

# Towards an analysis of virtual realism

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## ABSTRACT

That VR media are realistic, or more realistic than other traditional forms of depictive media, has sometimes claimed to be a “common-sense” view (Murphy, 2017). Exactly what comprises the realism of virtual media is not entirely clear and needs careful analysis, however. This paper offers the beginning of a philosophical analysis of the concept of “virtual realism” as it applies to videogames and related media. The term turns out to have several different senses that though related, are materially distinct and of differing credibility. This paper will add depth and clarity to the growing literature on virtual reality media by providing analysis of a key concept that is currently undertheorized.

## Keywords

Virtual worlds, media, realism, philosophy.

## VIRTUAL MEDIA AND REALISM

There is *prima facie* plausibility to the idea that the depicted worlds of virtual reality (VR) are, in some sense at least, more *realistic* than worlds depicted in other artistic media. Take for example *Resident Evil 7: Biohazard*, a survival horror game that is compatible with PlayStation 4 VR. One can play the game using a traditional screen display or the PlayStation 4 VR headset, but in my experience, playing through the game in its VR mode is the more perceptually striking and emotionally disconcerting experience. The sense of being within the world, the realistic appearance of the world’s environments, and the feeling of anxiety and fear provoked by the events depicted, all make for a greater impression in VR. This apparent realism has not gone unnoticed by academics and scientists. The games studies social scientist Dooley Murphy has conducted a qualitative analysis of the literature on VR, attempting to substantiate and extend what he takes to be the “common-sense claim that VR ‘feels more real’ than traditional screen-based games” (2017).

The concept of realism has long been an important one within artistic history, with some artistic media and styles—like VR—being plausibly seen as more realistic than others. Realism has also been a significant interest to philosophers of the arts, though it has frequently led to disagreement and debate. One key issue is precisely that of whether some media styles *are* more realistic than others, and if they are, what this realism amounts to. Initially, one might think that a supremely realistic medium would be one that conveys or depicts, in a naïve way, what we ordinarily perceive when we encounter the world: realism in this way could be conceived as a kind of illusion. Indeed, some theorists seem tempted to ascribe this kind of illusionistic realism as a potential inherent in VR (Chalmers, 2003; Grau, 2003).

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Many philosophers have resisted naïve illusionism, however. According to Ernst Gombrich, pictorial realism is not some attempt to convey what is seen by the innocent eye, which is itself impossible. It is rather the use of a style to “articulate the world of our experience” in much the way that language is used to impart information (Gombrich, 1960, 90). For Gombrich, this means that there is no single objectively realistic pictorial style, and that different styles may articulate the world of experience to convey differing, yet each in its own way realistic, visual styles. Philosophers are still split on the question of realism and there is a persistent suggestion that the concept is undertheorized, and is most likely a multivalenced one, which, if properly analysed, may reconcile much of the apparent disagreement about the realism of artistic depiction (Lopes, 2006). If the debate about realism in art has achieved anything, it is that care must be taken about the claim that some medium is an especially realistic one.

We would do well to take this lesson on board at this relatively early stage of theorising about virtual worlds and their apparent realism. In that spirit, this paper presents a preliminary analysis of the concept of *virtual realism*. I will analyse the several senses in which virtual reality media might be claimed to be realistic and argue that these senses are materially distinct. Realism in virtual media is ambiguous and can be unpacked into at least five distinct theses: 1. Virtual realism as immersion: virtual media are reliably or distinctly immersive. 2. Psychological realism: virtual media reliably engage our psychology and behaviour so as to seem real. 3. Depictive realism: virtual scenes resemble the features of corresponding real visual scenes. 4. Ontological realism: the objects and worlds depicted by virtual reality are in some sense “real.” 5. Functional realism: VR media sometimes preserve the functions of the items or activities they depict.

I will conclude that to be respectable or useful, the idea of virtual realism requires a clarified and careful use, and so an initial extensional refinement is needed here. The description “virtual” has been applied to so many aspects of new computerised technology, and with such a looseness, that it might be suspected of being an empty buzzword (Heim, 1994). To avoid this vagueness, I will limit the use of the term “virtual” by focusing on virtual *media*, and specifically on the most prominent virtual media, 3D stereoscopic headsets and motion tracking devices. These are the most prominent of virtual media both because they provide what is perhaps the most phenomenologically striking feature of VR—*spatial presence*, to be discussed below—and are at the forefront of the recent successful commercial developments in VR media in the form of the release of the HTC Vive, PlayStation 4 VR, and other stereoscopic headsets. In what sense or senses might such media seem to be realistic or increasing in realism?

## **REALISM AND IMMERSION**

Some forms of computer technology, particularly videogames, have long been associated with the psychological attitude of *immersion*. Most basically, immersion comprises the sense of being taken up completely with an activity and forgetting the world external to that activity. In Bob Witmer and Michael Singer’s standard test of presence, immersion is “a psychological state characterized by perceiving oneself to be enveloped by, included in, and interacting with an environment that that provides a continuous stream of stimuli and experiences” (Witmer and Singer, 1998: 227). This attentional aspect of immersion is sometimes explained in terms of Mihaly Csikszentmihalyi’s familiar concept of flow (1990). The concept of immersion is frequently ambiguous in the literature, however, with other writers implying a richer sense in which immersion involves a sense of *transportation to other worlds*. “Sensory immersion,” explains games theorist, Carl Therrien, is “associated with the feeling of being transported to a non-immediate reality in the context of mediated

representations. In these cases, it is generally linked causally to the degree of vividness or credibility of the represented reality” (Therrien, 2014, 451). The perhaps intentional ambiguity between physical displacement and attention is also evident in Michael Heim’s account of immersion where he refers to it as involving being “submerged” in a virtual world and also being “cut off” from surrounding reality (1993). Both the basic attentional concept and more elaborate transport/displacement concept might be used to frame and explain the apparent realism of VR media. VR would be counted as realistic if it was found to be extensively or reliably immersive (however we conceive of or measure that term).

As described, immersion is not suitable for entirely capturing the *prima facie* sense of virtual realism, however. First, as primarily a psychological state, immersion may not allow us to say that the medium in question is itself realistic (beyond saying that it is reliably immersive). Later in this paper we will find that the quality of realism attributable to virtual worlds sometimes refers not to the psychological response encouraged by or associated with the medium, but to the depictive, functional, or ontological features of the medium.

Second, the attentional sense of immersion is not anyway reliably indicative of the psychological impression of realism of a virtual medium or world. Immersion—the sense of intense focus associated with Csikszentmihalyi’s concept of flow—is possible even with very non-realistic VR media (and indeed is an attentional factor shared by a wide variety of activities beyond VR, given that Witmer and Singer’s analysis applies as much to immersion in the actual world as it does to virtual worlds). The physics-based puzzle game *Tumble VR*, for example, is far from visually realistic: functionally and stylistically the game avoids realism with its clean and idealised representations and disembodied interaction. But it is still a very immersive game that tends to make the player forget the world around them and become consumed by solving its gravity-based puzzles. Moreover, VR media need not be immersive even when they are realistic because this realism can *disrupt* immersion where the events of virtual worlds leave the user feeling especially vulnerable, effectively deterring their participation in the world (Murphy, 2017). For example, the disturbing events of *Resident Evil 7*, while they are sensorially captivating, may disrupt rather than encourage attentional flow (Tavinor, 2018, 157). One of the most unfortunate side effects of VR, motion sickness, means that rather than being immersive, one must often put in significant effort to tolerate the medium even as it seems “real”—and perhaps *because* it seems real, at least to the visual and vestibular systems (Lawson, 2014). Immersion, principally, concerns attention or concentration, and while VR media do have attentional effects (most obviously by the stereoscopic headset physically blocking vision and precluding attention to the real world) this is likely a consequence of VR media rather than a characteristic feature of its realism.

As noted, the use of the term immersion is sometimes vague between an attentional concept—where one becomes oblivious to events and things beyond the activity they are consumed with—and a perceptual or spatial sense of immersion—where one is “transported to” or “submerged” in another world, or is overtaken by a sense of reality inherent in the visual features of a virtual world (Therrien, 2014; Heim, 1993). We have found that the attentional sense fails to capture the sense of virtual realism, but even this second sense of immersion is problematic because of an ambiguity between two further senses of virtual realism that sensorial or transportational immersion does not discriminate: psychological realism—where a virtual world gives the psychological impression of being real—and depictive realism—a related position that virtual media *objectively resemble*—or can be made to resemble—the real world. Because of this ambiguity, and because the idea of immersion seems unavoidably imprecise in its use of the metaphors of being *immersed in* or *transported to* another

world, and more generally because the concept is “opaque and contradictory” (Grau, 2003: 13), we may be conceptually better off without it.

## PSYCHOLOGICAL REALISM

The next conceptual means of capturing the sense of *virtual realism*—and one that is inherent in the idea of immersion—is psychological realism. Psychological realism refers to those cases where virtual worlds *seem* to the user as if they were real or cause their appreciators to respond or behave as if they were real. Psychological realism probably accounts for many of the more phenomenologically and behaviourally striking aspects of VR. A form of at least *prima facie* evidence of psychological realism comes from the observation of many naïve participants’ initial responses to VR worlds, whether it is a user screaming and flailing about in a VR rollercoaster simulation, or simply physically reaching out to touch or gesture toward objects in VR worlds. In his review on the literature on player experience in VR, Murphy touches on many of the prevalent aspects of psychological realism, and finds that a predominating theme in the phenomenology of VR is what he calls a sense of “patiency,” that is, a feeling of having limited agency in the VR world, and a “co-occurrent [...] sense of self vulnerability” (2017, 10). A notorious case of psychological realism of VR is the “virtual pit” experiment where participants, asked to approach an apparent pit in a virtual reality environment, were observed to have raised heart rates and other physiological responses indicative of anxiety (Slater et al., 1995; Meehan, 2001). Psychological realism may also be behind some of the claimed or speculated positive real-world applications of VR, such as its potential in encouraging empathy (Maister, et al., 2015) and its use as a distraction from the pain of medical procedures (Indovina, et al., 2018).

The central aspect of psychological realism, and the focus of a great proportion of previous investigation of psychological responses to VR, is *spatial presence*. Spatial presence can be roughly characterised as the feeling of being spatially located in the depicted VR space, and has been claimed to be a predictable, even psychologically inevitable, response of standard human perceptual psychology to VR depictions of space and the objects located in that space. A recent cognitivist account of presence sees the response as rooted in basic and universal human responses to perceived environments—including their aptness for interaction—where “spatial presence is reducible to VR users’ unconscious acceptance of an avatar’s egocentric reference frame and virtual peripersonal space as viable, supported by the “tuning out” of contradictory sensory information from the physical environment” (Murphy, 2017, 3). On this view, spatial presence relies on a kind of sensory illusion—or several kinds, because it may not be limited to the visual sensory modality—that are exploited by VR media to give the user the impression of reality.

It is impossible to explore or evaluate these claims about the nature of spatial presence here, or the extent to which spatial presence involves imagination involvement rather than, or in addition to, perceptual illusions, but it seems clear enough that psychological realism is a coherent interpretation of virtual realism, and indeed, that it may be the predominate form of VR realism. Nevertheless, it is distinct from the other forms of virtual realism we might consider. Most obviously, the impression of spatial presence does not seem depend on the veracity or graphical sophistication with which virtual spaces are depicted: as Murphy notes, “a user’s willing involvement in or absorption in a virtual simulation may compensate for technological [i.e. graphical] shortcomings” (2017, 4). One may feel spatially present in an environment even when it is evident that the environment is artificial: and for the moment, it is universally the case that VR has technical shortcomings that make the artificiality of VR environments very apparent to the user. These include the evident pixelization of the stereoscopic screen, the limited and artificially bordered

field of vision, the lack of depth of field effects, and many other technological artefacts that can be found in most current VR systems.

Also, as noted in the previous section, psychological realism need not lead to attentional immersion, as some psychologically realistic VR events (e.g., the psychological and physiological responses caused by the proximity of threatening VR agents [Murphy, 2017, 10]) can discourage VR involvement.

## **DEPICTIVE REALISM**

This leads us naturally onto to a third and related form of virtual realism that we can call *depictive realism*. This is the idea that virtual media are in some way faithful to the appearance of real perceived objects and environments, particularly in terms of their visual and spatial features. As noted in my introduction, the debate about the realism of depictive media has a long history within philosophical aesthetics. While there has been a lot of disagreement there about what it is that we mean when we use the term *realistic* in connection with the appreciation of the arts—that is, what counts as realism in the arts—one interpretation of realism as *resemblance* has been prominent (but not uncontroversial) (See especially Gombrich, 1960; Goodman, 1976). It is unnecessary to defend a resemblance account of depiction or depictive realism here, but resemblance clearly is an important aim in the design of VR systems where in many of its practical applications, “it is important for the graphic image to create a faithful impression of the 3D structure of the portrayed object or the scenes the displays depict” (Hoffman, et al., 2008, 01). This sense of realism is also inherent in Therrien’s account of sensory immersion when he refers to the “vividness or credibility of the represented reality” as contributing to the sense of immersive transportation (Therrien, 2014, 451). In this context *depictive realism* is the idea that virtual depictions resemble the scenes they are depictions of. Virtual media might be said to be realistic in this sense if their depictions resemble the scenes provided by natural vision.

Conveying virtual realism as depictive realism draws an especially close connection between virtual reality and the history of pictorial depiction in the arts. This connection is illuminating. A crucial episode in the evolution of painterly realism were experiments in linear perspective performed by Filippo Brunelleschi in Florence in 1413 and Leon Battista Alberti’s subsequent codification of linear perspective in the treatise *De pictura* (1435). Brunelleschi painted a panel depicting the Florentine Baptistery in his newly developed linear perspective style. By holding the panel with the image facing away from him toward the Baptistery, the building could be compared with the image by inspecting the painting with a mirror seen through a hole in the panel. Brunelleschi’s intention was to directly compare his painting technique with the qualities of natural vision to show how his technique rendered the geometry of natural vision in a potentially illusionistic way.

Alberti’s subsequent system of linear perspective—*perspectiva artificialis*—treated paintings as imaginary “picture planes” suspended between the viewer and the depicted scene and allowing for the organisation of perceptual space by charting the geometry of light rays in the perceptual spaces. We can interpret these developments as comprising an attempt to replicate the perceived qualities visual scenes in a visual artistic medium, and Brunelleschi seems to have conceived of his experiments this way. The idea that depictive resemblance and realism can be explained by physical principles such as those invoked by Alberti has been given a sophisticated modern defence by John Hyman (2006). Hyman holds that resemblance is not merely a matter of psychology (much less convention), but of physical principles of optics, particularly occlusion and point of view.

These ideas can easily be extended to VR because geometrical and physical principles of the kind employed by Brunelleschi and codified by Alberti, and to which Hyman attributes depictive resemblance, are a key consideration in the design of VR environments, a process that owes as much to the science of optics as it does to the art of depiction. Modern 3D computer environments are, at their most basic, geometrical models composed of collections of vectors, and observed from the point of view defined by a “virtual camera” (Kerlow, 2000).

The resemblance account was famously challenged by Nelson Goodman (1976) and one aspect of this challenge throws further light on the relationship of VR to depictive realism. Goodman sceptically notes that for linear perspective to achieve any semblance of illusionistic realism, “the picture must be viewed through a peephole, face on, from a certain distance, with one eye closed and the other motionless” (Goodman, 1976, 12). Not only does VR seem consistent with the resemblance account, it may strengthen it, because virtual media have made improvements over previous artistic media in terms of the physical principles employed, and in doing so provide a challenge to Goodman’s scepticism. The utilisation of VR headsets and motion tracking makes it false of VR depictions of spaces that “the picture must be viewed through a peephole, face on, from a certain distance, with one eye closed and the other motionless,” because VR allows for binocularity, the scanning of visual scenes, and the apparent movement of the viewer with respect to the visual scene. These are features that may extend the depictive realism of VR media (and which ground some of the aspects of psychological realism considered above; i.e. the “viability” of the peripersonal space depicted). VR replaces the “picture plane” with an encompassing visual field.

There are still further difficulties with the realism of the depiction of space in VR media—in particular there are problems with the rendering of visual focus and depth of field (Hoffman, et al., 2008)—but the advances of VR depiction certainly have the potential to revivify the debate about the realism of depictive media. What bearing does VR depiction have on the debate about the naturalness or conventionality of systems of perspectival depiction? More fundamentally, what is it for a virtual reality media to render space and its furniture in a realistic way? These are questions worth pondering.

## **ONTOLOGICAL REALISM**

A fourth sense of virtual realism is brought into focus if we reorientate from the resemblance of virtual objects with their real-world counterparts, to ontology of the virtual objects themselves. What is it that the stereoscopically rendered models in VR media actually depict? What do users of virtual worlds interact with? In recent work David Chalmers suggests a different notion of virtual realism when he claims the objects depicted by VR headsets, are “digital objects, constituted by computational processes on a computer” (Chalmers, n.d.). Chalmers refers to this position as “digitalism,” and contrasts it with the “virtual fictionalism,” a position that he takes to claim that virtual objects such as videogame monsters are fictional things. This analysis leads him to make some very strong claims about the ontological status of VR objects and worlds, including that “virtual reality is a sort of genuine reality, virtual objects are real objects, and what goes on in virtual reality is truly real” (Chalmers, n.d., 1).

Chalmers has two key arguments for this position, the “causal” and the “perceptual” arguments. The perceptual argument runs like this:

- (1) When using virtual reality, we perceive (only) virtual objects.
- (2) The objects we perceive are the causal basis of our perceptual experiences.
- (3) When using virtual reality, the causal basis of our perceptual experiences are digital objects.

(Chalmers, n.d)

This argument gives us a good sense for why we can refer to Chalmers' position as a realist one: his account attempts to find the real underpinnings of our engagement in virtual worlds and locates this in the computational objects that ground our causal and perceptual interaction with such things.

Again, in the space I have here, I cannot fully explore this position, or subject it to the criticism it probably deserves, but it is sufficient for the purposes of this analysis to point out that this sense "virtual realism" draws on the metaphysical sense of realism that we also find in debates about the ontological standing of scientific entities, moral properties, abstract entities, and so on. This ontological conception of virtual realism is worth considering and is likely to generate important debate because of its close connection with areas of traditional philosophical concern within metaphysics. It is a very different conception of virtual realism to those previous considered, however, because the previous sense of realism treated here have concerned the appearances generated by virtual media and have often remained silent about the reference or causes of those appearances.

But it should be pointed out that ontological realism would not gain much support from the truth of other forms of virtual realism. For example, the truth of psychological realism does not imply the truth of ontological realism: we can be psychologically provoked, either illusionistically or via our imaginative engagement, by non-existent objects. This may happen in the case where virtual media depict fictions: an insane cannibal lurching up a darkened hall in *Resident Evil 7* might seem psychologically real—in the sense of inspiring terror—even if it does not exist. And there certainly are accounts available, such as fictionalism, that show how it need not exist (Brock, 2002). Likewise, with a virtual pit: the mere appearance is enough to inspire fear irrespective of its existential status. Furthermore, the truth of ontological realism would not by itself not imply the truth of either psychological or depictive realism, because the reality of Chalmers' digital objects is perfectly consistent with users having only an imprecise or distorted experience of such objects as they are manifested in virtual media, or of not being psychologically impressed by the reality of these objects or by their veridical appearance. And given that Chalmers identifies digital objects with "data structures, which are grounded in computational processes which are themselves grounded in physical processes on one or more computers" (Chalmers, n.d.) there is perhaps reason to think that perceivers *are* given a false or incomplete impression of these computational objects when they are encountered visually through VR headsets: in VR, what one appears to encounter are cannibals, not data structures.

## **FUNCTIONAL REALISM**

Chalmers denies that VR object can be wholly understood as comprising fictions, but if we do consider that at least some cases of virtual reality depict fictional worlds, objects or characters, a new conception of virtual realism comes into view: namely,

those cases of VR, contrasting the fictional cases, that are used to mediate an interaction with real items or the real world. For the most part, the utilisation of VR in videogames is for the purposes of depicting fictions (Tavinor, 2018). A cannibal lurching up a hallway is a fiction because such depictions are intended to act as “props” in games of make believe (Walton, 1990). The cannibals, and the world in which they exist, are not real. This is the case even if those props utilise psychologically realistic techniques to generate the anxious sense of agential proximity noted above, so that the cannibals seem especially real (and threatening). The VR medium is here used as a depiction of a fictional world that could equally be conveyed in non-VR media—though if psychological and depictive realism are accurate, perhaps with less perceptually and affectively striking features.

But there are other cases where VR is employed to mediate a non-fictional interaction with real items in the real world. One such case is the Disney research on ball catching in virtual worlds (Pan, M. and Niemeyer, G. 2017). In their experiment Matthew Pan and Günter Niemeyer used a motion tracking camera to track a ball’s position and display it on a stereoscopic headset as an animated ball within a rudimentary virtual environment comprising a textured floor, basic lighting, and depictions of the user’s hands (Pan and Niemeyer, 2017, 1). The virtual world was also capable of depicting the ball’s predicted trajectory and a target where the ball could be intercepted by the catcher. Using this visual information, the user could orientate her hands (depicted by the paddles) to achieve the task of catching the ball in virtual and real space. Tavinor argues that if the interaction with a virtual cannibal counts as “virtual fictionalism,” the ball catching case might be usefully characterised as “virtual realism” (Tavinor, 2018). He is also willing to countenance that virtual media might allow for real seeing, i.e., that they might be “transparent” the sense of that term applied to photography by Kendall Walton (Walton, 1984). In such uses, we “might usefully conceive of VR [...] as a technological perceptual appendage or augmentation that allows for genuine seeing” (Tavinor, 2018, 155).

We can call this sense of virtual realism *functional realism*, because it depends on a virtual medium *preserving the function* of its real counterpart. In the Disney case above, the virtual medium preserves the function of seeing and catching a real ball, partly by the provision to the user of the kind of information that constitutes one of the characteristic or even definitional features of seeing. To really see something through a medium, claim the philosophers Jonathan Cohen and Aaron Meskin, rather than merely having a visual experience caused by that thing, “what is essential is that the relevant visual experience is produced by a process that carries egocentric spatial information about the object” (Cohen and Meskin, 2004, 8). Such egocentric information bears a relationship of spatial counterfactual dependence between the depiction and what is depicted, so that if the picture moves with respect to the object depicted, the apparent position of the object in the depiction should also move. This is why they take it that we can see objects in mirrors—which do convey egocentric spatial information bearing this counterfactual relationship—while we do not see things in photographs, which are indeterminate with respect to the egocentric spatial position of the items they reveal. However, it may be that because VR, at least in realistic uses, can be used to provide the viewer with egocentric spatial information, that their users do see the things depicted in such cases (author redacted, forthcoming). It is precisely because the depictions on the headset in Pan and Niemeyer’s research do have an egocentric counterfactual spatial relationship with the ball that the participant is able to catch that ball.

It is also this sense of functional realism that explains another observation that can be made of virtual items such as virtual stores, virtual memory, and so on: why, after a period of social familiarisation, these things so easily come to be regarded as actual



instances of the items they instantiate in a virtual way. By preserving the crucial function of stores—allowing for the sale and distribution of commercial items—virtual stores can be regarded as stores *simpliciter*, and they increasingly are. The preservation of function allows these virtual items to instantiate items of their given kinds, despite the change of medium. Consideration of functional realism clearly cuts to the heart of the nature of virtual media, where it seems to be a structural or functional correspondence between the actual item and its virtual counterpart, that comprises the fundamental feature of virtuality.

But again, this sense of realism, though it may coincide with the senses described earlier—the ball being caught might be made to look real via the use of sophisticated graphical techniques—it need not. The transparency of functionally realistic media does not necessitate depictive realism because even distorted images or images lacking detail can allow us to see the objects they depict. And this is what we find in the Disney experiment as it was conducted: the ball, environment, and the users own body representation are minimally detailed and quite unrealistic (Pan, and Niemeyer, 2017, 1). Additionally, functional realism does not provide evidence for Chalmers’ position of digitalism (that is, the claim that the objects depicted in virtual media are digital objects) because, as in the case of the Disney research, the object depicted in functionally realistic VR are typically the real objects actually seen and interacted with through the virtual media (author redacted, forthcoming).

What can we conclude from this brief analysis? What is suggested to me is that the idea of “virtual realism” is credible, and indeed has multiple useful interpretations, but also that it will take further work before the nature and interrelations of these interpretations become fully clear.

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