical gaze, pushing the tech field to reconsider its priorities.

Acute Art, Khora Contemporary and VIVE Arts have all chosen to cooperate with visual artists as their core business, believing that artists could trigger innovative ideas. Active since 2017, Acute Art is probably the best-known of the three companies. Its self-declared mission, as stated on their website's homepage, is to

"collaborate with the world's leading contemporary artists, providing access to cutting-edge technologies that allow them to translate their creative vision into new digital mediums — including virtual, augmented and mixed realities." The list of artists involved with Acute Art includes figures whose popularity has transcended the limits of the art world such as Marina Abramović, Jeff Koons, Olafur Eliasson, and Anish Kapoor. These artists always pushed the boundaries between art and entertainment. Addressing VR was a logical step.

Interestingly, these artists approached VR for the first time thanks to Acute Art. The company's peculiar ability is to stimulate already established artists to meet new challenges towards immersive technology and create new synergies between them and technicians. It is not by chance that a noteworthy contemporary art curator, the Swedish Daniel Birnbaum, was chosen to be the company's artistic director. Birnbaum is a renowned name in the contemporary art world, having directed the 53rd Venice Biennale in 2009 and the Moderna Museet in Stockholm from 2010 to 2018. Birnbaum's nomination as the head of Acute Art in 2019 is proof that the very definition of artist and the entire art system has embarked on a massive process of change. Experimenting with new forms of cultural production through the adoption of technology is a way to bypass the art market's logic and contribute to technological innovation on different premises than those of any other tech business.

The curator's role is essential in assigning credibility to these companies' activities, in framing these hybrid productions as works of art rather than mere forms of media entertainment. For instance, Birnbaum represents a true bonding figure between the company, artists, and the cultural world at large. He has the skills to steer the work of artists who normally produce on different terms. On the occasion of a summit on "art in the digital age," which took place in Verbier in Switzerland in 2018, Birnbaum had the chance to discuss VR with Canadian novelist and artist Douglas Coupland. With great enthusiasm, he claimed: "It seems that once or maybe twice every century, a technological breakthrough occurs that changes fundamental conditions of our being-in-the-world" (Birnbaum and Kuo, 2018: 15). What emerges is not necessarily a utopian outlook on VR but an acknowledgment of the major role played by VR in addressing issues of identity, materiality, perception, and empathy.

In Abramović's *Rising* (2018), one of the early projects produced by Acute Art, users enter an intimate virtual space and come face-to-face with the avatar of the charismatic Serbian-American artist. The user can finally fulfill the common desire of touching her body, as this haptic dimension is at stake in most of the artist's projects, from her early performances of the 1970s to the popular event *The Artists Is Present* (2010) which was staged at MoMA in New York. After establishing contact with the artist, one finds oneself in a dramatic setting, surrounded by melting polar ice caps. Acute Art developers captured the artist's unique facial expressions in order to create a realistic avatar that could transmit an emotional vibe, albeit no technology could ever recreate the aura that characterizes her presence in the flesh (Figure 3). *Rising* is not a site-specific installation; users are allowed to experience it on-site, in the case of presentations in exhibition spaces, or remotely, from any location, wearing immersive headsets.

Carrying on the "performative" narration typical of the artist's oeuvre, the body becomes a door through which one experiences the traumatic impact of global warming. Trapped inside a glass tank that is slowly filling with water, Abramović asks the user to help her before it is too late, before the water level rises above her head and drowns her. The scene is a metaphor for rising sea levels; choosing to save the artist, the user saves the planet. As in the works by Rafman and Wolfson discussed before, one finds oneself immersed in an emotionally intense micro-narrative based on a dystopian scenario that ultimately addresses the very role of VR. "With virtual reality, technology players will be immersed in a dystopian world," states the artists in a behind-the-scenes documentary on the project. "It seems increasingly likely to be the future of our planet. I hope to explore the questions if immersive play will increase empathy for the present and the future victims of climate change and how this experience will affect players' consciousness and energy" (Abramović, 2018).

The work of Khora Contemporary unfolds along the same line of Acute Art. The company's mission, as it appears on its website, is to "provide artists with best assistance to develop and unleash their imaginative visions exploring this new media and its limitless possibilities." Chinese artist Yu Hong's VR piece *She's Already Gone* (2017), produced by Khora, is based on a virtual extension of the artist's painting practice. Her portraits of Chinese women, at various ages, hint at the psychological impact of the social transformations that are taking place in her country. Presented at Faurschou Foundation in Beijing, in this VR work the user follows the life of a Chinese woman, from birth to old age, moving within different spaces. A defining feature of this piece is the

Figure 3. Marina Abramović, still from *Rising*, 2018, Courtesy of Acute Art

hand-painted feeling of each space, characterized by visible brushstrokes, which adds a layer of physicality to the virtual world and at the same time reinforces the power of painting in addressing a mental state through an expressionistic approach informed by memory and culture.

Unlike Acute and Khora, VIVE Arts is not exclusively involved in visual arts projects. Its productions are articulated in four different areas: cultural heritage; art and photography; architecture and design; and film and performance. Its distinctive feature is that its projects are not self-initiated but always developed in part-nership with institutions ranging from museums to biennales, and from film festivals to fashion shows. VIVE Arts projects explore the immersive potential of VR thanks to the high-end technology and expertise of Tai-wanese corporation HTC, of which VIVE is a division, and are rarely interested in metalinguistic forms of criticism on the medium itself. For example, Cai Guo-Qiang's *Sleepwalking in the Forbidden City* (2020) for Palace Museum, Beijing, is a mesmerizing virtual fireworks ceremony akin to the gunpowder choreographic spectacles-as-art-events, normally staged outdoors, for which the Chinese artist has been known since the 1980s.

A one of a kind VIVE production is French artist Dominique Gonzalez-Foerster's *Endodrome* (2019), made for the 58th Venice Biennale (Figure 4). Gonzalez-Foerster emerged in the early 1990s in association with the Relational Aesthetics movement theorized by Nicolas Bourriaud, and is known for creating interactive installations based on a twisted perception of everyday spaces. With *Endodrome* — whose title combines the Greek word *endon*, meaning "internal," and *dromos*, meaning "race" —, the artist proposes an immersive explo-ration into an abstract space that is a metaphor of an altered state of mind. Reinforced by Corine Sombrun's soundtrack, the eight-minute journey envisions a shamanic trance experience. The work is reminiscent of the psychedelic light shows of the 1960s, with the only difference that, thanks to the "unframedness" of VR, one feels to be experiencing this virtual space in one's own head, like a true hallucination. Moreover, it is also a critique of the isolationist dynamics of the VR medium.

4   The Primacy of Sight: From Viewership to Empowerment

This essay was conceived during the COVID pandemic, a state of global emergency that has accelerated our dependence upon technology. We are still waiting for proper responses by artists to such a difficult moment, and the changes society and human life is undergoing. The effects of extreme measures such as lockdowns,

Figure 4. Dominique Gonzales-Foerster, *Endodrome*, 2019. Virtual reality environment. Duration and dimensions variable. Soundscape by Corine Sombrun. Supported by HTC VIVE Arts. Exhibition view: May You Live in Interesting Times, 58th International Art Exhibition – La Biennale di Venezia, Venice 2019.Courtesy the artist; 303 Gallery, New York; Corvi-Mora, London; HTC VIVE Arts; Esther Schipper, Berlin. Photo © Andrea Rossetti

social distancing, and the online shift of most of our daily activities, including education, work, and leisure, or anything that traditionally involved a physical encounter with other human beings, have proven to be hard challenges. However, if we look at the VR art projects that have been discussed, we can see how they prefigured some aspects of the current state of fear and concern. To make sense of the pandemic, we do not need to wait until the art projects being made right now will be disclosed; it is enough to look at some of the art that was made in the past five years. The futuristic impulse that characterizes most of the art approaches to technology often implies the prefiguration of future scenarios.

In most cases, as with VR, the speculative approach that contemporary artists have with regards to technology brings them to imagine dystopic futures. It is not that artists are anti-technology or anti-progress. Quite the contrary: most artists have praised the arrival of new technologies, but they have also proposed different applications for them. In the 2018 conversation mentioned above with Birnbaum, Coupland talked of a certain feeling he normally experiences with VR, which he referred to as "VR sadness": "People put these things on and they come out," he said, "and they never quite return to the full world, and a part of them is invested in this machine" (Birnbaum and Kuo, 2018: 54). This is precisely one of the points raised by some VR art projects such as those by Wolfson and Abramović, who employed VR to empower users, to awake their conscience, with the hope they would return to the real world determined to take action, or at least a position, with regards to the problems that affect the world whether it be violence, climate change, or something other.

The VR works of art considered here have elicited such introspective dynamics thanks to an inversion in the media mechanisms of VR and the modes of narration associated with them. Whereas most VR applications imply a shift in the user's position, from viewer to storymaker, in most VR art projects one is confronted with the inescapable condition of passive viewership, no matter how illusionistic the immersion and interaction with a VR space is. We are helpless in front of the person being beaten to death in Wolfson's work. We can only watch the disaster of our earth in Abramović's work: whether we decide to save her avatar from drowning or not, we know this will not have an actual impact on the planet. By pushing us to a condition of impotence, both these works reestablish passive dynamics that are characteristic of the modes of narration of classic media such as cinema and television. Like the audience in Burden's *Shoot*, we are confronted with the fact that we can hardly escape our condition of spectatorship.

Many contemporary artists that employ VR overturn the modes of storytelling typical in most applications of this technology, namely an immersive version of traditional cinematographic narrative forms that depend on the user's movements and ocular behavior. Sure, one has the feeling of moving and experiencing a customized immersion in a VR space, whether one is standing or sitting in a room. However, the users cannot move, they can only watch; this is the true condition of VR which the artists discussed above expose in their works. Their idea of storytelling is less based on exploring the illusionistic dynamics of unframedness, presentness, and immediateness and more focused on improving the viewer's critical awareness regarding the very mechanism of VR. Therefore, the narration becomes less dynamic and more based on the act of seeing, which, although it implies (and often exploits) the possibility of movement, as in cinema and television, leaves the body at rest.

By restoring the primacy of sight over movement, the artists discussed in this article show how VR's appeal relies on the fact that it offers new and exclusive ways of seeing. According to Italian media scholar Simone Arcagni, "to access another visual world, it is necessary to completely turn off the 'real' one through a headset that first eliminates sight and then activates a new one. Virtual reality is therefore born within a reset of vision, a sort of initial blindness that marks a clean break from any other visible up to this moment realized" (Arcagni, 2018: 110). While most VR applications in gaming and cinema exploit this aspect to allow users to experience illusionistic forays into virtual worlds, visual artists seem to be more interested in opening up a discussion on our current technological condition. Rather than an excited explorer of phantasmagoric universes, stimulated at various sensorimotor degrees, the user is reminded that most of one's life is increasingly being conducted from behind a screen: from the illusory feeling of immersion, one can only get frustrated.

In the past decade, pioneering VR developer Lanier has turned into a prolific writer that polemicizes against the contemporary Internet industry, notably social networks, through successful books such as *Who Owns the Future* (2010) and *You Are Not a Gadget* (2013). Unlike these, *Dawn of the New Everything: Encounters with Reality and Virtual Reality* (2017), which came out when VR was becoming relevant again, is animated by the same technophilic attitude that characterized his 1980s experiments and early wearables. "VR is one

of the scientific, philosophical, and technological frontiers of our era," argues Lanier in his book. "It is a means for creating comprehensive illusions that you're in a different place [...] And yet it's also the farthest-reaching apparatus for researching what a human being is in the terms of cognition and perception. Never has a medium been so potent for beauty and so vulnerable to creepiness. Virtual reality will test us. It will amplify our character more than other media ever have" (Lanier, 2017: 1).

Lanier's enthusiastic view of VR has not changed over time. According to this visionary father of VR, unlike other technologies, VR has always represented a tool for self-analysis, in the 1980s as well as forty years later. The visual artists discussed so far have developed a similar approach. Theirs is not necessarily a critique of the medium per se, but of how it is used. In developing forms of storytelling based on metalinguistic investigations of the medium, these artists are recovering an intrinsic characteristic of VR, namely its capacity to allow users the chance to "[research] what a human being is in the terms of cognition and perception" (Lanier, 2017: 1). This is precisely what Gonzalez-Foerster's *Endodrome* is about: the artist takes the role of the shaman who, by manufacturing a virtual trance state, induces the user to an altered state of consciousness, also known as *state of flow*, in which one is in complete control and voluntarily merges with the surrounding nonphysical reality.

Besides Lanier, hardly any of the recent studies on VR discuss this technology in similar terms or as a psychological introspection device. In *Storytelling for Virtual Reality: Methods and Principles for Crafting Immersive Narratives* (2017), for example, John Bucker examines how classical storytelling modes can be applied to VR, focusing on cinema and animation. According to Bucker, there are two main storytelling approaches to VR, one in which the user watches a scene played out in the surrounding space, and the other one where the user becomes the camera. Bucker argues that "Storytelling in Virtual Reality is less about *telling* the viewer a story and more about letting the viewer *discover* the story" (Bucker, 2017: 7). What this and other studies on VR fail to acknowledge is VR's capacity to enhance the user's consciousness. If storytelling in VR is, as Bucker suggests, about letting the user discover a story, then most VR art projects rely on a type of storytelling that pushes one to discover, or rather be confronted with, oneself.

Is VR bound to vanish and soon become an obsolete technology? Considering its fluctuating progress, particularly the fact that around the turn of the millennium it did not garner much attention, this is highly foreseeable. Another indicator is the decrease in sales in the video game industry after an early phase of excitement. Aside from entertainment consumerism, VR might be increasingly used to create realistic simulations with training or testing in fields as diverse as the military, medicine, education, the automotive industry, and space agencies. It is not a coincidence that one of the early adopters of Lanier's wearables in the 1980s was NASA. Considering the current COVID pandemic and related future scenarios based on social distancing, VR applications might be developed to perform daily activities at a distance, from work to leisure to sex, as VR pornography is a field that is being highly debated. However, many technological advancements need to be made, particularly concerning the unwanted symptoms caused by the prolonged use of VR.

When artists adopted the Sony Portapak in the late 1960s, some of them analyzed the mechanism of video as a medium and how it was being used in the television industry. Others, associated with the Guerrilla Television movement, experimented with new forms of storytelling that eventually brought to new ways of doing journalism, documentaries, and filmmaking at large. With VR today, we seem to be on a similar threshold: some artists are deconstructing the mechanisms of VR as medium and language, even in narrative terms; others are proposing new applications of it, in strict collaboration with high-end companies that are able to turn even conceptual approaches into workable solutions. These artists are not interested in exploring the immersive, multi-sensory experience offered by VR for its own sake, but in exploiting it to make users aware of the alienating and desensitizing impact of digital technologies, empowering them to distinguish actual reality from its surrogates, no matter how illusory these might be.

References

Abramović, Marina (2018). "Behind the scenes with Marina Abramović," *Acute Art* https://acuteart.com/artist/marina-abramovic/ (last accessed 04-06-2021).

Arcagni, Simone (2018). *L'occhio della macchina*. Turin: Einaudi.

Birnbaum, Daniel and Michelle Kuo, eds. (2018). *More Than Real: Art in the Digital Age*. London: Verbier Art Untold Association and Koenig Books.

Bucker, John (2017). *Storytelling for Virtual Reality: Methods and Principles for Crafting Immersive Narratives*. London: Routledge.

Casetti, Francesco and Andrea Pinotti (2020). "Post-cinema Ecology." In *Post-cinema: Cinema in the Post-art Era*, edited by Dominique Chateau and José Moure, 193-217. Amsterdam: Amsterdam University Press.

Grau, Oliver (2003). *Virtual Art: From Illusion to Immersion*. Cambridge, MA: The MIT Press.

Lanier, Jaron (1989). "Virtual Reality: An Interview with Jaron Lanier," *Whole Earth Review* (Fall 1989): 108-119.

Lanier, Jaron (2017). *Dawn of the New Everything: Encounters with Reality and Virtual Reality*. New York: Henry Holt and Company.

Luckey, Palmer (2014). "The Future of Virtual Reality." *Oculus* (25 March 2014). https://www.oculus.com/blog/the-future-of-virtual-reality/?locale=nl_NL (last accessed 04-06-2021).

McLuhan, Marshall (1966). *Understanding Media: The Extensions of Man*. New York: McGraw-Hill.

Mitchell, W.J.T. (1994). *Picture Theory: Essays on Verbal and Visual Representation*. Chicago and London: Chicago University Press, 1994.

Turkle, Sherry (2015). *Reclaiming Conversations: The Power of Talk in a Digital Age*. New York: Penguin.

Ward, Frazer (2001). "Gray Zone: Watching 'Shoot.'" *October*, Vol. 95 (Winter, 2001): 114-130.

Francesco Maria Spampinato – University of Bologna (Italy)

✉ francesco.spampinato@unibo.it

Francesco Spampinato is a contemporary art and visual culture historian and writer, and a senior assistant professor (tenure track) at the University of Bologna. He holds two degrees from the University of Bologna, in *Preservation* (2003) and *Art History* (2004), an MA in *Modern Art* (2006) from Columbia University, New York, and a Ph.D. in *Études Cinematographiques et Audiovisuelles: Arts et Média* (2018) from Sorbonne Nouvelle, Paris. From 2011 to 2015 he was Adjunct Professor at Rhode Island School of Design, Providence, US. His articles have been published in academic journals such as Cinéma&Cie, NECSUS, PAJ, Senses of Cinema, Stedelijk Studies, and Visual Culture Studies, as well as magazines such as Abitare, Blueprint, DIS, Flash Art, Kaleidoscope and Mousse. He is the author of the following books: *Come Together: The Rise of Cooperative Art and Design* (Princeton Architectural Press, New York, 2015), *Can You Hear Me? Music Labels by Visual Artists* (Onomatopee, Eindhoven, 2015), *Art Record Covers* (TASCHEN, Cologne, 2017), and *Art VS. TV: A Brief History of Contemporary Artists' Responses to Television* (Bloomsbury Academic, New York and London, 2021).

Valentino Carticalà – Manchester Metropolitan University (UK)

✉ valentino.catricala@gmail.com

Valentino Catricalà is a contemporary art scholar and curator specialized in the analysis of the relationships between artists and new media technologies. He is currently lecturer at Manchester Metropolitan University, curator of SODA Gallery, Manchester, and the director of the Art Section of the Maker Faire–The European Edition. He is also art consultant at Paris Sony CS Lab and adjunct curator at KunstRaum Goethe (the art space of the Goethe-Institut in Rome). He founded and was artistic director of the Rome Media Art Festival (MAXXI Museum) and art project coordinator at Fondazione Mondo Digitale, Rome. He has curated exhibitions in important museum and galleries including Hermitage (Saint Petersburg), Minnesota Street Project (San Francisco), New York Media Center, Stelline (Milan), MAXXI Museum (Rome), Palazzo delle Esposizioni (Rome), Ca' Foscari (Venice), New Delhi Italian Cultural Institute (India). He is the author of several articles and the books *Media Art. Prospettive delle arti verso il XXI secolo. Storie, teorie, preservazione* (Mimesis, 2016) and *The Artist as Inventor* (Rowman & Littlefiled, 2021).

A Journey into Artworks: Storytelling in Augmented Reality and Mixed Reality

Sofia Pirandello*

University of Milan (Italy)

Abstract

The paper aims to show Augmented Reality (AR) and Mixed Reality (MR) artworks are increasingly taking the form of walking tours across the city. These installations in urban space transform the viewer into an experiencer. Indeed such artworks consist in perceptual environments, which give new menanings to known places thanks to virtual objects. They can elicit a strong sense of presence into the visitor, who is free to build different paths related to the artwork both in time and space, using her own mobile devices. AR an MR artworks use immersive, multimedia, and interactive storytelling, which modifies everyday context affordances. The actual environment results from the intertwining of the physical and the digital. Artists like Keiichi Matsuda, in *HYPER-REALITY* (2016), and Magali Barbé, in *Strange Beasts* (2017), have imagined the most dystopian and alarming aspects that could emerge from new virtual technologies. However, AR and MR artworks reveal potentialities impossible to obtain through any other medium. The article will discuss some relevant examples such as the *[AR]T* project (2019), organized by the New Museum of New York and Apple, *Actual Reality* (2019) by Hito Steyerl and *MNEMOSCOPIO* (2020), by Emilio Vavarella.

Keywords: Augmented Reality; Contemporary Art; Spatial Storytelling; Interactivity; Imagination.

Acknowledgements

∗ ✉ sofia.pirandello@unimi.it

1   Introduction

This paper considers the case of contemporary artworks in Augmented Reality (henceforth, AR) and Mixed Reality (henceforth, MR). In the last ten years, as a consequence of the increasing diffusion of virtual technologies in everyday life, artists have begun to express themselves through these media, adapting to their evolutions and contributing to the rethinking of their development and of their possible concrete applications. More and more, AR and MR art seeks to answer the question: "how to create AR with an impact on our physical reality?" (Veenhof 2018: 354).

Despite the fact that our world results from the merging of digital and concrete elements, virtual objects are often considered non-real-entities of a delusional (and therefore dangerous) nature. In this article I first analyse recurring narratives about AR and MR technologies that depict them as a disturbing presence. I will suggest considering these descriptions, frequently present in movies, tv-series, and artworks, as based more upon a dystopian conception concerning the future than on an understanding of the current use of virtual technologies.

I will then show some relevant case-studies, selected from actual contemporary AR and MR artworks. I will propose considering them as "walking artworks" characterized by three main features: they are installed throughout the city, reconfiguring the usual meaning of some places; they are conceived to be traversed and explored in first person by the users, who are usually engaged in a creative performance, which is for the most part improvised and gestural; they highlight the technical, multimedia, and interactive character of human imagination.

2   A Narrative of Augmented and Mixed Reality

Variously imagined since the 1980s in science fiction books and movies, video games and comic strips, AR emerged in the 1990s, largely thanks to experiments with Head-Up Displays (Gatti 2019). These devices, used mainly in military applications, overlay additional information onto the user's visual field in a way that still allows her to perceive her surroundings. The term AR refers to all those technologies that, like Head-Up Displays, involve the superimposition of virtual elements on the concrete world, enhancing the subject's operational and perceptive possibilities and expanding her experience of the environment (Liberati 2016). These could include texts and information available on a mobile phone or 3D objects placed in the usual action space. There still is no agreement on a precise definition of AR. Some scholars believe that when we interact with three-dimensional and complex digital objects that are integrated into the everyday world we should speak of MR, rather than AR, since MR is often held to include a blurring of the concrete-digital distinction (Arcagni 2018). However, in many cases, leading companies such as Apple, Adobe, and Microsoft use the two terms interchangeably, at times even when referring to the same tool, context or project.[1]

From its very origin, AR was conceived not to replace, but to integrate, modify and enhance the real environment with electronic functions, adding them to the affordances already present in it (Wellner, Mackay, and Gold 1993). In that sense, it is possible to consider MR as the radicalisation of AR, since MR is not defined by the complexity of the digital objects embedded into the environment but rather by its tendency to remove the boundary between the concrete and the digital. Today, AR is mostly developed for smartphones and other mobile devices; its interface takes the form of a virtual image, and there still is a clear frame defining it. On the other hand, there are already devices like Microsoft Hololens 2[2] and Oculus Quest 2[3] that do not necessarily involve the use of controllers; with these, the user freely interacts with three-dimensional holograms which appear alongside concrete objects.

In general, I believe that what is common to all these technologies is a strategy of digital enhancement and an extension of reality through virtual elements. Following Andrea Pinotti (2017), virtual digital images present themselves as an-icons, namely as environments or parts of them, negating their iconic and representational

---

1.   This applies to almost all the technologies and artworks cited in the text, with a few exceptions.

2.   https://www.microsoft.com/it-it/hololens/hardware (last accessed 05-01-2021).

3.   https://www.oculus.com/quest-2/ (last accessed 05-01-2021).

nature. Given their increasingly widespread diffusion in the everyday environment and their tendency to blur the threshold between the real-world and the image-world, these images can elicit a strong sense of presence. Being pictures on a screen or holograms, they are manipulable entities through which users intervene in the world and interact with others. In my opinion, even if they are virtual objects they have real and transformative consequences on the users' lives. They thus reconfigure the visual, which becomes "a multisensory, interactive, responsive, 'autonomous', 'intelligent', or at least 'smart' universe" (Arcagni 2018: 119). The user is no longer merely an "observer" but an "experiencer" (Pinotti 2017: 1); these images are operative interfaces, tools that actively mediate the relationship between human beings and the outside world (Hoel 2018), allowing, to different extents, for interaction with and manipulation of the environment (Fedorova 2015). As Trevor Paglen pointed out, they can be traced back to the operational images Harun Farocki explored from the early 2000s: they are images that do not just depict something, they "do things" (Paglen 2014).[4]

The contemporary world is already mixed, because it results from the integration of various kinds of materiality, both concrete and virtual. However, the digital enhancement of the environment is often interpreted as a disturbing irruption of a phantom presence, one that threatens to take a dystopian turn in the near future.

There are already many artists who are highly critical of AR, mainly concerned with its ability to delude the user about the reality of digital objects. For instance, Magali Barbé's short film *Strange Beasts* (2017) tells the story of Victor, game designer and originator of the AR game *Strange Beasts*, which allows users to create friendly-looking monsters to their liking. *Strange Beasts* harnesses a technology which, through the use of specially-designed contact lenses, projects these odd creatures directly onto the user's retina. Victor enthusiastically underlines the interactive and playful nature of this new and revolutionary type of entertainment. He shows his daughter having fun with characters generated straight from her imagination. However, as the viewer soon realises, Victor is so immersed in his augmented world that he has completely lost touch with reality. The little girl he plays with is as digital as the other strange beasts; seen from the outside, Victor is a lonely man speaking with invisible entities.[5]

Another artist, Keiichi Matsuda, film-maker and designer of Augmented, Mixed and Virtual Reality projects, has also been reflecting for years on the problems that could follow from the dissemination of these technologies. In his famous film *HYPER-REALITY* (2016), the viewer's gaze coincides with that of a woman wearing an AR device: she moves with difficulty across her city, her visual field covered in hundreds of pop-ups featuring information, advertising and entertainment. Sounds and images fill the perceptual field, all the woman's activities are linked to a personal account through which she can earn points, on the bus, in the supermarket, even at a church. The hyper-performance technology produces a paradoxical contraction of the subject's perceptual possibilities. Technology is no longer at the service of the individual, but rather it diminishes the subject's interpretive creativity and impoverishes her social relations.[6] Likewise, in his most recent 360° movie *Merger* (2018), the protagonist, a young accountant, cannot match the optimisation capacities of technology and decides to undergo an operation that will allow her to merge with the network, sacrificing her own existence to better satisfy her clients.[7]

This kind of artwork is important because it reflects on the design of digital interfaces. It raises questions about the need for regulation concerning users' privacy, and the importance of safeguarding them against a framework directed towards a logic of consumption.

In some respects, however, I consider these criticisms too as problematic: while a virtual child will never have the same characteristics of a real child, this does not mean that digital objects are not real. Although Barbé's pixel child is real, she is not truly a child, just as her exact reproduction in wax or plastic would not be. Whether virtual elements are fictional or not is not so much a matter of their being digital, but rather of their properties and their function in the world (Chalmers 2017). Since they are not concrete, there are many needs that virtual

---

4.   Harun Farocki, and Paglen as well, was especially interested in discussing the images created by machines for other machines, invisible to the human eye. Machines do not really need "to see" anything, images as interfaces are just a sort of "kindness" they perform for human beings.

5.   https://www.magalibarbe.com/strange-beasts-1 (last accessed 05-01-2021).

6.   http://km.cx/projects/hyper-reality (last accessed 05-01-2021).

7.   http://km.cx/projects/merger (last accessed 05-01-2021).

elements cannot satisfy, from affective to physiological ones, but this seems to me to be precisely why we do not risk losing contact with things.

Matsuda's analysis, which is in some respects less catastrophic, is surely more effective because it predicts a more plausible scenario. Nevertheless, there are some unjustified exaggerations in his work too. While it is unlikely that the virtual labels and objects superimposed on the environment will all be activated simultaneously, because this would lead to the complete ineffectiveness of the technical tool, the protagonist's frustration with technology also stems from her using it in a mistaken way. The woman asks the Google Assistant questions such as "Who am I?" and "Where am I going?," which the technology, interpreting them literally, inevitably fails to answer, providing instead biographic facts and navigational routes on Google Maps. The result is a portrayal which demonises the digital as something that infests our lives without in any way contributing to or improving them. The digital and the virtual completely miss the essence of the human; they distort and annihilate it. Thus, Matsuda seems to allude, not too subtly, to a distancing away from a more authentic — if not de-technicalized, at least de-digitised — human dimension.

Imagining the future is useful and necessary. However, we must not forget that these are not just futuristic technologies. They are already variously and widely used in fruitful ways. Their present application is worthy of analysis. The next section examines the work of artists who currently employ AR not only as a subject of study but also as a medium of reflection and narration.

3   Narrating with Augmented and Mixed Reality

Since the first experiments after its emergence around 2010, AR and MR art has tended to integrate with urban space. In 2011, the political art collective Manifest.AR took part in the Occupy Movement with hundreds of AR protest artworks in the area surrounding the New York Stock Exchange.[8] Thus, a hybrid space for dissent and artistic creation emerged: "the Safety Glass of the Display is shattered and the Physical and Virtual are united in a new In-Between Space."[9]

Manifest.AR is generally recognized as the first artistic collective that started to augment the physical environment with virtual elements in its interventions (Geroimenko 2018). It is true, however, that other new media art collectives, such as the British Blast Theory, had already been experimenting with interactive online technologies since the early 1990s. Blast Theory creates actions that ask for the active involvement of the public in the urban space. Doing so, they explore the political implications of the wide use of the Internet in the city space, and the way it mediates relations with other individuals. For example, in *I like Frank* (2004), an adventure game which took place in Adelaide, users were playing both in the streets and online, comparing experiences and sharing information by means of a mobile phone to find a fictional character named Frank.[10]

As frequently happens in Blast Theory performances, AR and MR artworks often take place in public spaces, becoming a tool for stressing the potential of new technologies, and understanding their social and political consequences. However, in contrast with other new media artworks, these stratify the concrete space by adding to it new virtual information and objects, only visible to those who use an AR or MR device such as a smartphone, a headset or glasses, being physically present at the place.

QR codes were one of the first and cheapest forms of augmenting reality, used in particular by street artists. For instance, from 2011 to 2017, the street artist Sweza placed his *QRadio*, a stencil shaped like a stereo and featuring an embedded QR code, in various cities around the world. Once captured with a mobile phone, the QR code activated an audio track, connected to the physical place like a sort of a soundtrack.[11] Street art was thereby enriched with sound elements aimed at transforming the perception of urban space.

---

8.   https://aroccupywallstreet.wordpress.com/protests-onsite/ (last accessed 05-01-2021).

9.   http://manifest-ar.art/ (last accessed 05-01-2021).

10.   https://www.blasttheory.co.uk/projects/i-like-frank/ (last accessed 19-05-2021).

11.   http://sweza.com/index.php/arbeiten/qradio/ (last accessed 05-01-2021).

In institutional contexts, too, both group exhibitions and individual AR and MR artworks have gradually taken the form of itineraries through city spaces. In 2019, the New Museum of New York, in collaboration with Apple, funded six works by Nick Cave, Nathalie Djurberg and Hans Berg, Cao Fei, John Giorno, Carsten Höller, and Pipilotti Rist for the *[AR]T* project. In various cities worldwide, such as Tokyo, Paris, and New York, visitors could participate for free with their mobile phones. The artworks formed an "interactive," "experiential" and "free to the public" walk.[12] In some cases, they asked participants to track specific objects, such as the poetic lines of *Now at the Dawn of My Life* by John Giorno or the coloured shapes of *International Liquid Finger Prayer* by Pipilotti Rist, which appeared gradually as the visitor advanced along the path, framing the surroundings with a smart device. In others, they were filters through which the environment could be viewed in a different way, as in the case of *Through* by Carsten Höller, which made it possible to see the surroundings with the sense of depth removed.

Likewise, for the more recent *Unreal City* (December 2020-January 2021), the Acute Art app and Dazed Media produced a tour along the river Thames made up of 36 AR and MR artworks by Olafur Eliasson, Cao Fei, and Tomás Saraceno, among others.[13] As with *QRadio* and *[AR]T*, the artists invited visitors to search for hidden virtual entities which would alter their usual perception of the space. In general, Acute Art makes it possible for users to see some of the artworks wherever and whenever they want. They can install them in their own homes, or in other everyday contexts, allowing the works to take on different meaning each time.

In 2019, the Serpentine Galleries in London also produced a series of artworks which integrated physical reality and virtual elements. Jakob Kudsk Steensen's *The Deep Listener*, notably defined as a "journey" through Kensington Gardens and Hyde Park, which provides an opportunity for users to explore the lives of five plant and animal species through their sights and sounds, presents itself as both a site-specific work and a digital archive.[14] As the title suggests, by photo-capturing specific objects spread through the gardens, the visitor can hear sounds which are not ordinarily audible, activated together with texts and virtual objects that are superimposed on the concrete environment.

Hito Steyerl's *Actual Reality*^os^ app worked similarly: once downloaded onto a mobile phone, it was activated by capturing various markers around the Serpentine building.[15] With the app running, users walking around the museum and capturing the markers would see the building distorted according to the representation of information about the local community's health, working, and living conditions, making immediately visible the real impact of social phenomena. The Serpentine's projects build a complex narrative, employing texts, audio and video tracks, official data and personal testimonies to bring out and make perceptible information that would otherwise be hidden. AR offered Steyerl the opportunity to work at that kind of "imperfect" artwork estimated by the Cuban film director Julio García Espinosa in his *For an Imperfect Cinema* manifesto (1969), one that "diminishes the distinctions between author and audience and merges life and art" (Steyerl 2009). While Espinosa looked at new media technology at the end of the 1960s with enthusiasm, as the promise for finally realizing an art of the people, Steyerl openly asserts the ambiguous character of viral online images (*ibid*.) and of digital technologies (2017), both in the art world and in the everyday world, trying to show that they are both a medium for expression and a tool for social contempt, control and repression. *Actual Reality*^os^ represents one of the well-known German artist's and theorist's many efforts to employ new technologies with an activist intent, to construct a shared strategy for denouncing and solving problems and for talking about a place from the inhabitants' point of view.

I would argue, then, that a particular type of artwork is thus taking shape — one that harnesses the virtual augmentation of the everyday environment to tell stories about places and the people who inhabit them. Both concrete and digital components are part of the work, which offers the user a space to explore actively from a haptic, auditory, and visual perspective.

In this kind of operation, personal and collective memory are transformed into spatial storytelling, as in Emilio

---

12. https://www.newmuseum.org/pages/view/ar-t (last accessed 05-01-2021).

13. https://acuteart.com/artist/unreal-city/ (last accessed 05-01-2021).

14. https://www.serpentinegalleries.org/whats-on/jakob-kudsk-steensen-the-deep-listener/ (last accessed 05-01-2021).

15. https://www.serpentinegalleries.org/whats-on/hito-steyerl-actual-reality-os/ (last accessed 05-01-2021).

Vavarella's *MNEMOSCOPIO* (2020).[16] Produced in Capo di Leuca (Italy) the work consists of a 3D map and an audio track superimposed on physical reality and perceived through a specially-modified helmet designed by the artist. The map and audios were created from the memories of those who had lived abroad for several years and then returned to their places of origin. The surrounding environment is also digitized and thereby remediated by the helmet.[17] One's own experience and that of others, as well as the present and the past, reality and imagination, the human and the technological gaze overlap and generate a perceptive short circuit. In Vavarella, hence, the focus on travel, on integrating the concrete and the digital, and on narration return as an experience to be lived in the first person.[18]

The unique spatial storytelling of AR and MR artworks is therefore particularly suited to the revitalization of the places and contexts of the past. Unlike a book or a movie, the addition of digital elements allows the story to be grounded in specific contexts. At the same time, it is not just a guided tour aimed at providing information, for the narrative is presented in a form that is perceptible by everyone (Wither et al. 2010). For example, in 2019, the Italian cultural association Landworks launched *ARgentiera in Augmented Reality*, which involves a series of residencies for the production of site-specific AR artworks to tell the story of the community of the Argentiera Sardinian mine, which has become an open-air museum.[19] Visitors are free to move through the old village streets, choose between the routes within it, get intrigued by artists' drawings and photos, and capture them with their mobile devices to complete the work, activating digital animations.[20]

Beyond the specifics that characterize them, some elements recur in each of the examples mentioned so far. I propose to consider them as "walking artworks": they are designed to be traversed on foot and explored since they are integrated into the city environment's space and time. The merger of physical space and virtual elements makes it possible for a particular type of multi-sensory and interactive storytelling to arise.

First of all, then, as a function of virtual augmentation, in walking artworks the environment acquires new levels of significance, which inevitably modify the experience of the context. Familiar places are thus invested with new meanings only available for those who use the required technology.

Artists use virtual elements to bring about concrete changes in the space in which the work is installed. Whether they reconstruct the past or imagine the future, walking artworks creatively reconfigure the world. Their tendency to add to the environment follows a practice of augmentation that was already present in many forms of new media artworks, realized thanks to other kinds of technology. The long series of Janet Cardiff audio walks across different cities; the augmented sculptures of Pablo Valbuena, projected onto the surface of buildings; or the data paintings of Refik Anadol: all reveal some hidden information linked to a specific place. The laser, LED and steam installation *Waterlicht* (2015) by Studio Roosegaarde, which gave the impression of being below the rolling sea under which Holland, without its dams, would be submerged, exemplifies the capability of using simple technology to provide site-specific knowledge (Mancuso 2018).[21]

Employing AR and MR technology, walking artworks owe much also to video games in general and to AR video games in particular. As in a video game, the visitor moves inside the narration and guides it according to her actions to complete a series of missions. In the case of walking artworks, the story itself is the reward. Geocaching, iButterfly, and especially Ingress and Pokémon Go have paved the way for the overlapping of complex virtual elements on the physical environment, resulting in its resemantization. Although their objects are virtual, they are still real, for they have a concrete effect on the lives of both players and of non-players who share the same action space (Liberati 2018).

Secondly, in walking artworks artists ask the visitor to contribute actively. They engage her by involving her body in different perceptual modalities, leave her time to dwell on different details at will, provide the oppor-

---

16. https://mnemoscopio.ramdom.net/index.php/progetto/ (last accessed 05-01-2021).

17. This is an example of Cross Reality: the digital environment inside the helmet corresponds to the surrounding physical reality, with the addition of virtual elements.

18. Due to the helmet configuration, however, the artwork is difficult to explore for extended time intervals.

19. https://www.landworks.site/argentierainar (last accessed 05-01-2021). I would like to thank Roberto Malaspina for this example.

20. At the time of writing, the installations are those by Francesco Clerici, Adolfo Di Molfetta, Milena Tipaldo and Andrea Zucchetti.

21. https://www.studioroosegaarde.net/project/waterlicht (last accessed 19-05-2021).

tunity to take photographs, and also to modify and share them. The viewer can decide to extend or shorten her stay; ignore some paths to favour others; and even leave out certain elements of the story altogether. Visiting the same walking artwork is never having the same experience twice: each time you can make different choices, interact differently with the virtual entities (sometimes also manipulate and install them), improvising gestures and movements. If the contemplation of an image is never an entirely passive task, in this case, as in many performative pieces of participative theatre,[22] the visitor cannot avoid participating if she wants to see the complete artwork. In walking artworks, she is called to lose herself in the narration, like a sort of *flâneur*, and to become "aware of a new urban dimension precisely by following the path of the artworks" (Biggio 2020b: 99).

This kind of artwork elicits a strong sense of presence, since it relies on the interactivity, agency, and mobility of the individual's body, which does not have to be reproduced digitally and is free to move around the physical environment. The technological device being used does not in itself command attention; it becomes a vehicle for observing and perceiving the world in an unprecedented way. It is not the object to look at, but one through which to perceive the surrounding space, as if it were a "magic lens" with transformative powers (Wither 2010: 45). The participant feels immersed because the artwork makes her responsible for the story's gradual progression by appealing to her conscious involvement.

While, as already shown, interactivity, integration of the real and the virtual, and the viewer's freedom to control the point of view are not, taken separately, exclusive features of AR and MR artworks, it is only here that they all are present simultaneously, transforming the visitor into a moving reader (Koenitz 2015). The contemporary hyper-reader is accustomed to juggling multimedia contents that refer to different temporalities and to contributing to their production — not only because she offers different interpretations of a story but also because she follows different paths within it, possibly adding elements and sharing her experience with others, remotely or in person (Valdivieso 2020).

As Federico Biggio pointed out, AR is "a mirror that reveals truths about the subject that is mirrored" (2020a: 107), with which one can construct and in which one can recognize one's own "data-representation of the world" (2020a: 106). AR is not only a technology that generates new affordances and reveals information hidden to the individual, but first and foremost one that reflects the ways that human beings interact with the outside world. Indeed, I believe it underscores their constant tendency to enhance the experience of the world with "virtual" and manipulable elements. In observing the environment and its objects, the human subject immediately interprets it according to its operational potentialities. She projects herself into space and time to build possible-action scenarios. Thanks to her imagination, she both places herself in objects and extends her body with things. The imaginative power of projecting oneself virtually toward the outside in a different time and space reveals "technics not as the product of culture over nature, but rather as the expression of an aesthetic structure of the human mind-body system" (Dalmasso 2019: 82), which constantly tends to expand and modify itself with technical objects. Humans are not the only animals that make tools. Nonetheless, what distinguishes them from other species is the feedback that technical objects have on their cognition, intervening and modifying it (Ihde and Malafouris 2019).

Thus, thirdly, AR and MR allow the technical-operational character of the human being's imagination to emerge (Hansen 2006), since they make its activity and products perceptible. In particular, Lambert Wiesing holds that "non-immersive virtual reality emerges from an assimilation of the image object to the imagination" (2010: 89) because it allows for a similar manipulation of the picture, which also negates its iconic character because it is always open to change. This manipulation is certainly not without limits, all the more because a completely free imagination would not really be engaged with the outside world. Human imagination is material since it reconstructs the past and designs the future while interacting with the present world (Malafouris 2020); it interfaces constantly with its surroundings and runs up against its characteristics (Montani 2014).

AR and MR technical images are as metastable as the contents of the individual's imagination, but they give to them a concrete form (cf. *MNEMOSCOPIO*), which can thus be perceived, shared, manipulated and contam-

---

22. The Rimini Protokoll collective, just to name one. Founded in 2000, Rimini Protokoll often uses public space as a stage for its performance, including the spectator as the main character. Interactivity is at the core of its research and practice. https://www.rimini-protokoll.de/website/en (last accessed 19-05-2021).

inated by the community in different ways and to varying degrees. In most of the artworks mentioned above users cannot add new contents.[23] On the other hand, in almost all cases, users are free to take a screenshot or a selfie of themselves in the artwork, to modify the image and share it with others in private messages or on social networks. The work is released from its creator's intentions and comes to life in other contexts.

In the examples discussed here, as in many other cases, AR and MR art accepts, and indeed requires, the collective construction of a shared work, which often takes the form of a narrative. Since these are works that gather information and testimonies linked to the context in which they are installed, the user is frequently confronted not only with the result of the artist's imaginative effort but also with that of the local community, transformed into an environment to be traversed.

Indeed, storytelling in AR and MR makes use of what Papineau (2016) calls the natural tendency of human beings to construct a narrative on the basis of their own experience of the environment, merging information acquired first-hand with personal inferences and the testimonies of others. These usually involve varied and complex perceptual information, which respects neither a spatial nor a temporal order. The individual arranges such information so that she can understand it. Compared to other forms of narration, the multimedia and interactive character of AR and MR storytelling better matches the kind of perceptual material the individual confronts daily. In this sense, it does not require the participant to follow a predetermined course of the story, but provides her with a variety of viewpoints from which to choose. The experience of others is put to the service of the individual; it becomes part of her personal history. Pietro Montani (2014) recalls how Wolfgang Iser describes reading literature as the only kind of practice in which the subject's point of view moves within the object being explored. It seems that virtual technologies have produced a new form of this kind of narrative. Reading is always a formative experience, for it modifies the reader's knowledge about the world. In this case, however, the reading takes place through direct experience of the world.

Contrary to what might be the popular view, in AR and MR artworks produced to-date, digital enhancement does not aim to saturate and muddle the perceptual field. When the work intends to deceive the viewer, it does not do so malevolently, but so as to produce an aesthetic effect, as has already been the case with in various works not created digitally (Conte 2020). As Ronald Azuma (2015) points out, AR storytelling establishes meaningful connections between the virtual and the concrete, generating results less "virtual" than other, more classical forms of storytelling, such as in books, TV series, films, or video games that do not display in the physical environment.

The variety of stimuli AR and MR offer can even be an asset for developing critical thinking. Unlike Virtual Reality (VR) installations, which direct the individual's experience with limited degrees of freedom, AR and MR leave the participant's imagination free to make associations between elements of different natures (past and present; digital and concrete), arranging them into different and creative levels of interpretation and action — ones not necessarily prefigured by the artist. For instance, discussing the renowned virtual installation *Carne y Arena* by the Mexican director Alejandro González Iñárritu, Luca Acquarelli (2020) shows how the VR installation was conceived as part of a more complex exhibition path made up of six rooms: five physical spaces and the actual virtual environment.[24] Acquarelli believes that the artwork's political character emerges from the multimedia composition of the work considered as a whole. Only by assembling various types of images, devices, and materials is it possible to build a complex, valuable, and non-stereotypical testimony of something happening in the real world. In the VR environment, the viewer's imagination is not given much freedom due to the reduced degree of interactivity. The participant, who wears a helmet, cannot see her body, cannot grasp objects, cannot intervene in the story or interact with the characters.[25]

---

23. There are already numerous storytelling artworks and projects that allow this possibility, constructing the story according to the additions of the "readers." Azuma (2015) mentions the example of *110 Stories*, a collective narrative about the Twin Towers in New York that is made up of the personal testimonies provided by the participants.

24. https://carne-y-arena.com/ (last accessed 07-01-2021).

25. Since the installation aims at bringing to life the existential condition and the feeling of powerlessness of a group of refugees crossing the Mexican desert, in this case the sense of passivity experienced in the VR space could be a functional element, intentionally sought for that reason (Montani 2017).

On the contrary, the specificity of AR and MR storytelling relies on a multimedia construction of the work and on a high degree of interactivity, appealing to individual agency and responsibility.

4   Conclusions

The human need for technology is a structural one, far from representing an evil dismissal of its supposed "natural" and "genuine" origin. Between human and technical being there is a relationship of interdependence which Pietro Montani has called "empowerment" (2017): there do not exist separate and independent technical and human bodies, with one set juxtaposed to the other. The innervation in material culture allows human cognition to express itself creatively with and through technological objects, including digital tools.

I consider technologies like AR and MR as a particularly fertile ground for the imagination's interactive tendency. In particular, as I've shown, AR and MR artworks narration endeavours to construct a world, modifying the everyday environment with new objects and envisioning a future version of it, thanks to the work of a plural imagination. Walking artworks are not the only type of AR and MR artwork. Nevertheless they certainly constitute a recurring schema in the works that use these technologies. In fact, as I have tried to show in this article by means of several examples, they tend to take place across the urban space, calling for the active and creative interaction of visitors, asking for their participation in order to be completed.

References

Arcagni, Simone (2018). *L'occhio della macchina*. Torino: Einaudi.

Aquarelli, Luca (2020). "Lo spettacolo del *re-enactment* e il tempo critico della testimonianza in *Carne y Arena* di Iñárritu." *E/C Rivista dell'Associazione Italiana di Studi Semiotici*, XIV(30): 229-238.

Azuma, Ronald (2015). "Location-Based Mixed and Augmented Reality Storytelling." In *Fundamentals of Wearable Computers and Augmented Reality, 2nd Edition*, edited by Woodrow Barfield, 259-276. Boca Raton: CRC Press. http://dx.doi.org/10.1201/b18703-15.

Biggio, Federico (2020a). "Guidebook for Mirror Worlds. Poetics of Transparency in Augmented Reality." *Body, Space & Technology*, 19(1): 97-108. https://doi.org/10.16995/bst.333.

Biggio, Federico (2020b). "Towards a Semiotics of Augmented Reality." In *Meaning-Making in Extended Reality. Senso e virtualità*, edited by Federico Biggio, Victoria Dos Santos, and Gianmarco Thierry Giuliana, 91-111. Roma: Aracne.

Catricalà, Valentino and Ruggero Eugeni (2020). "Technologically Modified Self–Centred Worlds. Modes of Presence as Effects of Sense in Virtual, Augmented, Mixed and Extended Reality." In *Meaning-Making in Extended Reality. Senso e virtualità*, edited by Federico Biggio, Victoria Dos Santos, and Gianmarco Thierry Giuliana, 63-90. Roma: Aracne.

Chalmers, David J. (2017). "The Virtual and the Real." *Disputatio*, IX(46): 309-352. https://doi.org/10.1515/disp-2017-0009.

Conte, Pietro (2020). *Unframing Aesthetics*. Milano-Udine: Mimesis International.

Dalmasso, Anna Caterina (2019). "Techno-aesthetic Thinking. Technicity and Symbolism in the Body." *Aisthesis*, 12(1): 69-84. https://doi.org/10.13128/Aisthesis-25623.

Farocki, Harun (2004). "Phantom Images." *Public*, 29:12-22.

Gatti, Giuseppe (2019). *Dispositivo. Un'archeologia della mente e dei media*. Roma: Roma Tre Press.

Geroimenko, Vladimir, ed. (2018). *Augmented Reality Art. From an Emerging Technology to a Novel Creative Medium. Second Edition*. Cham: Springer.

Hansen, Mark B. N. (2006). *Bodies in Code. Interfaces with Digital Media*. New York–London: Routledge.

Hoel, Aud Sissel (2018). "Operative Images: Inroads to a New Paradigm of Media Theory." In *Image – Action – Space: Situating the Screen in Visual Practice*, edited by Luisa Feiersinger, Kathrin Friedrich, and Moritz Queisner, 11-28. Berlin, Munich and Boston: De Gruyter. https://doi.org/10.1515/9783110464979-002

Ihde, Don and Malafouris, Lambros (2019). "*Homo faber* Revisited: Postphenomenology and Material Engagement Theory." *Philosophy and Technology* 32: 195-214. https://doi.org/10.1007/s13347-018-0321-7.

Koenitz, Hartmut et al., eds. (2015). *Interactive Digital Narrative: History, Theory and Practice*. New York and London: Routledge.

Koukouti, Maria Danae and Lambros Malafouris (2020). "Material Imagination: An Anthropological Perspective." In *The Cambridge Handbook of the Imagination*, edited by Anna Abraham, 30-46. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108580298.003.

Liberati, Nicola (2016). "Augmented Reality and Ubiquitous Computing: The Hidden Potentialities of Augmented Reality." *AI & Society*, 31(1): 17-28. https://doi.org/10.1007/s00146-014-0543-x.

Liberati, Nicola (2018). "Phenomenology, Pokémon Go, and Other Augmented Reality Games. A Study of a Life Among Digital Objects." *AI & society*, 31(1): 17-28. https://doi.org/10.1007/s10746-017-9450-8.

Liberati, Nicola (2020). "The Borg–Eye and the We–I. The Production of a Collective Living Body through Wearable Computers." *AI & society*, 35(1): 39-49. https://doi.org/10.1007/s00146-018-0840-x.

Malaspina, Roberto Paolo and Sofia Pirandello (2021). "Memoria interattiva. Contro-monumenti in realtà aumentata." *Roots § Routes*, XI (35), January-April. https://www.roots-routes.org/memoria-interattiva-contro-monumenti-in-realta-aumentata-di-roberto-paolo-malaspina-e-sofia-pirandello/ (last accessed 25-05-2021).

Mancuso, Marco (2018). *Arte, tecnologia e scienza. Le Art Industries e i nuovi paradigmi di produzione nella New Media Art contemporanea*. Milano and Udine: Mimesis.

Manovich, Lev (2006). "The Poetics of the Augmented Space." *Visual Communication*, 5(2): 219-240. https://doi.org/10.1177/1470357206065527.

Modena, Elisabetta, Andrea Pinotti, and Sofia Pirandello (2021). "Virtual Reality and Augmented Reality: New Tools for Art and Politics." *Paradigmi,* XXXIX(1): 87-126. https://doi.org/10.30460/100230.

Montani, Pietro (2014). *Tecnologie della sensibilità. Estetica e immaginazione interattiva*. Milano: Cortina.

Montani, Pietro (2017). *Tre forme di creatività: tecnica arte politica*. Napoli: Cronopio.

Paglen, Trevor (2014). "Operational Images." *e-flux*, 59. https://www.e-flux.com/journal/59/61130/operational-images/ (last accessed 25-05-2021).

Papineau, David (2016). "The Foundations of Narrative." In *Art, Mind, and Narrative. Themes from the Work of Peter Goldie*, edited by Julian Dodd, 61-79. Oxford: Oxford University Press.

Pinotti, Andrea (2017). "Self-Negating Images: Towards An-Iconology." *Proceedings*, 1(856): 1-9. https://doi.org/10.3390/proceedings1090856.

Quaranta, Domenico (2013). *Beyond New Media Art*. Brescia: Link Editions.

Steyerl, Hito (2009). "In Defense of the Poor Image." *e-flux*, 10. https://www.e-flux.com/journal/10/61362/in-defense-of-the-poor-image/ (last accessed 25-05-2021).

Steyerl, Hito (2017). *Duty Free Art. Art in the Age of Planetary Civil War*. London and New York: Verso.

Valdivieso, Humberto (2020). "Unsatisfied with Space: Hyper–Readers in the Cybercosm of the 21st Century." In *Meaning-Making in Extended Reality. Senso e virtualità*, edited by Federico Biggio, Victoria Dos Santos, and Gianmarco Thierry Giuliana, 307-327. Roma: Aracne.

Veenhof, Sander (2018). "Living and Acting in Augmented Words: How to Be Your Own Robots?." In *Augmented Reality Art. From an Emerging Technology to a Novel Creative Medium. Second Edition*, edited by Vladimir Geroimenko, 343-355. Cham: Springer.

Wellner, Pierre; Mackay, Wendy, and Gold, Rich (1993). "Computer Augmented Environments: Back to the Real World." *Communications of the ACM*, 36(7): 24-26. https://doi.org/10.1145/159544.159555.

Wiesing, Lambert (2010). *Artificial Presence. Philosophical Studies in Image Theory*. Stanford: Stanford University Press.

Wither, Jason et al. (2010). "The Westwood Experience: Connecting Story to Locations Via Mixed Reality." *IEEE International Symposium on Mixed and Augmented Reality 2010, Arts, Media and Humanities Proceedings (ISMAR AMH 2010)*, Seoul, Korea, 13-16 Oct., 1: 39-46. <https://doi.org/10.1109/ISMAR-AMH.2010.5643295>

Sofia Pirandello – University of Milan (Italy)
✉ sofia.pirandello@unimi.it
Sofia Pirandello is a PhD student in Philosophy at the University of Milan. She worked on imagination in order to show its relevance in our everyday life, taking into account the cases of literature, visual arts, and mental diseases like schizophrenia. She attended CAMPO, the art curator course held by Fondazione Sandretto Re Rebaudengo of Turin. She is currently working on a PhD thesis about how digital technology affects our cognitive evolution, studying the effects of Augmented Reality (AR) on reasoning and creativity.

Dreamlike Environments: "Story-living" in Virtual Reality Installations

Giancarlo Grossi*

University of Milan (Italy)

Abstract

This article examines the narrative identity of a new emerging medium, the virtual reality installation. In order to do so, the representation of dream states often presented in virtual art will be considered as a metareflexive model to be analysed in order to comprehend the distinctive characteristics of this experience. From this point of view, the study distinguishes virtual from physical art installations, the experience of which has been compared by Claire Bishop to the process of de-codification of dreams, focusing on the concept of incorporation. Accordingly, this incorporated experience of immersive images will be considered in relation to contemporary dream theory, formulated in the fields of neuroscience and philosophy of mind. At the same time, a second focus will be devoted to the use of the dream metaphor in new media art dealing with media archaeology and in particular in the interactive artwork *Beyond* (1997). In conclusion, the analysis of two contemporary virtual reality installations metariflexively dealing with dream experience, *Somnai* (2018) and *The Key* (2019) will lead to the individuation of a common experiential model: storyliving instead of storytelling.

Keywords: Virtual reality installation; Virtual art; Dream theory; Narrative strategies; Storyliving; New media art.

Acknowledgements

* ✉ giancarlo.grossi@unimi.it

1 Introduction

It is not easy to describe the narrative identity of virtual reality. The emerging new medium, as yet neither institutionalised nor occupying a widely-recognised social role, is diffused across several fields of experience, from immersive gaming to virtual art, from what is called "VR cinema" (a merely audio-visual but completely immersive experience) to the most complex virtual reality installations often characterised by the presence of tracking devices producing a superposition between physical and virtual elements (so-called layered reality), a major degree of interaction often integrating the tradition of immersive theatre and performance, a complex multisensory experience of the virtual content. In these conditions, the very concept of storytelling — implying a story recounted by the author with a spectator passively receiving it in a preconstructed form — needs a radical review.

In this study we will investigate the identity of virtual reality installations by examining a meta-reflexive model often purposed by its narrative organisation: that of dreaming, grounded in the similarity between the multimodal and multisensory experience of immersive images and the elements that culturally and historically characterise our conception of nocturnal visions. This similarity does not concern only virtual installations but has been used as a metaphor to describe the experience of installation art in general, for its immersive properties and the process of comprehension this art effectively implies. Consequently, a series of questions arise: is there a similarity between the construction of meaning in dreams and installations? And if so, is it possible to distinguish between the dreamlike involvement experienced in physical installations from that of virtual installations? What does the representation of dreams in virtual reality installations tell us about this involvement?

2 Installation Art and the Dream Scene

Art theorist and critic Claire Bishop proposes "installation art" as "a term that loosely refers to the type of art into which the viewer physically enters, and which is often described as 'theatrical', 'immersive' or 'experiential'" (Bishop 2005: 6). At the same time, Bishop underlines the consonance between the possibility of entering the space of the image and the building of a "dream scene" characterised by a "psychologically absorptive, dream-like environment" (10). This identity is the result of two main factors: firstly, the installation's power to *activate* the viewer, who is asked to reconstruct in a dynamic and personal way the global sense of the art-space in which she is absorbed; secondly, its power to *decentralise* her, since any single element of the art environment can draw attention and become a path to follow so as to shape a narrative meaning. The Cartesian paradigm of vision falls completely apart. The idea of the picture as an organised, controllable field of vision, thanks to the processes of framing and distancing, is substituted by a radically different cognitive strategy. It is a scheme dealing with a vision lost in the meanders of the representation, in which the physical and imaginary spaces almost coincide and the meaning of which is blurred and only with difficulty explicable.

The "dream scene" of installation art is therefore experienceable and readable only by using the same tools developed originally by Sigmund Freud in *The Interpretation of Dreams* (1900). Claire Bishop argues that for the father of psychoanalysis the dream presents three main characteristics: it is *hallucinatory*, presenting itself with a sensory vividness closer to perception than to memory or imagination; it is *composite*, absurd if taken for as a whole but comprehensible if read in its constitutive elements as a rebus; it is *subjective*, since it is not meant to be decoded, but analysed through the technique of free association, which reveals the individual and affective connections of the dreamer. Consequently, for Bishop the whole history of art installations, from their early origins in the Paris Surrealist exhibitions of 1938, 1947 and 1959, and that in New York in 1942, to Illja Kabakov's total installations, has a *fil rouge*: requiring of the viewer an oneiric disposition for the artwork to be concretely experienced and understood. It was not by chance that in the 1938 Surrealist exhibition directed by Marcel Duchamp visitors were welcomed in complete darkness "since it evoked Freud's comparison of psychoanalysis to archaeology: viewers were cast into the role of excavators, uncovering the works one by one as if retrieving for analytic illumination the dark and murky contents of each artist's unconscious psyche" (Bishop 2005: 22). Accordingly, they could also find "rumpled beds in each corner of the gallery," confirming "this equation between the exhibition's *mise-en-scene* and the unpredictable and irrational imagery of dreams" (Ibidem).

More recently, Kabakov's 1984 installation *The Man Who Flew into Space from His Apartment* proposes an art space in which a series of cues — a pair of empty shoes, numerous posters of inventions devoted to Soviet space missions covering the walls, a spring mechanism hanging from a partly destroyed ceiling — suggest a story that the viewers, overwhelmed by visual inputs and possible cognitive paths, is asked to reconstruct. They are not allowed to enter the room but can look into it from a small external hall. Any single element could be central to the construction of meaning. While other art historians such as Boris Groys (2006) consider the sense of the artwork as mostly focused on the theme of Soviet Utopia understood as the material realisation of metaphysical concepts rather than on mental states, Bishop asserts the consonance between the total installation and the dream scene. In Kabakov's artworks "we imaginatively project ourselves into an immersive 'scene' that requires free association in order to articulate its meaning; in order to do this, the installation's assemblaged elements are taken one by one and read 'symbolically' — as a metonymic part of a narrative" (Bishop 2005: 16). Kabakov's description of the way total installation may interact with the viewer in his book *On the "Total" Installation* (1995) confirms the oneiric nature of his art: the environment is constructed "in such a way that the viewer ... finds himself inside of it, engrossed in it" (Kabakov 1995: 243) and its main motor is "the cracking up of the wheel of associations, cultural or everyday analogies, personal memories" (317).

The dream scene then coincides with the possibility of finding the meaning of an immersive artwork in the negotiation between the free path of the viewer and the traces left around her. In this sense, the passage from physical immersive art spaces to virtual spaces can be interpreted as an increasing approximation to dream states. In the definition of art historian Frank Popper, virtual art includes several elements of technical media developed by the late 1980s and in particular "interfaces between humans and computers — for example, visualisation casks, stereoscopic spectacles and screens, generators of three-dimensional sound, data gloves, data clothes, position sensors, tactile and power feedback systems, and so forth — [that] allowed us to immerse ourselves completely into images and interact with them" (Popper 2007: 1-2). The recent development of virtual devices includes a new lighter and easily wearable generation of head-mounted displays (Oculus Rift, HTC One, Google Daydream, and so forth) and tracking technologies (from motion to volume capture) that allow an ever-increasing sense of presence and immediacy grounded in the hybridisation between the human body and the medium. Likewise, in the field of game studies Gordon Calleja (2011) proposes the concept of *incorporation* as a more accurate description of this condition than *presence* and *immersion*. Incorporation is defined as "the absorption of a virtual environment into consciousness, yielding a sense of habitation, which is supported by the systematically upheld embodiment of the player in a single location, as represented by the avatar" (169). While immersion and presence express a univocal polarisation between consciousness and digital environment, incorporation describes a biunivocal and reversible relation, resting on multiple strategies of involvement. In particular, narrative involvement arises from the negotiation between two different narrative tactics: Calleja distinguishes between *scripted narratives*, events pre-scripted into the storyline, and *alterbiographies*, stories generated by the individual player as she takes part in the game. Similarly to what happens in installation art environments, in virtual worlds too the story arises from the negotiation between pre-designed narrative elements and the free associations and paths created and followed by the user. The radical difference lies in the incorporation of this process in immersive virtual environments, which make this "dream scene" even more similar to dreams. This analogy becomes evident if we move from Freudian dream theory to the recent epistemological understanding of dreaming to be found in neuroscience and philosophy of mind, in which the metaphor of a "virtual reality simulator inside the brain" has become increasingly widespread.

3   The Virtual Reality of the Brain

In the theories of the mind of the 1990s the idea of an immersive simulator inside the brain becomes a common metaphor for the dream state. For the influential psychiatrist and dream theorist John Allan Hobson the brain possesses an innate virtual reality generator able to furnish predictive models of the world (Hobson, Hong and Friston 2014). This model is present in waking consciousness as well as during REM sleep, but with a substantial difference. While during waking life the simulator operates online, constantly updated by sensory prediction errors, during sleep the model is simplified and perfected thanks to the offline condition of isolation. Consequently, the simulation generated in dreams produces a more efficient model of prediction, which is useful, from an evolutionary perspective, during wakefulness. Therefore, Hobson sees consciousness as an

"embodied process of inference, realised through the generation of virtual realities" (1). Dreaming provides the theatre for conscious experiences. In this sense, its function is that of a proto-consciousness, starting in the womb and then active every night, a safe space necessary to optimise cognitive and perceptive skills (Hobson 2009). In his studies, Hobson has used various multimedia metaphors to describe the way the narrative model works in dream states, underlining how virtual reality is more accurate than cinema to this end:

> Putting it all together — integrating all of these disparate elements into a credible dream plot — is the job of what's left of the executive *I*. Here we are on thin ice because we don't really know how the dream scenarios are composed, any more than we know how ideas are generated in waking. We emphasise narration because the reports we have of dreams read like stories. This is dangerous because the reports are necessarily given in waking and rely entirely on language, whereas the dreams themselves are experienced more like films. They are multimedia events, including fictitious movement of a type not yet stimulated easily, even in the most technically sophisticated film. Only virtual reality, where the subject's own movements affect perceptions, comes close to this dream experience. Thus, we use the term 'narration' advisedly to signal the coherence of dream experience, which is all the more remarkable given the apparent chaos of REM sleep dreaming (Hobson 2002: 145).

The first scientific views of the dream as a virtual reality simulator situated inside the brain date back to the early 1990s and concern problems related to consciousness in wakefulness and sleep. Its first occurrence in neuroscientific literature appears in a study made by the neuroscientists Rodolfo R. Llinás and Denis Paré, who emphasise the virtual aspect of dream consciousness as opposed to the Jamesian view of consciousness as the product of external sensory input. Accordingly, they claim that "consciousness is fundamentally a closed-loop property, in which the ability of cells to be intrinsically active plays a central role" (Llinàs & Paré 1991: 521).

In 1995 the neuroscientist Antti Revonsuo followed the metaphor of dream as a virtual simulation in several studies. According to Revonsuo, dreams reveal "the subjective, macro-level form of consciousness in general" so that "both dreams and the everyday phenomenal world may be thought of as constructed virtual realities" (Revonsuo 1995: 35). From an evolutionary perspective, they are both simulations aiming at optimising cognitive skills through the generation of efficient models of the world. Together with Katja Valli, Revonsuo elaborated two paradigms for dream theory. Firstly, the *threat simulation theory*, claiming that the purpose of dreaming is the repeated simulation of threatening events, whose repeated and safe experience during sleep improves our ancestors' recognition and avoidance skills, enhancing survival and reproductive success (Valli & Revonsuo 1995). Secondly, the *social simulation theory*, introducing into the virtual reality model of the dream the idea of the avatar, simulated subjects to interact with, and suggesting that dreams have the function of rehearseing social perception and cognition, improving mind-reading skills inherited from an ancestral past in which social inclusion in the group was essential for survival (Revonsuo, Tuominen & Valli 2015). A further development of the virtual reality model of dream theory has been put forward by philosophers of mind Thomas Metzinger and Jennifer M. Windt. Following the identification between consciousness and the production of inner virtual reality simulations, they wonder if dreaming could be considered a conscious experience and what degrees of consciousness are present in dreams. For Metzinger and Windt, dreams are conscious experiences as they satisfy three main criteria: *globality*, since they activate a global model of reality; *presentationality*, or the integration of this model into a window of virtual presence; *transparency*, since this simulated model of reality is not recognised as a model by the subject who is experiencing it (Metzinger & Windt 2007). In this sense, waking and dreaming consciousness differ only in one respect, also comprehensible in a virtual sense: that waking life is an online dreaming. Even with some important exceptions — when external auditory stimuli such as the alarm clock are integrated into the dream story — dreams occur offline, in a state of radical separation from the external world.

In conclusion, contemporary dream theory not only uses virtual reality as a heuristic metaphor to comprehend the biological function of dreaming, but also proposes a model of the narrative experience in both dreaming and virtual reality installations. The latter is grounded in the possibility given to the dreamer/visitor of being immersed in a certain imaginary storyline bringing her personal background into it, so that she can interact with the storyworld by enhancing survival skills and making decisions related to ethical and social life. All this, of course, in the safe condition of a separated virtual model of the world.

4   Virtual Dreams and Media Archaeology

Another reflection on the similarity between dreaming and virtual reality devices may be found in the field of new media art, in particular that of Zoe Beloff, who uses interactive media at the service of media-archaeological research, focusing on "the psychological and/or gender-specific implications of technologies of the past, visualising them with their re-creations" (Parikka & Huhtamo 2011). In this perspective, the central analogy between the oneiric and the digital realm lies not only in their immersive and multisensory properties, nor in their narrative organisation, but also in their shared ability to archive and re-present past experiences nowadays. Thus the sense of presence provided by virtual reality and dreams can be defined, following Vivian Sobchack, as "the literal transhistorical (yet not ahistorical) transference or relay of metonymic and material fragments or traces of the past through time to the 'here and now'" (Sobchack 2011: 324). In fact, the perspective of media archaeology searches in the past for the traces of trans-historical models which, with both continuities and differences, shape the experiences of the present. In this sense, the capacity of today's immersive images to absorb and capture the viewer inside themselves emerges with equal precision in illusory spaces such as the frescoes in ancient Pompeian villas, Baroque trompe l-oeil, and Nineteenth-Century panoramas (Grau 2003, Griffiths 2008), as well as in the evolution of the screen from its original static perspective to the capacity to "alter the relationship between represented and actual space" (Rogers 2019: 149) right up to its total adherence to the movements of the viewer's gaze. The recursive historical return of the traces of the past in the media devices of the present can also be read as a dreamlike process, as Zoe Beloff does.

In *Beyond* (1997), a QuickTime VR series accessible via cd-rom as well as via web, Beloff offered an exemplary strategy of how digital media, thanks to their symbolic power to archive, can function like a dream by re-immersing the user into a world innervated by XIX century media techniques. In an article indispensable for comprehending the theoretical background of the artwork, Beloff (2005) states that her main goal in using digital tools was to explore "the paradox of technology, desire and paranormal posed as the birth of mechanical reproduction." Beloff calls this peculiar episteme, which constitutes the object of her investigation, the "dreamlife of technologies," a historically and materially determined mental geography that the user can explore in the interactive and nonlinear way allowed by the hypertext structure as well as by QuickTime VR and its 360° visualization tools. The device that *Beyond*'s QuickTime VR vision intends to resuscitate is, however, the *panorama*, the cylindrical painting widely-diffused in the XIX century which trapped the viewer inside a hallucinatory and global representation (Pesenti Compagnoni & Tortonese 2001). In Beloff's (2005) words:

> I am fascinated by long outdated forms resurfacing anew in the digital realm. Such are panoramas. Actual panoramas painted around specially constructed circular rooms were a popular form of entertainment in the nineteenth century. Long forgotten, they now reappear in the virtual realm as QuickTime VR. My QuickTime videos are made "live" without digital manipulation, by re-photographing film and text with the Quick Cam, using effects that would not have been out of place in Méliès studio. Just as the earliest filmmakers struggled to find a new visual language through the newly developed technology of cinema, here I aim to invent in a personal way, a new digital articulation of space and time that both grows out of cinema yet goes beyond it (78).

The location represented within the digital panorama, explorable in its totality without a precise direction or point of arrival, consists of a real abandoned asylum, whose ruins stand for the different spaces, both imaginary and real, of the mental and historical geography investigated by Beloff: "from Charcot's clinic at the Salpêtrière, to Raymond Roussel's fictional world of *Locus solus*, to the destroyed buildings of the two World Wars, to the Paris Arcades of the Second Empire, to the ruins of the Great World Expositions, to Edison's laboratory at Menlo Park" (79). Moreover, *Beyonds*' virtual panorama contains several rooms: in any of them there is one or more silhouettes that activate short videos, representing documents of this unconscious topography. These films have been recovered from New York flea market as well as from early film footages taken from the Library of Congress collection, and matched with Beloff's mesmerising metallic voice — "a 1930's BBC radio drama voice, the voice of a medium" (Beloff & Beckman 2006: 78) — reading narrative textbook passages, scientific licences, physio-psychological accounts of the XIX century. These videos represent the dead who are summoned to life by the digital image's function of medium — to be intended in both technological and parapsychological sense. They are lost films that emerge to a new life, isolated from their original context —

the afterlife of images — and resurrected in the dream-space of a digital panorama. In these brief sequences it is possible to find fragments of the narrations that characterise XIX Century technical unconscious: the first phonographic experiments, Jules Antoine Lissajous' machine that visualises vibrations, Raymond Roussel's fictional "Ice House" described in *Locus solus*, Pierre Janet's tests with somnambulists at the Salpêtrière. These are wrecks from the protohistory of media in which it is already possible to guess the interactive and immersive future of digital technologies.

Roussel's role is in this sense central. In *Locus solus* (Roussel 2008) the writer imagined a series of scientific tests performed by inventor Martial Canterel (evidently inspired by Edison). The most intriguing of his inventions is precisely the "Ice House," which consists of a series of dioramas visible behind a glass partition. In each of these, actors are continuously playing out the same sequence, replicating it at any given time with extreme accuracy. The truth behind the invention is that the actors are dead and continuously brought back to life by Canterel using electrical impulses: their performance consists in repeating at every resuscitation the most traumatic moments of their life. This later process corresponds with the same revivification that the psychologist Pierre Janet, who treated Roussel after an episode of delusional ecstasy, at the time investigated in his experiments on somnambulism (Janet 1889, 1989). After Janet, the advent of psychoanalysis will trace in dreaming the possibility of reaching forbidden traumatic experiences beyond the hallucinatory sense of presence provided by the dream content.

For Beloff, this oneiric function of archiving and re-presentation of the past is visible in two realms. The first is early movies, which "were shown initially with a still frame up on the screen that would then suddenly come to life as the projectionist cranked the projector. At the same time these films, each 50 seconds long, were often shown as loops so that the same gestures were repeated with uncanny precision over and over again" (Beloff 2005: 5). The second realm is digital media and the way they can absorb and resuscitate the cinematic experience, in a sense that turns the idea of remediation described by JD Bolter and Richard Grusin into an oneiric process (Bolter & Grusin 1999). In a media archaeological perspective, a new character of the analogy between dream and virtual reality experience emerges: that of a direct access to the past, that can be re-lived and elaborated into the immersive archive of the digital image.

5   *Somnai* and the Clinic of Lucid Dreams

Having underlined the specific elements that make dreaming a cultural model for virtual reality installations — content which makes sense only in relation to the viewer's personal experience, expressed in free-associations; the incorporation of this experience, which aims at improving individual skills in a safe and simulated virtual environment; the direct access to the past that re-presents itself — it is now possible to analyse virtual experiences openly representing dream states, searching in their contents and forms for a meta-reflective narrative model of the medium's identity.

The first example is *Somnai* (dotdotdot 2018), a layered reality experience presented in London which combines the tradition of immersive theatre with the use of virtual reality devices. This experience is presented as a clinic of the lucid dream, in which the participants are invited to learn the art of mastering the narratives of their dreams and of immersing themselves into them. Equipped with a tracking device as well as with socks and nightgown, the users are called one by one to submit to face recognition and are identified with a numbered bracelet. At this very moment they can encounter their totemic guide, a woman who introduces them to the art of lucid dreaming. To start, they must wear a night mask, separating external stimuluses from inner ones. The mask obviously consists of a virtual reality head-mounted display. By wearing the helmet, the user finds herself enveloped in imaginary worlds that require her not just to view them but more than all to live them and to explore these worlds in a multisensory way: there are sky landscapes to fly across, sea depths to dive within, a rickety wooden bridge dangerously suspended over an abyss to go through. Confusing these digital dreams with reality is not possible from a merely visual perspective: their obsolete 1990s videogame graphic radically compromises any possibility of the voluntary suspension of disbelief. Only by taking into account the involvement of the other senses it is thus possible to understand the power of the reality effect they provide. In particular, this is evident in relation to the tactile properties of the objects which appears in the imaginary environment, such as the marine flora faithfully corresponding with the softness of props enveloped

by immersive images thanks to a tracking device, or the bridge which, through the same process, effectively creaks under the users' feet, rocked by the wind. The same illusion is enforced by the sense of smell, such as that of the seaweed they meet in the underwater environments. It is not vision, but the hallucinatory idea of presence confirmed by the other senses in absence of an effectively corresponding external object which makes these digital dreams indistinguishable from the real. To which a further factor is added, given that it is possible to interact via a digital avatar both with the actors who lead the experience and also with the other participants, who can be perceived inside the helmet in the form of luminescent ghosts.

In this sense, the lucid dream functions as a model of the narrative strategy proposed by the virtual installation: where the story is only partly pre-designed, and partly corresponds with the result of any participant's personal choices. In fact, in *Somnai* each member of the group is expected to make decisions that lead to multiple and different endings. In the last part of the experience each is invited to select one room in which to finally experience the lucid dream, which may be an idyllic dream for the luckiest or a deadly nightmare for the most unfortunate.

This final option, conferring to the user's blind choice the production of an ending, overturns the concept of storytelling as a participative collective process, and needs new paradigms to describe what a narrative is when we experience a virtual reality installation or a technological dream.

6 *The Key* and the Concept of "Storyliving"

The French immersive artist Céline Tricart coined the concept of "storyliving" to describe the narrative design she projects for virtual reality installations. What this concept means in concrete terms becomes clear through the analysis of *The Key* (2019), an experience once again devoted to the process of remembrance in dreams.

In this experience, the participant is welcomed by a female performer who asks her to delve deep into her own dreams so as to discover the forgotten secret of her childhood. Along the oneiric journey the participant is invited to bring with her the only object the performer has preserved from the past, a small key. Then, she can wear the head-mounted display and enter into the dream environment. This latter is represented as the interior of a home suspended in the clouds, part of a celestial city visible through the window, where the user feels free to interact with three animated spheres which she is invited to protect from several dangers, and these instantaneously arrive: an explosion destroys all the walls, scattering the spheres into the open sky, while the user falls into apocalyptic scenarios such as a hell-like desert or a line of white-faced humanoids advancing towards a monstrous leviathan. It is in the transition between these visions that the forgotten trauma is finally revealed. The immersion passes from CGI to photography and, contextually, from dream to reality, showing the experience of a bombed-out home in Iraq, with the need to protect loved ones and to emigrate towards a safe refuge and the absence of welcome in the promised lands. The only dreamlike element that remains once the head-mounted display is removed is the key, which symbolises that of the home many refugees have left, and still carry with them during their flight.

Céline Tricart's main goal is thus to create a virtual reality experience in order to produce a sense of awareness towards the real world. In this way, instead of putting the user inside another's shoes, following the experiential model of the empathy machine theorised by Chris Milk in 2015, she projects a magical realist metaphor of the historical trauma that cannot be *recognised*, but experienced in its emotional implications under the camouflage of the dream (Tricart 2018). Accordingly, the oneiric processes of condensation and displacement — from a Freudian perspective — created by the virtual representation are expected to encounter the participant's own personal experience and action to find the complete sense.[1] It is a narrative meaning in which the subject reaches a direct comprehension of collective and historical trauma, bringing together individual and social memories. For Tricart, virtual reality is in fact conceived as a "first-person medium," avoiding "squeezing the participants into the people's bodies and telling them what to think and when" (Tricart & Yu 2019). She calls this possibility, helped by a very easy and user friendly interactional design (Höök 2018), storyliving,

---

1. For the philosopher Pietro Montani (2018), dreams as well as virtual reality may be considered as an active part of the operative work of imagination as understood in a Kantian sense, which de-automatizes the production of cognitive schemes, thus performing new possibilities of open meanings.

since the participant's personal social and historical comprehension is grounded in the sense she brings into the virtual environment. The metaphor of the dreamlike environment sustains this project, in which a subjective, embodied experience of the image radically undermines the idea of a story to be told. Narration is thus produced by a series of affections, actions, choices which shape an imaginary world conceived as a series of infinite personal possibilities.

7   Conclusion

In conclusion, we can adopt the concept of storyliving to properly describe the narrative identity of virtual reality installations seen as a new, not yet widely-diffused and institutionalised form of medium. The dream experience, already proposed by several scholars and in particular by Claire Bishop as a model for installation art, continues to function as an operative metaphor for comprehending the strategies of storyliving in virtual environments. In fact, both physical and virtual reality share important elements: the idea of an immersive image, which surrounds and absorbs the viewer into its visual field; the absence of a hierarchical organisation of this space starting from a main scene; the possibility for the viewer of choosing any detail of the vision as a privileged centre of her own narrative path (as in Freudian free-association); the integration of some levels of freedom, interaction and decision into the storyline. Virtual reality nonetheless introduces a novelty: the radical incorporation of these processes into a separate individual experience achieved by the use of a wearable device such as a head-mounted display. Accordingly, the similarity between installation and dream becomes even more evident in the virtual realm, in the strategy of a "first-person medium," to be investigated as the most recent form of exteriorisation of the conscious and unconscious self.

References

Beloff, Zoe (2005). "An Ersatz of Life: The Dream Life of Technology." In *The Sharpest Point: Animation at the End of Cinema*, edited by Chris Gehman and Steve Reinke, 78–85. Toronto: YYZ Books.

Beloff, Zoe and Karen Beckman (2006). "Impossible spaces and philosophical toys: An interview with Zoe Beloff." *Grey Room* 22: 68–85.

Bishop, Claire (2005). *Installation Art*. Millbank, London: Tate Publishing.

Bolter, J. David and Richard Grusin (1999). *Remediation. Understanding New Media*. Cambridge, MA: The MIT Press.

Calleja, Gordon (2011). *In Game: from Immersion to Incorporation*. Cambridge, MA and London: The MIT Press.

Grau, Oliver (2003). *Virtual Art: From Illusion to Immersion*. Cambridge, MA and London: The MIT Press.

Griffiths, Allison (2008). *Shivers down Your Spine: Cinema, Museums, & the Immersive View*. New York: Columbia University Press.

Groys, Boris (2006). *Ilya Kabakov: The Man Who Flew Into Space From His Apartment*. London: Afterall.

Hobson, John Allan (2002). *Dreaming: An introduction to the science of sleep*. Clarendon: Oxford University Press.

Hobson, John Allan (2009). "REM sleep and dreaming: towards a theory of protoconsciousness." *Nature Review Neuroscience* 10(11): 803–813. https://doi.org/10.1038/nrn2716.

Hobson, John Allan, Charles C.H. Hong and Karl J. Friston (2014). "Virtual reality and consciousness inference in dreaming." *Frontiers in psychology* 5(1133). https://doi.org/10.3389/fpsyg.2014.01133.

Höök, Kristina (2018). *Designing with the Body: Somaesthetic Interaction Design*. Cambridge, MA: The MIT Press.

Huhtamo, Erkki and Jussi Parikka, edited by (2011). *Media Archaeology: Approaches, Applications, and Implications*. Berkeley, London and Los Angeles: University of California Press.

Janet, Pierre (1989 [1889]). *L'Automatisme psychologique. Essai de psychologie expérimentale sur les formes inférieures de l'activité humaine*. Paris: Société Pierre Janet.

Kabakov, Ilya (1995). *On the Total Installation*. Stuttgart: Cantz.

Llinás, Rodolfo R. and Denis Paré (1991). "Of dreaming and wakefulness." *Neuroscience* 44(3): 521-35. https://doi.org/10.1016/0306-4522(91)90075-y.

Metzinger, Thomas and Jennifer M. Windt (2007). "The philosophy of dreaming and self-consciousness: What happens to the experiential subject during the dream state?" In *The New Science of Dreaming Vol. 3: Cultural and Theoretical Perspectives*, edited by Deirdre Barrett and Patrick McNamara, 193-247. Westport, CT: Greenwood.

Montani, Pietro (2018). "Once again on 'Narrative imagination'. Schematizing without concept in language, image and dreaming brain." *Reti, saperi, linguaggi* 1: 127–134.

Popper, Frank (2007). *From Technological to Virtual Art*. Cambridge, MA and London: The MIT Press.

Revonsuo, Antti (1995). "Consciousness, dreams and virtual realities." *Philosophical Psychology* 8(1): 35–58. https://philpapers.org/go.pl?id=REVCDA&proxyId=&u=http%3A%2F%2Fdx.doi.org%2F10.1080%2F09515089508573144.

Revonsuo, Antti, Jarno Tuominen and Katja Valli (2015). "The avatars in the machine: Dreaming as a Simulation of social reality." In *Open MIND*, edited by Thomas Metzinger and Jennifer M. Windt, 32. Frankfurt am Main: MIND Group.

Rogers, Ariel (2019). " 'Taking the Plunge': The New Immersive Screens." In *Screen Genealogies. From Optical Devices to Environmental Medium*, edited by Craig Buckley, Rüdiger Campe and Francesco Casetti, 135-158. Amsterdam: Amsterdam University Press. http://dx.doi.org/10.1515/9789048543953-006.

Roussel, Raymond (2008 [1914]). *Locus Solus*. London: Calder.

Sobchack, Vivian, (2011). "After-word. Media Archaeology as Re-Presencing the Past." In *Media Archaeology: Approaches, Applications, and Implications*, edited by Erkki Huhtamo and Jussi Parikka, 323-333. Berkeley, London and Los Angeles: University of California Press.

Tricart, Céline (2018). *Virtual Reality Filmmaking. Techniques & Best Practices for VR Filmmakers*. New York and London: Routledge.

Tricart, Céline and Kathrin Yu (2019). "Unlocking the Mystery of 'The Key'." Interview, in https://noproscenium.com/unlocking-the-mystery-of-the-key-q-a-2f8958d65c9b (last accessed 14-01-21).

Valli, Katja and Antti Revonsuo (2009). "The Threat Simulation Theory in Light of Recent Empirical Evidence: A Review." *The American Journal of Psychology* 122(1): 17–38.

Giancarlo Grossi — University of Milan (Italy)

✉ giancarlo.grossi@unimi.it

Giancarlo Grossi is a post-doc researcher in Aesthetics in the Philosophy Department of the University of Milan. His research interests concern the relationship between visual culture, media devices and mind sciences. His later studies focus on the relationship between immersive media and aesthetic experience from an archaeological point of view. He has published several articles in scientific journals and two books: *Le regole della convulsione. Archeologia del corpo cinematografico* (Meltemi 2017) and *La notte dei simulacri. Sogno, cinema, realtà virtuale* (Johan & Levi 2021).

Turn Your Head and Listen: 360° Audio Between Old Utopias and Market Strategies

Raffaele Pavoni*

University of Florence (Italy)

Abstract

Many scientific publications directly concern VR, often conceived as a battlefield for rethinking our relationship with the moving image, and our frameworks on topics such as the cinematographic language or the spectator perception. And yet, although for some time film studies have re-evaluated the role of sound in cinematic production and spectatorship, in the field of VR the theoretical reflection on concepts such as stereoscopic audio and binaural recording has remained confined to the technological-engineering aspect. This essay aims to explore the most common audio techniques and their real impact in terms of consumption and affordances, on the basis of some software studies and sound studies reflections and within a media-archaeological perspective. The results of these innovations go beyond the technological features, suggesting a further rethinking of the cinematographic form and calling into question, even from an audio-only perspective, the issue of audience perception and interaction. The case studies taken into account might be an impulse, heuristically, for new studies on these topics.

Keywords: Spatial Audio, Virtual Reality, Binaural Audio, Sound Studies, Software Studies.

∗   ✉ raf.pa53@gmail.com

1   Introduction

Many recent scientific publications directly concern Virtual Reality (VR). This comes by one hand from the growing availability of products and devices; by the other, from the impulse of revitalising film studies through a medium that appears to be, somehow, destabilizing. VR, in other words, is often conceived as a battlefield for rethinking our relationship with the moving image, and our frameworks on topics such as the cinematographic language or the spectator experience.

And yet, although for some time film studies have re-evaluated the role of sound in cinematic production and spectatorship (often intertwining the paradigms of sound studies, or underlining the aural feature of the cinematic experience), in the specific field of VR studies the theoretical reflection on concepts such as spatial audio and binaural recording has remained confined to the technological-engineering domain. This one seems to be actually a lack of these evolutions and mutations' interpretations.

This article explores some of the most common audio techniques and their impact in terms of consumption and affordances, on the basis of the abovementioned reflections and within a media-archaeological perspective. I will focus on some case studies, both on the hardware and on the software side, which seem to be particularly emblematic: indeed, the results of these innovations go beyond the simple technological fact, suggesting a further rethinking of the cinematographic form.

The utopia of sound immersion is, in fact, consubstantial with the history of cinema, although often relaunched (and withdrawn) for purely commercial reasons. And yet, as this essay will theorise, the abandonment of a Point of Listening (POL), as the abandonment of a Point of View (POV), seems to be at the same time a strength and a limit of those products, calling into question, even from an audio-only perspective, the issue of audience perception and interaction. This kind of approach, built on a software and sound studies methodology, could represent an impulse, heuristically, for new studies on the subject. In the next chapter, I am going to insert this hypothesis in the pre-existing debate on VR, drawing a theoretical framework and applying it to specific technologies, in order to prompt — in the conclusions — further studies on these topics.

2   VR: The State of the Art

A systematisation of VR studies implies a theoretical and academic distinction between a social or aesthetical approach and an engineering one. This phenomenon could be inserted in the broader scenario of an evolution of visual culture, which seems to face a growing predominance of the device, intended as a cultural artefact. At the same time, studies on the technological features of these devices often confine with advertisings (both hiddenly or explicitly). To discern market tactics and academic studies is sometimes as uneasy task, especially in the field of VR, as the emphasis that leads both kind of publications is somehow similar.

Studies, highlighting the educational potential of VR, are increasingly flourishing, especially in a moment where the COVID-19 pandemic has forced the exploration of new teaching strategies. Along this line, for example, we find publications that underline the lack of clear guidance in the library community on how to introduce these technologies in effective ways and make them sustainable within different types of institutions (Cook et al. 2019) or hypothesize a theoretical framework for the development of educational Augmented Reality Audio Games (ARAG) (Rovithis et al., 2019a), or investigate the benefits of VR on music education (Fletcher et al. 2019). Particularly relevant, in this sense, are the contributions of Andreoli (2018), who proposes some significant case studies in terms of gamification of learning, and Rossi (2020), who supports and integrates the knowledge of IT tools for the design and management of virtual environments with indications relating to the organizational and strategic activities that govern the formation of the image in VR.

Another vivid field of studies, related to VR, concerns cultural and digital heritage, focusing on the role of VR in preserving and divulging cultural artifacts. This may lead to establish different connections between architecture, visual arts and education (Luigini and Panciroli, 2018), or between 3D modeling and rendering and the use of documentary materials (Basso 2020). This may also suggest a reconceptualisation of museums in the context of a new exhibition design, paying attention to the inversely proportional relationship between attractiveness and credibility (Amoruso 2019). In the most extreme outcomes, this can lead to a renegotiation

of the very notion of heritage, and of its constituting elements: "are the objects themselves? Is the site as a whole? Is the excavation a documentation?" (March 2001: 277, my translation). Battini (2017) analyses the virtual simulation of architectural sites, whereas Nau (2019), on an archaeological level, questions how to make VR suitable for the analysis of a broader processing spectrum of hypotheses, possibilities and solutions, both in research and in restoration. Moreover, some psychological essays focus on the the effects of VR perception on associative memory (van Helvoort et al. 2020), or on anxiety states and heartbeats (Brinkman et al. 2015).

Finally, as is the case for this essay, VR is a privileged object of film and game studies, although many of these contributions are often fragmented in the multiple streams of individual case studies, however relevant they may be (Jung et al. 2020; Steincke 2016; Arcagni 2018, 2020; Dalpozzo, Negri and Novaga 2018). The lowest common denominator of all these contributions seems to be the desire to conceive virtual reality as an experimental form, where filming and gaming habits intertwine with engineering features, and Humanities are confronted with a forced interdisciplinarity. Many contributions deal with the remediation and reorganization of perception; in particular, VR is often conceived as a disruptive epistemological tool, which entails an emancipatory drive (as in the largely autobiographical work of Lanier) (2017). Phenomenological, neuroaesthetical and ontological approaches are often privileged, in these studies, as they help to rediscuss concepts such as the point of view, the immersiveness of contemporary media, the role of screens in the current media ecology, the perception of virtual experience as a physical on (and vice versa), the identification process and engagement in VR stories, the features of wearable technologies; last but not least, as in this essay, the POL. Despite similarities, as Majkut argues, "the epistemologies of POL and POV are dissimilar in fundamental ways," primarily because ubiquitous POL "isn't 'point' as 'center' of sense orientation. Metaphorically, it may be better thought of as a 'corner of orientation,' located peripherally on a horizon" (2014: 179).

This issue, in particular, has mainly been the subject of engineering analysis, whereas few contributions, in Humanities, tend to highlight the potential of spatial sonic expression. These studies deal with the sound not only as an integral part of immersive virtual experiences, but also as a critical point of departure for creative and technological works (Çamcı and Hamilton 2020), or propose a simple and efficient system to estimate room acoustic for plausible reproduction of spatial audio using 360° cameras for VR / AR applications, based on the estimated geometric and acoustic properties in the scene (Kim et al. 2019). Engineering studies, on their side, deal with concepts such as the spatial separation of binaurally recorded speakers (Kern and Ellermeier 2020) and the telecommunication systems that support them (Gamper and Lokki 2010), or sound interaction in game playing (Rovithis et al. 2019b).

Humanities, to sum up, often seem to leave those topics to the engineering studies. Yet, the contribution of software studies should lead us to a greater sensitivity in this aspect. Specifically, in VR the close interdependence between the medium (the interactive video) and the content (the graphic interface), in which one finds its *raison d'être* only through the existence of the other, suggests an overcoming of both these concepts, focusing on the dialectic between hardware and software. The concept of medium as software, in particular, seem to be useful: considering everything that stands between sender and recipient as a manipulation through software, it is possible to enclose the totality of the communication processes put in place and to analyse them in a unitary framework that takes into account the specificities of the single product. When J. L.Godard ironically stated that "camera movements are a question of morality" (Rivette 1961, my translation), he tended underlining how the "non-neutrality" of the gaze was added to the "non-neutrality" of the support. This support, following Manovich's insight, has its own status: "a code may also provide its own model of the world, its own logical system, or ideology; [...] most modern cultural theories rely on these notions, which together I will refer to the 'non-transparency of the code' idea" (2001: 64).

The question of audio in VR, if analysed from a cultural point of view, brings out the role of social interactions in the definition of a medium, regardless of its commercial success (a failure is, in itself, "social"). The innovation, in fact, transcends the physical support to manifest itself, as I have already said above, in the social use that is made of such supports. This is what Carlo and Colombo argue, for instance, underlining precisely that the main feature that digitization offers to the media is that of detaching them from their supports. After a long-term definition of a medium "on the basis of the connection between a certain technology, a certain language and certain conditions of use" (Carlo and Colombo 2007: 16, my translation), today, inevitably, the definition of medium refers only to some kind of social use. The proposal, the two scholars conclude, is to "consider a single

medium, in a given historical period, as a momentary balance between a multiplicity of social dimensions, which go beyond the medium itself, but also shape it and are in turn lively" (17, my translation). These social dimensions seem to be best expressed by the algorithmic architecture of the medium. Quoting Manovich again, "for users who only interact with media content through application software, the 'properties' of digital media are defined by the particular software as opposed to solely being contained in the actual content" (Manovich 2013: 152). Many studies have followed this path, as Galloway's reflections on the protocol (Galloway 2004) and the interface (Galloway 2012), and those of Chun on the relationship between new media and habit linked to old media (Chun 2016). This framework reveals to be useful, as we will see, in the analysis of VR audio.

3   VR: Where Sound and Software Studies Converge

The attention, in the contributions cited, is to the role of software in defining the aesthetics and interaction methods of contemporaneity. Software defines the visual culture in the double sense of a social shaping of technology and, we could say, of a technological shaping of society, as technology and society are both expressions of a temporally and geographically situated culture. To this regard, by updating and developing Gibson's studies (1979), the affordances of the algorithm and its impact on the filmic experience seem to have both a technological and a social matrix, where both aspects contribute to defining contemporary aesthetics. This is particularly true in the case of VR: to examine the affordances that differentiate these technologies from physical reality may be a valid approach to understanding why users adopt these technologies, wondering, therefore, "whether the historical floundering of virtual and augmented applications has partly been due to a failure to understand the natural affordances of these technologies" (Steffen et al. 2019: 723).

The problem seems to be reconfigured in the environmental and 'ecological' conception of the screen proposed by screen studies, in which "a screen is always part of a screenscape [...] aimed at offering a mediation with the world and the others thanks to both the images that it hosts and its very nature of site" (Casetti 2019: 46). The device is here reconceptualised as an even more interactive interface: In this sense, VR is both an object of study and a heuristic tool, which in the final chapter will be developed as such. Software studies, to this extent, seem to share the same, so to speak, "culturological" matrix, with another line of study that is particularly relevant to our object of study, and on which it is perhaps necessary to dwell for questions of method; that of the so-called sound studies.

Many scholars have headed in this direction, often systematically (Sterne 2012). Frequent is the reference to the notion of "relational space," coined by Scott McQuire to emphasize the role of the media in changing the contours of everyday experience and social space, making it variable and contingent (McQuire 2008); this relational aspect of sound, and sound media, is already a first important sign of contact with the software perspective, suggesting how both perspectives may converge. We may retrace the same convergence also in the reference to Henri Lefebvre (1974), who from a constructivist point of view coins the notion of "lived space," which is experienced through the images and symbols associated with it, or to the studies on soundscapes by Robert Murray Schafer (1977), whose book *The Tuning of the World* is almost a kind of manifesto in this field. Sound studies, like software studies, re-evaluate the device in a cultural and relational sense (as recently film studies tend to do, as well).

Spatial audio debate shares the same theoretical issues. Moving on to our case study, indeed, Parisi shows how the effectiveness of virtual experience depends on how the constraints and possibilities of human bodies are respected: the higher virtual and physical experience are tuned, the higher is the illusion of presence in the virtual world. As the author writes, "thanks to the media we are able to transcend the limits imposed by our biology. We do this every day when we wear glasses to see better; when we see the surface of the moon thanks to the use of powerful telescopes; when we deal with images as if they were real alternative worlds" (Parisi 2020: 90, my translation). Bodily syntonisation stresses the importance of the acoustic side of virtual experience, against the mere visual one. Frameless vision, in fact, seems to be phenomenologically less important than actively exploring the environment by using the body as an interface. To quote Parisi again

> the current limitations to the transparency of virtual reality are attributable to technical and de-
> sign limits which [...] could be reduced simply by considering the phenomenological characteris-
> tics that characterize the embodied experience. Since the body is the first mediator, we cannot

conceive of a virtual experience if not starting from what we are used to in normal ecological behaviour (97, my translation).

Total transparency, the author concludes, "appears impossible, but I would also add useless" (97, my translation). This transparency therefore seems to bring out the device, and this is the contradiction and the one of the main theoretical interests of VR. Here, moreover, VR reveals to be strictly connected to the Early Cinema, that is, to a certain type of cinema of attractions that re-evaluates the device as the very object of the filmic experience. In this sense, VR becomes, as Oppedisano (2020) defines it, a "paradigm for the knowledge of cinema culture" (115).

In this sense, the concept of "space for action," as developed by Colombo and Eugeni (1996), reveals to be useful. The two scholars distinguish the explicit space, which is seen on the screen when we act on it, from the implicit one, which is not seen when we look at the screen (or listen to the audio, we might add), but can become visible (or audible) if we perform certain actions in the explicit space. The space of perception-action is only the explicit space, where the implicit one is a space of possible action. The anchoring of the POV (and the POL) to a physical support, be it fixed or mobile, far from the being a limit, constitutes in this sense a necessary precaution to avoid getting lost in the space that we strive to consider 'real'. Moreover, as Gaudreault and Marion argue, every interactivity is intimately illusory (2013: 38-42), a contradiction that the very concept of virtual reality, as Maldonado points out (1994), express. The virtualization of reality, according to Maldonado, presupposes a series of questions about the materiality of reality and the immateriality of the virtual. The case of audio recordings, in this sense, may configure a philosophical and epistemological dilemma, as it entails a different integration between real and virtual experiences. Today, "technology is increasingly incorporated into the everyday fabric; it is transparent, wearable and ubiquitous, and therefore the poles of the man-machine union appear no longer dissociable but seem to form a new unit in continuous evolution" (Dalpozzo, Negri and Novaga 2018: 8). Dalpozzo (2018), in this sense, proposes a core question: should the current "early" virtual reality be considered only a form of playful entertainment? It is clear, to sum up, how the strong orientation towards the viewer, typical of the cinema of "attractions," re-emerges in VR cinema. Both devices, we may add, share the same purpose to educate audiences to a new image, characterized by an "attractive" aesthetics, which find a new ethical dimension in some contemporary productions. The same thing applies to audio, if we take up Chion's suggestion to overturn the relationship between audio and video within the cinema, where the concept of "'natural harmony' between sounds and images" is always questioned by the postproduction process (2019: 98). The author reminds us that the 'audiovisual contract' (a notion which could be extended to any audiovisual medium) is "a kind of symbolic contract that the audio-viewer enters into, consenting to think of sound and image as forming a single entity" (Chion 2019: 249).

The relationship between sound and image is therefore not one of harmony, but of mutual contamination. The same 'contractual' concept of cinematic audio can be operated for audio in VR, for which perhaps a media-archaeological perspective can be equally relevant. The questions raised by Arcagni in "The Eye of the Machine" (namely in the chapter "The Virtual Eye") could be overturned, to this extent, in "The *Ear* of The Machine." Does the machine hear? What does it feel? What does it allow humans to feel? And above all, an enigma that would fascinate Chion: to what extent is its "ear" dependent, somehow, on its "eye"? Here too, the relationship between the two senses, and between the production and reproduction technologies connected to them, is as old as cinema itself.

"Is there the possibility of achieving, as far as sound is concerned, a result similar to that already achieved for light with photography?" This was the question raised, in 1857, by the worker-typographer Èdouard-Léon Scott de Martinville (Coeuroy 1929: 13, my translation), who went down in history for having invented the Phonautograph, the first device capable of recording sound. In the mid-nineteenth century, the chase game between sound and photo-cinematographic experiments, that will characterize the following decades, was already at work. This tension still reverberates today, with the new VR devices. Nevertheless, when the first recordings of the human voice began to circulate for international fairs, they shocked audiences just like moving images did, if it is true, as Coeuroy reports, that at the first presentation of Edison's phonograph, on 11 March 1878 at the Academie des Sciences in Paris, the representative Puskas was accused by the academic Bouillaud of ventriloquy (Coeuroy 1929: 26).

Initially, the phonograph was initially conceived as an alternative to the typewriter in corporate communi-

cations, so much so that it met with firm resistance from stenographers (Steffen 2005). Yet, already in 1878, in his volume dedicated to "radio microphones and phonographs," Count Theodor du Moncel, complaining about the limits of the machine, hoped for its use in the musical field: "if it were possible to reproduce at will a concert by the famous Adelina Patti, what a precious instrument the phonograph would become!" (du Moncel 1880: 246, my translation). The author's desire manifests not only a desire of a musical nature, but also that of reviving what has already been lived, of creating what we could call a sound phantasmagoria: "the wax figures representing great men will not only be able to render a faithful image of one's features, but also to make them speak, and the illusion will be complete" (du Moncel, 1880: 246-247, my translation). Edison's phonograph, therefore, like the cinema, satisfied and at the same time stimulated the desire not only to preserve and revive a simulacrum of reality, but also and above all to make it relive anytime and anywhere.

It is therefore not surprising that Edison himself, presenting his Kinetoscope in 1894, clearly declared that he wanted to "do for the eye what the phonograph did for the ear" (Edison 1888). An important point emerges here: at the origin of the two phenomena of sound and visual recording there is a substantial production convergence, aimed at filling the hunger for sounds and images that characterized the growth of mass society. In a famous image of the Black Maria studio, built by Edison and William K. L. Dickson in New Jersey to produce films for the Kinetoscope, in front of the set we find a compresence of a Phonograph and a Kinetoscope (Meeker 1894): this representation is involuntary emblematic of a triangulation between an old studio, in the background, and the new forms of technical reproducibility, in the foreground. The first is illuminated with natural light, the second are connected to each other through electricity; the same, on the other hand, that connects them to the surrounding space. In those studios, obviously, practices and professions will gradually diversify, but here we have a sort of primitive and incisive representation of a forced coexistence between two different media.

It is with this paraphernalia and with this scheme, we could say, that Edison was preparing to conquer Europe. *Dickson Experimental Sound Film* (1985), the very first experiment in this sense, proves to be particularly significant at the proxemic level. The violinist plays in the exact centre of the picture, and everything else is forced to adapt to his performance: the huge pavilion on the left, who tries to record it, the dancers, who dance it, and the off-screen operator, who tries to follow its rhythm. It was the first of a long series of experiments (Hébert 2007: 104), which in France culminated, in 1902, in Alice Guy's *chronomegaphone*, produced by Gaumont. As a rudimentary assembly of a gramophone and a cinema, the *chronomegaphone* was used in the so-called *phonoscènes*: beyond the technological amazement, these shows began to exercise a factual role in the diffusion of music (Keazor and Wubbena see them as the ancestors of the music videos) (2010). We will see, in the next chapter, how the experiments on VR audio seem to resume, to a certain extent, the same spirit of these pioneers, a comparison that reveals to be heuristically relevant. What is radically different is the technology, being the algorithmic architecture that lays beyond the device a cultural artifact like the device itself. Early film studies, software studies and sound studies, in the analysis of VR audio, are therefore forced, more than ever, to deal, and to constitute a new framework. This is the goal of the next two chapters.

4   Software Technologies for VR Audio Processing: Some Case Studies

From their very beginning, VR or 360˚ videos were expressly conceived for an immersive use on a visual level, trying above all to respond to the problems of stitching and parallax. For this reason, while many companies have developed the first cameras, and many video production studios have bought these devices and pushed them to their limits, few have taken audio into equal consideration. Today, according to the law of supply and demand, hardware and software companies are slowly adapting, revealing a need that is not only commercial but also cultural and perceptive (I have previously argued that film studies software studies, sound studies strongly converge on this point).

Audio in VR is variously defined with different expressions, sometimes confusingly – which is another typical problem of new media studies. We often talk indifferently of binaural, spatialized, spatial, reflected, spherical, 3D, VR, object-based and resonance audio, despite the attempts to distinguish the meaning of those terms (see, for instance, Fig. 1). More defined is the distinction between binaural, surround and stereo: recording audio for VR spatial applications audio needs binaural technologies, that is when different audio signals are sent to
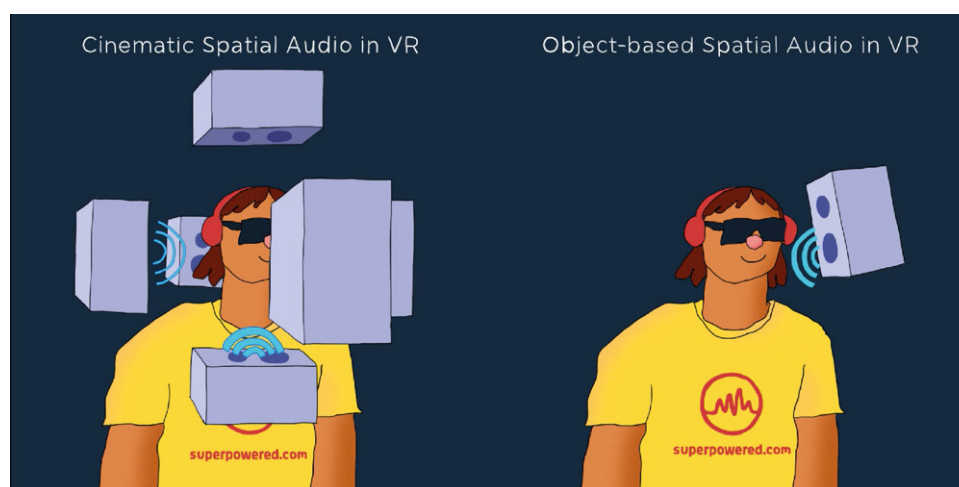
Figure 1. Audio VR scheme, divided into spatial and object-based ones (Source: https://superpowered.com/3d-spatialized-audio-virtual-reality)

each ear to create a three- dimensional sound field (or "spatial sound"). Stereo is unable to create a natural and complete three-dimensional sound field because it is only able to position audio left or right, close or far from its original sources. Surround sound creates a more immersive aural experience than the stereophonic one; at the same time, it is still locked to a fixed, two-dimensional virtual environment. And yet, between binaural and stereo audio there is an intimate connection: just as in the leap from mono to stereo, space can change a musical mix, as it allows clarity and composition of sonic elements in a new way, transforming — at least potentially — its impact. Binaural is therefore perhaps the most exact term, although its uses are not limited to the field of virtual reality: binaural audio replicates the functioning of the human auditory system, considering the impulse responses of the brain and the so-called HRTF (Head-related transfer function), that is, a response that characterizes how an ear receives a sound from a point in space. Human anatomy, in other words, plays a fundamental role in the way in which sound waves are perceived, decoded and analysed by the human brain.

The standard, in this sense, is the Ambisonics sound, to which all hardware and software devices seem to adapt. Ambisonics is very different from traditional Stereo and Surround techniques; instead of sending the signal to predefined speakers, it treats the sound as a sphere that develops around a centre, which could be as much the position of the microphone during shooting as the position of the listener during playback. Thus, the signal is not dependent on any number or configuration of channels. The advantage of this format is the possibility of recording and decoding, at a later time, the audio material in another format, to rotate the whole sound seamlessly. Avoiding sudden and perceptible passages from one speaker to another, this standard can adapt to the most disparate needs.

Ambisonics is an encoding format: its information could be generated both by software and by microphones (as it is in the case of VR cinema, for instance). The microphones that allow to record in Ambisonics adopt several capsules, able to cover the sound sphere not only around the horizontal axis, but also to film above and below the listener. This is a focal point, which reveals how the additional dimension of height is able to recreate the feeling of being truly immersed in the experience. This method of creating three-dimensional sound fields later allows the POL (that is, where the player is) to be modified to any spot. This feature is what makes binaural audio the privileged solution for VR.

The head, with its mass and its "bulk," ensures that a sound that reaches the left ear first takes a few microseconds before reaching the right ear. The same concern, we may observe, has always been observed in concert audio systems, where the delay (or latency) is calculated in order not to give the effect of reverberation. The real innovation of spatial audio, indeed, is that the two sounds are enjoyed by the same person at the same time, trying to replicate the functioning of the human hearing system. When recording and creating audio for

spatial applications like VR, AR, XR creatives have to take all the rules and techniques of stereo recording and rethink them in terms of spatial application and 3D development. This rethinking is necessary both to give a (virtual) reality effect and to avoid that mismatch between the visually and auditory perceived environment that can be physically annoying, and cause effects of perceptual distortion and, ultimately, nausea. There have been numerous efforts, in both hardware and software development, to overcome these limits, in order to create a realistic sound effect (that is, essentially, an environment where "you can hear what you see"). We might try to analyse some of them, in order to understand, in the conclusions, how the overcoming of the limits constitutes, itself, a limit, in which a redefinition and a remediation of the spectatorial perception is at stake.

For what concerns the microphones, we might take into account the Zoom H3-VR virtual reality audio recorder, which is suitable for live streaming, video conferencing and direct recording. The microphone Soundfield SPS200 adaptively aligns the phases of the four microphone elements, which is useful for controlling timbre of different objects in recordings, or to control the balance between different objects. The Ambeo VR Mic is especially designed for 360° spatial audio recording, an Ambisonics microphone fitted with four matched KE 14 capsules in a tetrahedral arrangement, which allows to get fully spherical Ambisonics sound to match your VR video/spherical 360 content. All these microphones allow to capture complete spherical audio from a single point in space: basically, they record exactly what a listener would hear if he or she was in that position. To record the Ambisonics signal correctly, with regard to position and level, sounds easy, but some care should be taken, as certain mistakes cannot be corrected during post-production. To augment the number of microphones simultaneously at work seems to be helpful in reducing those mistakes: Core Sound OctoMic, for instance, have up to nine directional microphones, whereas the Zylia ZM-1 microphone contains some 19 mic capsules to the 4-8 above. In this last product, the idea is not necessarily VR: the company itself suggests to use this technology to automatically separate sound sources through one single device. In other words, if someone puts the "ball" in a studio recording, the software will separate out drums, keys, and vocalist. The parallel with VR cameras, such as Facebook Volumetric VR Camera, is evident, and follows, even visually, the line of the 'audio-visual chase' traced in the pre-cinema and early cinema years.

Figure 2. Comparison between ZYLIA ZM-1 microphone and Facebook Volumetric VR Camera (Sources: https://audioxpress.com/article/r-d-stories-the-genesis-of-the-zylia-zm-1-and-next-generation-audio-recording)

From the point of view of software production, while relying on the aforementioned Ambisonics technology, a trade war seems to be recurring between Facebook and Google (VR and spatial audio, in this sense, are just two battlefields in the wider context of a Big Tech competition). On the first side we have Facebook 360 Spatial Workstation: it is an end-to-end pipeline that allows sound designers to drop in audio sources, pan and sync to scene elements, and render to a single Ambisonic file that is played back on Facebook and Oculus video. Originally developed by Two Big Ears, Facebook 360 Spatial Workstation is now a free tool provided by the Audio 360 team at Facebook. It is a collection of plugins for Digital Audio Workstations (DAWs) that includes, for instance, a spatialised audio player and and a loudness meter. These plugins seem to be a pivotal element in

the technological chain where social values are encoded, at the interface between manufacturers and users, as they help authors to create spatial audio content, to encode it with platform-specific metadata (for Facebook, YouTube, etc.), and to play it back in a client application. On its side, Google recently launched Resonance audio – Audio Factory (Google), an open-source multi-platform, in the wake of the Chrome Experiments showcase, for all the creatives and engineers who deal with sounds in three dimensions. Spatial audio, here, could be edited and added to 360-degree videos, VR games and ARcontents. Resonance Audio, in other words, is a Software Development Kit (SDK) aimed at the developer community, based on the VR Audio technology of the Mountain View group and designed to allow the creation of experiences characterized by a high level of user immersion, even on mobile devices such as smartphones, where the computing power guaranteed by the processor is often limited. It is available on GitHub and supports various platforms for augmented and virtual reality, configuring itself as a sort of software development kit related to the reproduction of 3D audio. The realism achieved by Resonance Audio is entirely based on the relationships between sound waves, human ears and the type of environment in which the sounds are reproduced. Within a VR scenario, Resonance Audio is able to associate a sound with a specific source. To achieve this goal, the physical laws through which our hearing is able to localize a sound have been implemented in software: more specifically, in Resonance Audio there is a reproduction of the inter-aural delay for localisation on the horizontal plane of low frequencies (between 20 and 2,000 hertz) and the inter-aural difference of intensity for the localisation of high frequencies (between 2,000 and 20,000 Hz). All of these variances in how our right and left ears hear a sound allow us in real life to determine things like distance, height, and where a sound is originating from. Interaural time difference, in turn, has to be put in relation with the filtering effect of the HRTF, that is, the filtering of a sound source before it is perceived at the left and right ears.

Other software technologies operate on the same level. The Ambisonics Toolkit, for instance, is a free spatial audio plugin, which brings together a number of classic and innovative tools for the artist working with Ambisonics surround sound (it can be used, for example, with the GoPro VR Player). Envelop for Live (E4L) is a free set of tools provided for musicians who aim to work with spatial audio production and live performances. IFFMpeg is a tool that allows to export different video types/codecs for different platforms attaching the spatial audio to the video (the act of mixing/merging of audio and video is called 'muxing'). Dear VR allows the users to mix immersive music, games, VR, AR and 360˚ video productions in a simulated DAW, supporting binaural, Ambisonics, and multi-channel loudspeaker output formats at once. Drops is built to provide a way for those with little or no musical background or training to create rich and expressive polyphonic rhythms. Tribe XR is a tool useful for learning to be a DJ in VR. G'Audio leverages object-based mixing for detailed placement of sound in a 3D environment, with a plug-in, G'Audio Craft, especially designed for gaming sonic experiences. Steam Audio is an audio package that can combine multiple occlusions, reflections, reverbs and effects (which, in turn, may work with other external software, like V-B Audio Voicemeeter Banana for Windows). Other plugins are available for audio or video production applications such as Avid, Première, Reaper, LiveSwitch. Other tools to create spatial music are are The Music Room (an expressive MIDI controller), Lyra VR (which allows to interact with 3D music sequences) and Electronauts - VR Music (an environment where one build, drop, remix and jam with friends and artists). Particularly relevant, for a comparison with the video technique, is GoPro Fusion Spatial Audio (GoPro rigs has been one of the first, most cheap and most used VR cameras, before the development of cameras such as Ricoh Theta, Kodak SP360, Giroptic 360cam, IC Real Tech Allie).

All of the apps mentioned amply demonstrate the potential of VR sound and music making, introducing creative tools that overcome old limits and generate new ones, where the two phenomena seem to be intrinsically connected. And yet, the feeling is that many of these ideas need to be honed and polished by creatives and professionals. Furthermore, many of the so called "innovations" seem to be intimately old, and connected to a 19th Century technological scenario. For instance, Ossic (formerly SonicVR) is developing the Ossic X, a highly sophisticated headphone in which every component — including head tracking — is designed for immersive 3D-audio playback. This algorithm, like others developed with Ambisonic audio codecs, synchronize the spatial audio channel with the head position, according to three combined parameters: dialogue with the viewer, integration of the viewer within the audiovisual fiction and three-dimensional simulation. Has cinema ever done anything else? Or, if we consider again Google's audio resonance patterns, we might see (Fig. 3) how the "bounce" patterns of sound frequencies are similar to those of light frequencies. Majkut's separation between

centre of orientation and *corner of orientation* seems to have, here, an emblematic representation, directly linking epistemological distinctions to software and hardware features. This epistemological clash entails a certain degree of complexity in the research on audiovisual immersion: beyond the apparent simplicity of the scheme proposed, indeed, Resonance Audio hides an obsessive attention to detail (the full project even consider and calculate the bounce of sound waves in the helix of the ear). It is precisely in this obsessive research for a fully immersive experience that VR technologies, both in the fields of video and audio production, turns out to be illusory and, as such, "non-immersive," as they constantly recall the ability of the device to "attract" through its technological features. From this consideration, I will try to sketch some similarities with early cinema practices in the next chapter, testing the framework proposed in the previous ones.

Figure 3. Resonance Audio SDK for Unity (Source:
https://forum.unity.com/threads/resonance-audio-sdk-for-unity-deliver-high-fidelity-spatial-audio-at-scale.503347/)

5   Conclusions

As we have seen, to compare moving images and spatial audio, just like *sound studies* attempted to do in the past decades, reveals to be fruitful, even the field of VR. Compared to traditional cinematic language, indeed, the difficulties that spatial images face are, in short, the absence of a hierarchy of plans and the impossibility of modulating the light environment without, for this, being forced to exhibit the apparatus. If this second aspect doesn't seem to be relevant from an audio perspective (where intradiegetic/non-diegetic distinction remains unchanged), the hierarchy of listening plans, on the contrary, seems to be a field in which engineers and creatives are jointly trying to work. Even only to decide whether to interact with a spatialized audio or not turns out to be a difficult question: taking into account the contribution of sound studies, as Paul Carter (2004) notes, "auditory space is durational, but it lacks music's (and writing's) commitment to linear development. Without a sense of ending, it is not located between silences" (59). What is the role, then, of spatial audio? Will it develop in a combination of directional music and non-directional audio? To what extent might the choice of a listening point be the responsibility of the spectator (or audience)? How much is that choice driven by the director, how much by software technologies, how much by the hardware devices?

The scenario seems indefinite, even more if, as we have tried to sketch, we consider the software as something which encloses a variety of products: protocols, plugins, proprietary coding systems (all these topics as been threated, as we have seen, by software studies). These products seem to be relevant for the values that they embed, the practices that they foster or that they are part of, in multiple and indefinite ways. It is precisely this indefiniteness that prompts us, both in the audio and in the video domain, to consider VR as a reconceptualization of our visual and auditory grammars of everyday life. We may see, as well, as those grammars are determined by a series of complementary and irreducible factors. In this complexity, we could say, the audiovisual aesthetics of the future is being and will be determined, at least potentially, by new media artists, which are bringing this expressive form to its structural limits. Spatial audio, therefore, seems to reveal, in the light of the case studies analysed, the importance of the devices and techniques, understood in a cultural and social sense, as determining factors with their own agency, and their own ideology: in this sense, as well, VR

may be intended in continuity with the history of cinema, and represents (or can be interpreted as) one of its multiple manifestations.

References

Andreoli, Marco (2018). "La realtà virtuale al servizio della didattica." *Studi sulla Formazione* 21: 33-56. https://doi.org/10.13128/Studi_Formaz-23090.

Amoruso, Giuseppe (2019). "Digital Technology for Knowledge, Design and Experiential Education for Culture." In *Digitalization and Cultural Heritage in Italy. Innovative and Cutting-Edge Practices*, edited by Fernando Salvetti and Antonio Scuderi, 12-22. Milano: Franco Angeli.

Arcagni, Simone (2020). *Immersi nel futuro. La realtà virtuale, nuova frontiera del cinema e della TV*. Palermo: Palermo University Press.

Arcagni, Simone (2018). *L'occhio della macchina*. Torino: Einaudi.

Basso, Alessandro (2020). *Ambienti virtuali per nuove forme di comunicazione*. Canterano: Aracne.

Battini, Carlo (2017). *Realtà virtuale, aumentata e immersiva per la rappresentazione del costruito*. Firenze: Altralinea.

Brinkman, Willem-Paul, Allart R. D. Hoekstra and René van Egmond (2015). "The Effect of 3D Audio and Other Audio Techniques on Virtual Reality Experience." *Studies in Health Technology and Informatics* 219: 44–48. https://doi.org/10.3233/978-1-61499-595-1-44.

Çamcı, Anil and Rob Hamilton (2020). "Audio-first VR: New Perspectives on Musical Experiences in Virtual Environments." *Journal of New Music Research* 49(1): 1–7. https://doi.org/10.1080/09298215.2019.1707234.

Carlo, Simone and Fausto Colombo (2007). "La digitalizzazione. Questioni strutturali." In *La digitalizzazione dei media*, edited by Fausto Colombo, 15-38. Roma: Carocci.

Carter, Paul (2004). "Ambiguous Traces, Mishearing, and Auditory Space." In *Hearing Cultures. Essays on Sound, Listening and Modernity*, edited by Veit Erlmann, 43–63. New York: Berg.

Casetti, Francesco (2019). "Primal Screens." In *Screen Genealogies. From Optical Device to Environmental Medium*, edited by Craig Buckley, Rüdiger Campe and Francesco Casetti, 27-50. Amsterdam: Amsterdam University Press.

Chion, Michel (2019). *Audio-Vision: Sound on Screen*. New York: Columbia University. 1st ed. (1990). *L'audiovision*. Paris: Nathan.

Chun, Wendy Hui Kyong (2016). *Updating to Remain the Same. Habitual New Media*. Cambridge, MA - London: The MIT Press.

Colombo, Fausto and Ruggero Eugeni. *Il testo visibile. Teoria, storia e modelli di analisi*. Milano: Carocci.

Coeuroy, André (1929). *Le phonographe*. Paris: Kra.

Cook, Matt, Zack Lischer-Katz, Nathan Hall, Juliet Hardesty, Jennifer Johnson, Robert McDonald and Tara Carlisle (2019). "Challenges and Strategies for Educational Virtual Reality. Results of an Expert-led Forum on 3D/VR Technologies Across Academic Institutions." *Information Technology and Libraries* 38(4): 25-48. https://doi.org/10.6017/ital.v38i4.11075.

Dalpozzo, Cristiano (2018). "Cinema e realtà virtuale, ovvero 'the early virtual (post)cinema of attractions'." In *Dalpozzo, Negri, Novaga 2018 (eds.)*, 87–106.

Dalpozzo, Cristiano, Federica Negri and Arianna Novaga (eds.) (2018). *La realtà virtuale. Dispositivi, estetiche, immagini*. Milano - Udine: Mimesis.

du Moncel, Théodose Achille Louis (1880). *Le microphone, Le radiophone et le phonographe*. Paris: Hachette.

Edison, Thomas Alva (1888). "Patent Caveat 110." West Orange, NJ: Edison National Historical Site Archives, 8th October.

Fletcher, Connor, Vedad Hulusic and Panos Amelidis (2019). "Virtual Reality Ear Training System. A study on Spatialised Audio in Interval Recognition." In *11th International Conference on Virtual Worlds and Games for Serious Applications (VS-Games)*. https://10.1109/VS-Games.2019.8864592.

Galloway, Alexander R. (2004). *Protocol. How Control Exists after Decentralization*. Cambridge, MA: The MIT Press.

Galloway, Alexander R. (2012). *The Interface Effect*. Cambridge, MA: Polity.

Gamper, Hannes and Tapio Lokki (2010). "Audio Augmented Reality in Telecommunication through Virtual Auditory Display." In *The 16th International Conference on Auditory Display (ICAD-2010)*, 63–71. http://hdl.handle.net/1853/49841.

Gaudreault, André and Philippe Marion (2013). *La fin du cinéma? Un média en crise à l'ère du numérique*. Paris: Armand Colin.

Gibson, James J. (1979). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Hébert, François (2007). *Dans le noir du poème: les aléas de la transcendence*. Montréal: Fides.

Jung, Timothy et al. (2020). *Augmented Reality and Virtual Reality. Changing Realities in a Dynamic World*. New York: Springer International Publishing.

Keazor, Heazor and Thorsten Wübbena (2010), *Rewind, Play, Fast Forward. The Past, Present and Future of the Music Video*. Bielefeld: Transcript Verlag.

Kern, Angelica C. and Wolfgang Ellermeier (2020). "Audio in VR: Effects of a Soundscape and Movement-Triggered Step Sounds on Presence." *Front. Robot. AI*, 21st February. https://doi.org/10.3389/frobt.2020.00020

Kim, Hansung, Luca Remaggi, Philip J.B. Jackson and Adrian Hilton (2019). "Immersive Spatial Audio Reproduction for VR/AR Using Room Acoustic Modelling from 360˚ Images." In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, 120–126. https://doi.org/10.1109/VR.2019.8798247.

Lanier, Jaron (2017). *Dawn of the New Everything. Encounters with Reality and Virtual Reality*. New York: Henry Holt and Company.

Lefebvre, Henri (1974). *La production de l'espace*. Paris: Anthropos.

Luigini, Alessandro and Chiara Panciroli (2018). *Ambienti digitali per l'educazione all'arte e al patrimonio*. Milano: Franco Angeli.

Majkut, Paul (2014). *Smallest Mimes. Defaced Representation and Media Epistemology*. Bucarest: Zeta Books.

Maldonado, Tomás (1994). *Lo Real y Lo Virtual*. Barcelona: Gedisa.

Manovich, Lev (2013). *Software Takes Command*. London - New York: Bloomsbury.

Manovich, Lev (2001). *The Language of New Media*. London - Cambridge, MA: The MIT Press.

March, Ramiro Javier (2001). "Information, image, réalité virtuelle et réalité." *Archeologia e Calcolatori* 12: 275–305.

McQuire, Scott (2008). *The Media City. Media, Architecture and Urban Space*. Los Angeles: Sage.

Meeker, Edward (1894). "Century Magazine Interior of the Kinetographic Theater." Orange, NJ: Edison's Laboratory, 1st June.

Nau, Jeffrey R. (2019). *Virtual Realities in Archaeology. Employing the Oculus Rift for Artifact Visualization and Education*. Master's Theses. Kalamazoo, MI: Western Michigan University.

Oppedisano, Federico Orfeo (2020). "Le strategie immersive del cinema tra attrazione e narrazione." In *Rossi 2000*, 103–118.

Parisi, F. (2020). "La sintonia sensomotoria nella realtà virtuale." *Reti, saperi, linguaggi. Italian Journal of Cognitive Sciences* 1: 85-102. https://doi.org/10.12832/98420.

Rivette, J. (1961). "De l'abjection." *Cahiers du cinéma* 120: 54–55.

Rossi, Daniele (2020). *Realtà virtuale. Disegno e design*. Canterano: Aracne.

Rovithis, Emmanouel et al. (2019). "Bridging Audio and Augmented Reality towards a new Generation of Serious Audio-only Games." *Electronic Journal of e-Learning* 17: 144-156. https://doi.org/10.34190/JEL.17.2.07.

Rovithis, Emmanouel et al. (2019). "Audio Legends: Investigating Sonic Interaction in an Augmented Reality Audio Game." *Multimodal Technologies Interact* 3(73). https://doi.org/10.3390/mti3040073.

Schafer, R. Murray (1977). *The Tuning of the World*. New York: Random House Inc.

Steffen, David J. (2005). *From Edison to Marconi. The First Thirty Years of Recorded Music*, London: McFarland & Co.

Steffen Jacob H, James E. Gaskin, Thomas O. Meservy, Jeffrey L. Jenkins and Iopa Wolman. (2019). "Framework of Affordances for Virtual Reality and Augmented Reality." *Journal of Management Information Systems* 36(3): 683-729. https://10.1080/07421222.2019.1628877.

Steincke, Frank (2016). *Being Really Virtual. Immersive Natives and the Future of Virtual Reality*. New York: Springer.

Sterne, Jonathan (ed.) (2012). *The Sound Studies Reader*. London - New York: Routledge.

van Helvoort, Daniël, Emil Stobbe, Richard Benning, Henry Otgaar and Vincent van de Ven (2020). "Physical Exploration of a Virtual Reality Environment. Effects on Spatiotemporal Associative Recognition of Episodic Memory." *Memory & Cognition* 48(4): 691–703. https://doi.org/10.3758/s13421-020-01024-6.

Raffaele Pavoni – University of Florence (Italy)

✉ raf.pa53@gmail.com

Raffaele Pavoni earned a PhD in Storia delle Arti e dello Spettacolo, at the University of Florence. The topic of his doctoral research is Italian music videos contemporary production and consumption. In his work, based on ethnographic analysis and market data, he tried to draw the actual institutional framework of music videos, and to understand how their transition to the web has changed the relation between audience, directors, music labels and software houses. Actually, he is studying the representations and self-representations of migrants in the old and new media, with a research project that intertwines film studies and visual anthropology.