Phenonarratology and Cinematic Virtual Reality: A Phenomenological and Analytical Approach to Embodied Viewing and the Changing Sensory Scope

Introduction

Virtual reality film viewing has gathered immense popularity in the general public, which is demonstrated by the increased accessibility of VR display devices and the rising number of 360-degree films—some of which are presented at film festivals or made by renowned filmmakers. Cinematic virtual reality, a sub-genre of virtual reality entertainment, employs stereoscopic view, which distinguishes it from cinema as well as a set of pre-rendered images and sound, which distinguishes it from other types of virtual reality experiences, for instance, gaming.[1]

Besides these attributes, the novelty of cinematic virtual reality lies in the fact that spectatorship engages a viewer's body as its position defines access to the surrounding simulated space. In other words, perceiving moving-image content is based on the momentary perspective and the body's biomechanical parameters, which are directly responsible for comprehending spatial relations and activating motor functions. Such embodied involvement in defining a subjective viewing experience likely increases engagement with a film narrative compared to screen-based watching, while it entails different cognitive processes, such as evaluation and decision-making: consciously or unconsciously, a viewer evaluates her access to narrative information and makes decisions about changing the visual perspective by turning her head or body.

Although its use is widely proclaimed in entertainment, education, and healthcare (e.g. for mental health treatments), virtual reality is still often associated with technological amazement and physical discomfort, for instance, cybersickness. This can make it a demanding task for viewers to establish and maintain engagement with a 360-degree film for an extended time. This problem calls for phenomenological, behavior-based, and analytical approaches to cinematic virtual reality. Using such an interdisciplinary approach, this paper offers methods for analyzing the role of a viewer's body as an instrument to coordinate interaction, perception, and the overall narrative experience. This approach is grounded in the embodied nature of viewing experiences: the body's control of the sensory perspective of the simulated space in which a film narrative appears.

Changes of sensory perspective are based on spatial and bodily contingencies and narrative context: the narrative of a 360-degree film serves as a base for emotional engagement and a contextual catalyst for interaction. Therefore, I examine interaction and narrative experience of cinematic virtual reality by combining phenomenological and narrative analytical premises into what I call the *phenonarratology* model. The model enables studying spectatorship on viewing platforms where viewers' bodies mediate the sensory spectrum.[2] Therefore, it allows for an overview of cinematic virtual reality's interactive capacities and the phenomenological experience of momentarily

[1] John Mateer, "Directing for Cinematic Virtual Reality: How the Traditional Film Director's Craft Applies to Immersive Environments and Notions of Presence," *Journal of Media Practice*, no. 1 (2017).
[2] The phenonarratology model was initially developed for smartphone movie or video spectatorship, but is applied for the case of cinematic virtual reality in this paper. Kata Szita, *Smartphone Cinematics: A Cognitive Study of Smartphone Spectatorship* (Gothenburg: University of Gothenburg, 2019).

defining the sensory scope through which a viewer accesses narrative information. Using the phenonarratology model, I aim to lay the foundations for an effective theoretical framework to study multi-layered viewing experiences and offer a base for assessing the ecological and cognitive aspects of moving-image spectatorship in immersive environments.

In the existing corpus of research focusing on virtual reality simulation—and especially cinematic virtual reality—factors that catalyze decisions for motor intervention are principally credited to the features of virtual environments or the characteristics of visual and sonic stimuli, such as brightness or volume.[3] This technologically oriented approach points to relevant factors in terms of virtual reality storytelling and generating engaging mediated environments.[4] However, the dominance of these inquiries marks a shortage of scholarship focusing on mental and motor processes, even though the decisions for turning one's body or head or moving attention toward elements outside of the momentary visual spectrum can signify complex cognitive processes. Hence, I begin this study of cinematic virtual reality by outlining the basic theses of 360-degree simulation, interactive spectatorship, and a viewer's embodied presence that define the parameters of experiencing a film in the moment. Then, I apply these to the framework of phenonarratology to reflect on the malleability of the sensory scope and its effects on subjective narrative experiences.

Immersive Viewing Experience: Observing and Interacting

Viewing experiences in cinematic virtual reality are characterized by two sets of mental activities: observing and interacting. A viewer observes objects, characters, and narrative events in the surrounding 360-degree space, where the momentary position of her body provides a frame for visual and auditory information.

Being in the center for observing figures and actions induces a strong sensation of occupying the fictional space. This sense of presence develops because sensory access to physical environments is masked while the body gains agency as its movement and the outcome of these moves correspond to real-life actions. For instance, turning one's head shifts the sensory scope of virtual stimuli much the same way as it would in a physical space. In addition to the torrent of 360-degree sensory stimuli and bodily control, the sense of presence while observing an audiovisual (film) narrative in virtual reality is catalyzed by the quality or fidelity of the simulated environment. Theoreticians of immersive media largely agree on this idea, claiming that the affective quality of a stimulus mentally immerses viewers or users into a fictional space simply by occupying the visual and auditory scope and offering bodily control.[5]

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[3] James J. Cummings and Jeremy N. Bailenson, "How Immersive Is Enough? A Meta-Analysis of the Effect of Immersive Technology on User Presence," *Media Psychology*, no. 2 (2016); Mel Slater and Sylvia Wilbur, "A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments," *Presence: Teleoperators and Virtual Environments*, no. 6 (1997).

[4] See Kath Dooley, "Storytelling with Virtual Reality in 360-Degrees: A New Screen Grammar," *Studies in Australasian Cinema*, no. 3 (2017); Mateer, "Directing for Cinematic Virtual Reality."; Giuseppe Riva, "Virtual Reality for Health Care: The Status of Research," *Cyberpsychology, Behavior, and Social Networking*, no. 3 (2002); Christian Roth, Tom van Nuenen, and Hartmut Koenitz, "Ludonarrative Hermeneutics: A Way out and the Narrative Paradox," in *Proceedings of the 11th Internat. Conf. on Interactive Digital Storytelling*, ed. Rebecca Rouse, Hartmut Koenitz and Mads Haahr (Dublin: Association for Research in Digital Interactive Narratives, 2018).

[5] Cummings and Bailenson, "How Immersive Is Enough?."; Slater and Wilbur, "A Framework for Immersive Virtual Environments (FIVE)."; Bob G. Witmer and Michael J. Singer, "Measuring Presence in Virtual Environments: A Presence Questionnaire," *Presence: Teleoperators and Virtual*

A viewer's sensation of presence in an artificially created space applies to several forms of virtual reality experiences. Yet, I argue that such a simulation-based account is incomplete in the case of cinematic virtual reality because of two reasons. Firstly, it fails to account for social factors, and secondly, it neglects narrative context.[6] Social and narrative elements include, for instance, empathizing with fictional characters and comprehending the functions of and interrelations between characters and objects. Thus, this question calls for an analytical discourse, a contextual angle, to consider viewers' comprehension not only of a fictional space and its spatial relations, but also narrative goals, actions, characters' motivations, and their relations. This prompts an entry to narrative engagement and comprehension through interactive viewing.

In moving-image spectatorship, content, percept, and context intertwine as a viewer immerses herself in a fictional world. This goes beyond the epistemic honesty of movies and video recordings, which are capable of presenting a fictional reality in the form of sensory truth. It points even to the contextualization of narrative actions, the mental process of organizing pieces of sensory information according to their meaning. By offering contexts for actions, characters, and objects, a moving-image narration can *transport*[7] or *absorb*[8] a viewer into a logically coherent sphere, which momentarily supersedes the rules of the physical world.[9]

In *Experiencing Narrative Worlds*, Richard Gerrig aptly labels this phenomenon narrative transportation, which he uses to describe written literature, but which is equally applicable to any form of storytelling—film among them.[10] Beholders of audiovisual stimuli achieve the sensation of being transported into a fictional world by establishing ecological and emotional connections with the space and its characters. The process and outcomes of narrative transportation resonate with the provisions of the *diegetic effect* generated by moving images.[11] Noël Burch's diegetic effect theory assumes a viewer's identification with a fictional space and emotional engagement with actions and characters, but only if one has access to the necessary semantic cues and pays continuous attention.

Access to narrative information is inherently impaired in cinematic virtual reality due to the limited and constantly changing sensory scope of the 360-degree space. This limited sensory scope stands in opposition to the immersive quality of simulation. Such a paradox of control and presence points to the conflict between embodied involvement and engagement: while a viewer's body, its narrative agency, and the overall multisensory film experience are assumed to positively affect the sensation of presence and engagement with a narrative,[12] constant interactions may impair

Environments, no. 3 (1998).

[6] Wijnand A. IJsselsteijn et al., "Presence: Concept, Determinants and Measurement," in *Proceedings of Human Vision and Electronic Imaging*, ed. Bernice E. Rogowitz and Thrasyvoulos N. Pappas (San José: SPIE: The International Society for Optical Engineering, 2000).

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

[8] Katalin Bálint and Ed S. Tan, "'It Feels Like There Are Hooks inside My Chest': The Construction of Narrative Absorption Experiences Using Image Schemata," *Projections*, no. 2 (2015).

[9] See Tom van Laer et al., "The Extended Transportation-Imagery Model: A Meta-Analysis of the Antecedents and Consequences of Consumers' Narrative Transportation," *Journal of Consumer Research*, no. 5 (2014).

[10] For movies, see, for instance, Matthew A. Bezdek et al., "Neural Evidence That Suspense Narrows Attentional Focus," *Neuroscience* (2015); Matthew A. Bezdek and Richard J. Gerrig, "When Narrative Transportation Narrows Attention: Changes in Attentional Focus During Suspenseful Film Viewing," *Media Psychology*, no. 1 (2017).

[11] Noël Burch, "Narrative/Diegesis—Thresholds, Limits," *Screen*, no. 2 (1982).

[12] See Cummings and Bailenson, "How Immersive Is Enough?."; Slater and Wilbur, "A Framework for

narrative comprehension or at least produce a different contextual understanding than what was intended by content producers.

Interaction with a virtual environment while watching a 360-degree film typically manifests itself in head or full-body movements, which change the content of visually available information and the direction of sound effects. Interactions are limited to the choice of visual angle—in most cases, neither the body's position in the three-dimensional space nor the timeframe of the screening can be altered. This latter point is crucial in terms of narrative engagement: a story unfolds only once, so certain pieces of information that are presented "behind one's back" are missed.[13] This leads to two key threads that must be followed before I turn my attention to the viewer's body: the motivations and outcomes of interaction.

Interaction by turning one's head or body originates from internal or external motivations. The former reflects on mental processes and reactions based on curiosity, boredom, or other factors. The latter category includes interactions initiated by narrative or sensory cues presented in the image or soundtrack of a movie. The difference between interactions prompted by personal reactions and pre-constituted stimuli marks a pivotal question, which is largely neglected in cinematic virtual reality scholarship.

Studies that deal with narrative experience focus predominantly on storytelling and pay little attention to how a story is perceived. Taking a closer look at cognition and narrative comprehension can remedy this limitation. According to a constructivist premise of film narration, spectatorship can be explained in terms of combining details presented on film and one's knowledge to predict upcoming actions.[14] This suggests that viewers evaluate incoming information and draw conclusions from the attributes of a given object, character, or action presented explicitly or implicitly.

For instance, when a film's hero is seen pointing a gun at someone, the viewer anticipates the act of pulling the trigger, the trajectory of the bullet, and the outcome of the shot. If this scene is presented in a 360-degree space, it is possible that moving one's attention from the character with the gun to the target requires head or body movements; that is, the two characters are shown standing on two opposite sides of the point of observation (camera). If we assume that the viewer turns her head as the result of internal motivations, the scenario of watching this particular scene appears as follows: she anticipates the direction of the bullet and turns her head or body to see whether there is a target character and is hit. In the case of external factors, we can attribute her reaction to storytelling elements, for instance, a sound or visual effect that reveals the bullet's motion or indicate the location of impact in the 360-degree space.

Classifying the motivations for interactions supports quantifying cognitive engagement with 360-degree films, more specifically, attention patterns and narrative

Immersive Virtual Environments (FIVE)."

[13] See also Hannah Syrett, Licia Calvi, and Marnix van Gisbergen, "The Oculus Rift Film Experience: A Case Study on Understanding Films in a Head Mounted Display," in *Proceedings of The International Conference on Intelligent Technologies for Interactive Entertainment*, ed. Ronald Poppe et al. (Utrecht: Springer, 2016); Kata Szita, Pierre Gander, and David Wallstén, "The Effects of Cinematic Virtual Reality on Viewing Experience and the Recollection of Narrative Elements," *PRESENCE: Virtual and Augmented Reality*, no. 4 (2021).

[14] See, for instance, Edward Branigan, *Narrative Comprehension and Film* (London: Routledge, 1992); David Bordwell, *Narration in the Fiction Film* (London: Methuen, 1985); Torben Grodal, "Emotions, Cognitions, and Narrative Patterns in Film," in *Passionate Views: Film, Cognition, and Emotion*, ed. Carl Plantinga and Greg M. Smith (Baltimore: The John Hopkins University Press, 1999), 127–145; Torben Grodal, *Embodied Visions: Evolution, Emotion, Culture, and Film* (Oxford: Oxford University Press, 2009).

transportation. This differentiation leads me back to the paradoxical constellation of the sensation of presence and the limited sensory scope.

The ontological constraints of cinematic virtual reality and the biological capacities of the human body enable an approximately 180-degree angle view of the image at any moment, while a viewer perceives even those sonic stimuli that originate outside of her visual scope. Due to the specificities of human vision, each head or body movement presents the viewer with a new range of stimuli to which attention can be paid, and, consequently, those that fall outside of the sensory scope.

While interactions limit the scope of visual attention, spatialized sound can provide narrative information: some sounds lack visual references but can compensate for the deficits in perceiving visual information by evoking associations through semiotic references. The detachment of sound from image facilitates cognitive processes using memories of real-life experiences and preceding encounters with films.[15] These associations create links between the features of objects and characters and their functions or narrative meanings. The process involved in integrating and interpreting multimodal narrative information helps clustering narrative elements into prototypes according to their material, social, and emotional characteristics, even if information about them is incomplete. This means that associations and mental clustering of narrative elements—even if selectively accessed—may be able to compensate for the missing information. Nonetheless, the subjective nature of mental clusters can affect comprehension and they also likely induce changes in the visual scope and idiosyncratic attention patterns.

Involving the Viewer's Body

In line with the discussion above, during virtual reality spectatorship, a viewer's body is involved both in defining the sensory scope and perceiving audiovisual information. Whereas the former is the obvious consequence (and one of the most important features) of virtual reality simulation, the latter is inherent to neural processes of subjective experiences, which implies embodied presence in spectatorship. The role of the viewer's body in perception and cognitive processing while watching movies is subjected to the processes responsible for receiving, recognizing, and reacting to others' actions and contextualizing the position and functions of objects. These processes are addressed in neurocognitive research: while discussing the theory of embodied simulation, Vittorio Gallese and colleagues state that a viewer perceives narrative actions and diegetic objects as if they are happening or located in her physical surroundings.[16] In addition, a viewer is capable of anticipating upcoming and inferring past actions by "mirroring" characters' mental state.[17]

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[15] Kathrin Fahlenbrach, "The Emotional Design of Music Videos: Approaches to Audio-Visual Metaphors," *Journal of Moving Image Studies*, no. 1 (2005); Kathrin Fahlenbrach, "Emotions in Sound: Audiovisual Metaphors in the Sound Design of Narrative Films," *Projections*, no. 2 (2008); Szita, *Smartphone Cinematics: A Cognitive Study of Smartphone Spectatorship*.

[16] Vittorio Gallese, "Embodied Simulation: From Neurons to Phenomenal Experience," *Phenomenology and the Cognitive Sciences*, no. 1 (2005); Vittorio Gallese and Corrado Sinigaglia, "What Is So Special About Embodied Simulation?," *Trends in Cognitive Sciences*, no. 11 (2011); Vittorio Gallese, "Bodily Selves in Relation: Embodied Simulation as Second-Person Perspective on Intersubjectivity," *Philosophical Transactions of the Royal Society B: Biological Sciences* 369, no. 1644 (2014).

[17] Vittorio Gallese and Alvin Goldman, "Mirror Neurons and the Simulation Theory of Mind-Reading," *Trends in Cognitive Sciences*, no. 12 (1998); Vittorio Gallese, "The Manifold Nature of Interpersonal Relations: The Quest for a Common Mechanism," *Philosophical Transactions of the Royal Society B: Biological Sciences*, no. 1431 (2003).

Embodied simulation entails the correspondence between acting and sensing, even when observing fictional characters. From a cultural-evolutionary angle, this even implies that an observed body—in many cases—has phenomenological similarities to the beholder's own body and the human (primate) emotional map, which promotes the understanding of others' actions. This leads to the process in which a beholder imagines herself in a character's position and observes and senses the diegetic world through such an affective channel. Hence, she experiences a virtual reality diegetic space by perceiving a character's position in relation to her own and sensing the elements of the diegetic space as if those belonged to her environment.

Embodiment as a strategy for constructing meaning is widely addressed in film and media theoretical and experimental research, too.[18] Whereas Laura Marks and Vivian Sobchack treat embodiment as the affective presence of a viewer's body in relation to a visually and sonically depicted space, for Miklós Kiss and Steven Willemsen it plays a role in a problem-solving activity. Although the former approach employs phenomenology and the latter embraces a clearer cognitive mindset, the two coincide in defining engagement with audiovisual narration: both approaches accept the existence of mental presence in an imagined (fictional) space, which is, again, a fundamental premise of the aforementioned neuroecological and neurophenomenological theses of narrative comprehension illustrated by the embodied simulation theorem. This serves as a basis for understanding virtual reality viewers' embodied involvement in shaping narrative presentation.

The correspondence between the movements of a physical body and the point of observation creates a strong sensation of embodied presence in the case of cinematic virtual reality. Therefore, considering the link that connects the physical and virtual body is crucial for understanding how a viewer observes a narrative space in cinematic virtual reality. 360-degree films have various ways of representing an observing agent. Frequently, a viewer is an independent observer with no represented body (for instance, in *The Calling*[19]). In other cases, one takes a position in a darkened segment of the space (such as audience in a theatre) looking toward the illuminated objects and characters (e.g. *Back to the Moon*[20]). In yet other cases, such as of *Miyubi* (fig. 1),[21] the viewer observes the diegetic space from the viewpoint of a particular object—in *Miyubi*, a robot—with specified features, size, and perspective.

Miyubi, one of the earliest examples of cinematic storytelling in virtual reality, presents the life of an American family over the course of a year through the eyes of Miyubi. Miyubi is a Japanese toy robot, a gift for the ten-year-old Denis that interacts with people by answering simple questions, and—more importantly—witnesses the struggles of the family members and records their occasional testimonies about everyday life and the future of society.

[18] For instance, Maarten Coëgnarts, "Cinema and the Embodied Mind: Metaphor and Simulation in Understanding Meaning in Films," Article, *Palgrave Communications* 3 (2017); Adriano D'Aloia, "Upside-Down Cinema: (Dis)Simulation of the Body in the Film Experience," *Cinema: Journal of Philosophy and the Moving Image* (2012); Miklós Kiss and Steven Willemsen, *Impossible Puzzle Films: A Cognitive Approach to Contemporary Complex Cinema* (Edinburgh: Edinburgh University Press, 2017); Laura U. Marks, *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (Durham: Duke University Press, 2000); Vivian Sobchack, *Carnal Thoughts: Embodiment and Moving Image Culture* (Berkeley: University of California Press, 2004).

[19] Charles Zhang, *The Calling*. Cinematic VR. Australia, 2018.

[20] Fx Goby and Hélène Leroux, *Back to the Moon*. Cinematic VR. United States, France: Google Spotlight Stories, 2018.

[21] Felix Lajeunesse and Paul Raphaël, *Miyubi*. Cinematic VR. Canada: Felix & Paul Studios, 2017.

Figure 1. Still from the virtual reality film, *Miyubi*. The viewer sees narrative events unfold from the perspective of Miyubi, a toy robot.

The case of *Miyubi* highlights compelling factors necessary for understanding viewers' behavior when watching 360-degree films: proprioception and social perception. The sense of an observer's body's size and position relative to objects and other bodies in a virtual space can affect viewer behavior, engagement, and comprehension: a virtual bodily position that fails to cohere with motion and perspective of a physical body to a large extent can distract engagement.[22] Perceiving one's body in relation to the surrounding environment is fundamental for adopting corporeality and ecological connections with the diegetic world. The embodied qualities of perception are equally grounded in the human body's sensorimotor mechanisms, the position for observation, and the social and cultural domains that the surrounding objects represent.[23]

The viewer is one with Miyubi who is operated by head movements, "up-down, up-down, left-right, left-right." And while the robot is capable of locomotion, the viewer can only control its perspective of the 360-degree space. The point of observation seems natural as the viewer sees tape recordings of Miyubi as well as other similar robots that cue its approximate size in relation to objects and characters. Additionally, Miyubi is generally placed in a way that its camera is at the characters' eye level: either the characters are sitting on the floor or low stools or Miyubi is standing on a table or chair.

In the movie, the viewer's attention is controlled by spatial cues and motion. External cues for turning one's head include moving characters, such as children running around, and the spatial outline of interior locations, such as staircases or doors that draw attention to entering or exiting characters. The spaces in *Miyubi* also include less mobile figures, such as the Grandpa character who is usually shown sitting in a wheel- or armchair as well as the myriad of toys, home electronics, and items of decoration that represent the early 1980s. These characters and objects are generally explored following internal motivations and are part of the carefully crafted visual world of the movie that evokes a strong sense of presence and occupies viewers' attention.

Object recognition and comprehension of spatial relations in a fictional environment also provide information about the modes of biomechanical interaction.[24] This implies

[22] See Robert Hassan, "Digitality, Virtual Reality and the 'Empathy Machine'," *Digital Journalism* (2019).
[23] Francesca Simion et al., "From Motion Cues to Social Perception: Innate Predispositions," in *Social Perception: Detection and Interpretation of Animacy, Agency, and Intention*, ed. M. D. Rutherford and Valerie A. Kuhlmeier (Cambridge: MIT Press, 2013), 37–60.
[24] Gallese, "Embodied Simulation."; Vittorio Gallese and Michele Guerra, "Embodying Movies: Embodied Simulation and Film Studies," *Cinema* (2012).

that classifying objects' manipulability activates motor functions related to corresponding manipulations in the observer's brain which assumes an affective synergy between the physical body and virtual sensory experiences.[25]

The Phenonarratology Model of Virtual Reality Spectatorship

Motor involvement generates an irreproducible, momentary constellation of the sensory scope, which leads to each viewer's access to a somewhat different set of sounds and images. This is largely dependent on one's choice in the moment that guides body posture and, therefore, access to narrative information. The options for interaction, the direct bodily connection, and the film's sensory proximity effectuate an intimate relationship between viewer and content. Affective qualities of this relationship point to a specific phenomenological experience that links the convenience and pleasure of both witnessing a story and influencing its presentation. Thus, the immersive quality of virtual reality simulation and a viewer's embodied presence, taken together, create a personal viewing experience that is influenced by an interplay between sensory input and personal preferences.

Altering the sensory scope affects cognitive processing, which requires a new approach to theorizing spectatorship. The concluding section of this paper offers one such approach: I organize the potentials to customize narrative experiences through bodily interactions and the effects thereof on viewing experience into the phenonarratology model of virtual reality spectatorship.

As I explain elsewhere, interactive viewing through motor involvement leads to a viewer's subjective interpretation of a film narrative in three steps: perception, evaluation, and eventual interventions, which lead to access to new sets of sensory information.[26] This assumes that embodied interactive narrative experiences are based on sensory alertness, perceptiveness, and cognitive processing; that is, on registering and contextualizing visual and sonic stimuli, interpreting narrative information, and making decisions of eventual motor reactions (i.e. changes of position). Thus, the viewer's body mediates perception and the cognitive processing of film narratives. This mediator role affords a twofold entry to modeling the cognitive aspects of narrative experiences in cinematic virtual reality: through embodied involvement and the sensory scope of the 360-degree field of simulation and narrative presentation. I link narrative experience and the plasticity of the sensory scope by arguing that virtual reality spectatorship involves a narrative experience cycle, where narrative information and audiovisual stimuli prompt decisions for changing the sensory scope and this new sensory scope provides access to a new set of narrative information.

As presented in figure 2, the phenonarratology model approaches virtual reality experiences through the aspects of embodiment and sensory scope. On one hand, a viewer's body serves as an instrument for comprehending spatial, social, and emotional contexts within the fictional space. On the other, the body's position defines the sensory scope: the momentary frame of image and direction of sound. In contrast to traditional movie screens, the content of this frame is not defined by a visual theme or mise-en-scène. Instead, it depends on the field of view, gaze direction, and head or body positions. The combined effect of a viewer's embodied and motor involvement and sensory access to narrative information leads to a narrative experience that

[25] Steven Shaviro, *The Cinematic Body* (Minneapolis: University of Minnesota Press, 1993).
[26] Kata Szita, "Cognition of Moving Images on Smartphones: An Approach of Phenonarratology and the Mobile Mise-En-Scène," (under review).

includes defining the momentary content of the subjective cinematic frame.

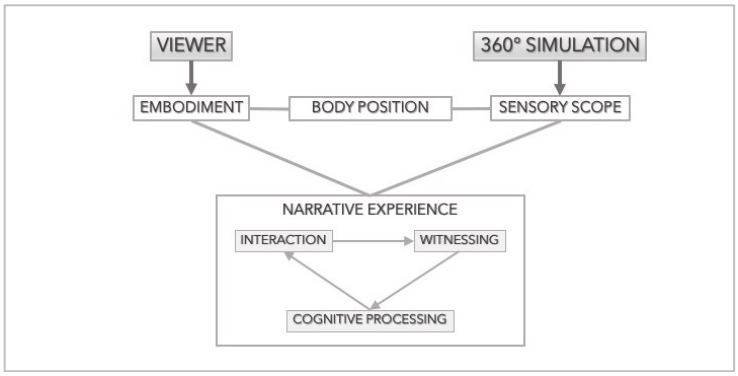

Figure 2. The phenonarratology model of cinematic virtual reality spectatorship.

The cinematic frame (underlined by, among others, Sergei Eisenstein's *dynamic square*[27] or Torben Grodal's *metaframe*[28]) acts as an ontological boundary between the diegetic and physical world, but also as the edge of accessible visual narrative information. Following Grodal's theory, a screen's edges serve as points of reference to evaluate the role and significance of elements that are present in it or absent from it. Grodal argues that attention within the frame is controlled by the addresser, but it is the viewer who decides whether to pay attention to visible elements or reconstruct those that fall outside of the frame.

In cinematic virtual reality, the balance of present and absent elements is rather malleable. Visual and sonic cues can lead the viewer's attention to parts of the 360-degree space that are momentarily invisible. Moreover, the clear division between present and absent sensory information based on relevance no longer applies: while the cinematic frame in screen-based spectatorship isolates relevant pieces of information, cinematic virtual reality needs to employ spatial cues to draw attention to relevant elements, otherwise, any segments of the 360-degree space can become relevant based on a viewer's personal interest and momentary cognitive motivations.

So, what is a constraint of screen-based watching is the opportunity for cinematic virtual reality for transporting the viewer into an entire simulated space. But the opportunities of the 360-degree simulation are also limitations: instead of framing emotional and dramatic themes, cinematic virtual reality prompts subjective and selective attention to information and a regularly updated frame of vision.

Conclusion

Cinematic virtual reality promotes a viewer's *immediate* observant role; her sense of presence in a diegetic space is supported by the panoramic sensory field in which a narrative unfolds independent of her gaze. Consequently, instead of directly influencing the outcome of narrative events, one's posture and the momentary sensory scope offers phenomenological links between the body and the objects and characters inhabiting the surroundings.

Viewing experiences of cinematic virtual reality are largely defined by a subjective

[27] Sergei Eisenstein, *Film Essays and a Lecture*, trans. Jay Leyda (Princeton: Princeton University Press, 1982).
[28] Torben Grodal, *Moving Pictures: A New Theory of Film Genres, Feelings and Cognition* (Oxford: Clarendon Press, 1997).

position of observation. On one hand, this reflects on the viewer's sensation of presence, which originates from embodied presence and proprioception in relation to the simulated space and the fictional characters and objects inhabiting this space. On the other, 360-degree simulation offers a wider scope of narrative information than what is available for human vision. Thus, on account of subjective access to narrative information, these attributes demand a view through the lens of phenomenology, embodied cognition, and narrative experiences. Arranging these elements into the phenonarratology model of virtual reality spectatorship relies on two fundamental points: the pliancy of the viewer's sensory scope and the sensation of physical involvement in self-curating the screening. Based on the integration of sensory modalities, a viewer interacts with the presentation of a 360-degree film in a way that changes the point of view and, therefore, the spatial composition of the perceived sound and image. Thus, cinematic virtual reality viewing entails narrative experiences in which the viewer's body and senses define the scope through which she accesses narrative information. And while 360-degree simulation promises a great deal of immersion, the options and motivations for interactions lead to encounters with personalized, yet fragmented narrative presentations.

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