Virtual Reality, Seeing-In, and Twofoldness

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Virtual reality headsets present us with two images, one directly before each of our eyes. One might therefore suppose that virtual reality offers experiences with the phenomenology of many other depictive images—an experience of seeing-in. *This paper argues that the phenomenology of virtual reality does not involve seeing-in due to our lacking the required awareness of virtual reality images' configuration. Instead, virtual reality is intended to generate an experience resembling that of everyday perception, artificially recreating the phenomenology of various experiences. Interestingly, however, the present technical limitations of virtual reality frequently also generate an under-recognized form of* twofold *experience, where we are perceptually aware of both the content of a virtual reality image and the way that content is represented, yet still without our seeing-in. But while this twofold experience is often unintended, it can also be deliberately aimed at to help guard against some of virtual reality's potential harms.*

1. Introduction

What distinguishes virtual reality from other pictorial media, and makes it so appealing, is the experience that it affords. Virtual reality seemingly recreates and makes easily accessible experiences that we could not otherwise have—swimming with sharks, exploring ancient cities, or driving a Formula 1 car. Virtual reality consequently has various further uses beyond entertainment, such as in the treatment of conditions such as post-traumatic stress disorder through exposure therapy to traumatic stimuli,[1] in educational and training contexts when one can learn and practice skills in a risk-free environment, to potentially evoke empathy for others through simulating their experiences,[2] and as a means to control simulated scenarios from which we can learn about human vision and psychology.[3] Virtual reality's recreation of experience also offers various potential harms, however, as users can undergo deceptive experiences (more on this in §6), or face the appearance of suffering highly unpleasant and potentially traumatic events.[4] Characterizing the phenomenology of virtual reality—*what it is like* to experience virtual events—is key to understanding these various benefits and harms.

1 See Vincelli and Molinari (1998), Gorini and Riva (2008), and Kothgassner et al. (2019); for reservations, see Botero and Whatley (2020).

2 See Ordóñez Angulo (2023).

3 See Mast and Oman (2004), Bruder et al. (2012), and Wilson and Soranzo (2015).

4 For philosophical discussion of the traumatic impact that virtual reality experiences can have, see Chalmers (2022: 350–3), Nader (2024), and Fisher (2025).

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In current editions of virtual reality headsets, we ultimately perceive images on screens, just as when viewing film or digital images, albeit much closer to our eyes. One assumption that will guide this paper is that we can think of the screens before our eyes in virtual reality as playing a roughly similar role to the screen surface in film or the canvas in painting, such that we can try to apply the extensive literature within aesthetics on our experience of these media to understand the phenomenology of virtual reality. I begin in §2 by outlining one influential approach to the phenomenology of depictive images, according to which they offer a distinctive experience of *seeing-in*. I argue in §§3–5, however, that virtual reality images typically do not enable seeing-in, and offer two quite different forms of experience. I conclude in §§6–7 by illustrating how conclusions regarding the nature of virtual reality experiences can illuminate how we might mitigate some of this technology's potential harms, as well as offer implications for recent philosophical debates regarding its metaphysics.

2. Seeing-in

When we view a picture, we often have an experience of seeing certain objects represented in it. Paintings, drawings, and other depictive images enable this distinctive experience of *seeing-in*—a notion originating in the work of Richard Wollheim (1987: 46–48).[5] Seeing-in is a *twofold* experience—a single experience with two aspects.[6] One aspect is *configurational*, as we are aware of the picture as a physical arrangement of some kind—typically markings on a flat canvas in the case of paintings; another is *recognitional*, as we are aware of the objects represented by this configuration. Consequently, we have a single experience whereby we are simultaneously aware of the configuration of a picture and of what it represents.

This recognitional aspect of perceiving depictive images comprises our having an experience in some way similar to being confronted by an object face-to-face (Wollheim 1987: 46). This is, of course, not phenomenally identical to seeing face-to-face—we can typically distinguish seeing a picture of an object from seeing the object in the flesh. (An exception is perception of *trompe l'oeil* images, which I discuss below.) Furthermore, many images depict despite significant differences between our experience of the image and of the depicted object (Hopkins 1998: 19). Our experience of cartoons, pencil sketches, and stick figures, for example, is often nothing like our experience of the objects they depict. Nonetheless, we experience *some* resemblance between the marks on the page and the

5 Wollheim's terminology has changed over the years from his original "seeing as" (1980) to "seeing-in" (1987: 45–51)—see Wollheim (2015: 137–43) for explanation. Wollheim is also sometimes ambiguous as to whether twofoldness is necessary for perception of pictures or for their aesthetic appreciation (Nanay 2005). For further discussion of the nature and aesthetic relevance of seeing-in, see Hyslop (1986), Walton (1992), Hopkins (1998, 2012, 2019), Lopes (2005), Newall (2009, 2015), Cavedon-Taylor (2011), Pettersson (2011), Dokic (2012), Bradley (2014), and Voltolini (2015, 2021).

6 A less common *threefoldness* view holds that our experience of pictures involves a configurational aspect and two distinct recognitional aspects—awareness of the represented object visually encoded by the image surface, as well as the actual object, if there is one, that is depicted (Wiesing 2010; Nanay 2018).

depicted object.[7] Sometimes, we cannot make out what a marked surface depicts, and our perception lacks any recognitional aspect (Wollheim 1987: 47). Yet once we come to see the arrangement of markings as visually representing something, our experience becomes twofold, featuring both a configurational and recognitional aspect.

While the notion of seeing-in originates in describing the experience of viewing paintings (Wollheim 1987), it is commonly taken to capture the phenomenology of perceiving other pictures such as drawings and photographs.[8] Wollheim (1987: 47) himself uses the notion to capture the phenomenology of seeing clouds that represent through their shape, while Kendall Walton (1992: 284) takes seeing-in to describe our experience of sculpture (see Hopkins 2020 for discussion). Many go further, claiming that our experience of the moving image in film is one of seeing-in (Hopkins 2008: 150, 2016: §2, 2019: §2; Currie 2018: 191–93; Terrone 2020). The question I will consider is whether our experience of virtual reality can also be described as an instance of seeing-in.

3. Seeing-in and virtual reality

Seeing-in a picture requires perceptual awareness of the configuration of the image that encodes its represented content. When viewing a painting of Napoleon, for instance, we see the brushstrokes on the canvas as giving rise to the represented content—the particular configuration of marks generates the appearance of a face. When watching a film, while we might not see the screen surface itself, we are aware of certain patches of light configured in such a way as to generate the representational content. In virtual reality, however, such configurational awareness is usually absent. We are typically unaware of the screen surfaces immediately before our eyes when we wear a virtual reality headset, unlike when viewing paintings where we are aware of the marked canvas (Chalmers 2017: 319; Tavinor 2021: 105). While we might be *cognitively* aware that we are perceiving a screen surface—we know that this is ultimately what we are seeing—we are not generally *perceptually* aware of it.[9] Nor in virtual reality do we typically see particular patches of

7 Some hold that it is in virtue of this experienced resemblance that images depict what they do (Peacocke 1987; Hopkins 1995, 1998). These views are one form of a more general *experiential* approach to depiction, whereby depiction consists in some relation between our twofold experience and the represented object (Walton 1973, 1990, 1992; Wollheim 1987: 43–47; Lopes 1996, 2005). Rival explanations of depiction take it as comprising genuine (rather than just an *experience* of) resemblance between pictures and their objects (Abell 2009; Hyman 2012), or as pictures "denoting" their depicted objects in a similar manner to linguistic representation (Goodman 1976; Kulvicki 2006).

8 Allen (1993, 1997) offers a rare denial that we experience seeing-in when viewing photography (and, by extension, film).

9 One might think we are perceptually aware that there is a surface *indirectly* through the borders of the images we perceive in virtual reality, past which we see black space. Susan Feagin (1998: 238) claims that awareness of this kind is sufficient to allow an experience of seeing-in for *trompe l'oeil* images, as the picture's frame marks a section of our visual field as worthy of attention. This indirect awareness of a surface, however, is typically taken to be insufficient for seeing-in, which requires perceptual awareness of the marked surface itself, rather than awareness of it through its relation to other external objects such as a frame.

illumination that generate the representational content, as we do on the screen in film. Since seeing-in requires perceptual awareness of an image's configuration, and virtual reality generally precludes such awareness, virtual reality typically does not generate an experience of seeing-in.[10]

Virtual reality is not alone in presenting images that do not admit of seeing-in. A similar case is *trompe l'oeil* images, which repel attention from their surface such that a two-dimensional image presents the appearance of a three-dimensional scene before us. Such images have received extensive discussion in aesthetics.[11] *Trompe l'oeil* images are commonly held to not elicit seeing-in since they do not call for perceptual awareness of a surface (Wollheim 1987: 62; Lopes 1996: 50; Ferretti 2020a, 2020b; Tavinor 2021: 69). On Wollheim's (1987: 62) view, where seeing-in provides the basis for depictive representation, such images do not even count as cases of picturing.

One might object that, in certain cases, we surely *are* perceptually aware of the screen surface in virtual reality. Consider, for instance, when one of the screens is marked with a scratch or smudge, or they fog up with condensation—here we are perceptually aware of the image surface when wearing a virtual reality headset. Yet this is not the right *kind* of perceptual awareness of a surface to constitute a configurational aspect, as is required for seeing-in. When we see a scratch or smudge, we are not seeing the image as a configuration of marks on a surface that represent some content, but rather we see a represented scene and *in addition* see marks on the surface of the lens before our eyes. Seeing-in constitutes a *unified* experience with two aspects. Seeing a scratch or smudge on the lens in virtual reality, by contrast, generates two experiences. We experience both the screen smudge and the depicted scene, but not as a single, unified experience, for we can separate each while retaining their phenomenology. When we remove the headset and wipe away the smudge, the recognitional aspect of our perception remains unchanged from before—we see the same representational content; and when the representational content shown to us in virtual reality changes, our experience of the smudge persists.

While seeing-in does not describe our *typical* experience of virtual reality, however, it can occur in certain aberrant cases. *Trompe l'oeil* paintings are often taken as paradigmatic images where we do not experience seeing-in. Yet consider standing immediately before a *trompe l'oeil* painting. You may now become aware of brushstrokes or cracks in the paint, and hence become perceptually aware of the picture as a configuration on a marked surface, experiencing seeing-in. Virtual reality can similarly permit seeing-in, although in this case when we are too *far* from the screens before our eyes. When we move a virtual reality headset away from our eyes and look at the images that were immediately before them, we are perceptually aware of the configuration of illuminated physical space on their surface, and how this gives rise to the objects they represent—we experience seeing-in.

10 For further arguments against virtual reality's involving seeing-in, see Marchetti (2025). Yet while Marchetti ultimately argues that virtual reality experience is onefold, since we lack awareness of the screen surface, I will argue in §5 that it can often be twofold *despite* this lack of awareness precluding our seeing-in.

11 See Feagin (1998), Lopes (2005: 36–40), Nanay (2015), Kemp (2018), and Ferretti (2020a, 2020b).

A further instance of seeing-in within virtual reality comes when we experience the 'screen door effect'. When confronted with a particularly bright scene, such as a snowy environment, we can make out the individual pixels against a darker grid of horizontal and vertical lines comprising the gaps between them, reminiscent of looking through a screen door. Somewhat like the pointillist paintings of Georges Seurat, we see individual dots of colour as giving rise to the represented objects. Again, we have perceptual awareness of the image's configuration and how it generates the representational content we experience; hence, we experience seeing-in.

Yet even if we *can* experience seeing-in within virtual reality and in viewing *trompe l'oeil* images, this does not undermine the claim that seeing-in does not capture the typical or intended experience of these media. All images generate ranging experiences when we look at them in non-standard ways. When we stand inches from a painting, we do not see what the splotches of paint depict, hence we have no recognitional aspect to our perception and do not see-in. But this does not undermine that seeing-in describes the *intended* experience of most paintings. We can therefore readily admit that some experiences of virtual reality and *trompe l'oeil* differ from the norm, but when one looks at these images in the intended manner, they do not generate an experience of seeing-in. These images do not *call* for awareness of their configuration, and, indeed, repel our attention from it (Wollheim 1987: 62).

Virtual reality, then, does not typically generate an experience of seeing-in, unlike other depictive images. Before proceeding to give a more positive characterization of the phenomenology of virtual reality, it is worth addressing two rival views that might maintain that our experience of virtual reality is one of seeing-in.

Following Wollheim, I have described seeing-in as a twofold experience, where we are perceptually aware of both the configuration of an image and its representational content. Some weaken what is required for seeing-in, however. Grant Tavinor (2021: 67–70) has recently argued that virtual reality involves seeing-in, for he holds that seeing-in does not require perceptual *awareness*, but rather mere perceptual *representation*, of a surface. Perception of virtual reality involves perceptual representation of a surface, even if we lack awareness of it, as evidenced by phenomena such as our mistaken approximations of distances in virtual reality (Hoffman *et al.* 2008; Tavinor 2021: 71). Our perceptual system registers that we are perceiving a surface, even if we are unaware of it as such. On this more permissive conception, our experience in virtual reality constitutes seeing-in, as does that of *trompe l'oeil*, which similarly involves perceptual representation of a surface (Nanay 2015, 2018: 172).

Others have offered an even more radical view which denies that seeing-in requires twofoldness altogether (Lopes 2005: 40; Currie 2018: 192; Kemp 2018). Such views take the label of 'seeing-in' literally, describing our seeing something in a picture, regardless of whether we have a twofold experience featuring a configurational aspect. In virtual reality, then, our lacking awareness of the configuration does not preclude seeing-in. We still *see* representational content *in* an image, hence we see-in.

The motivation for each of the above views is to offer a more unified account of our picture perception, avoiding Wollheim's (1987: 62) controversial commitment to denying *trompe l'oeil* as a case of picturing (Lopes 2005: 38; Tavinor 2021: 70). Wollheim claims

that picturing requires seeing-in, and seeing-in requires configurational awareness. Consequently, *trompe l'oeil* images, which lack such awareness, do not constitute cases of picturing. Many take this to be an unhappy conclusion—*trompe l'oeil* images may generate a non-standard experience, but they are surely still instances of picturing! Denying that seeing-in requires perceptual awareness of the image surface, or any configurational aspect, thus allows seeing-in to encompass all picture perception. This allows a more unified account of the perception of pictures, including deviant cases such as *trompe l'oeil*.

This theoretical unity comes at a cost, however. Seeing-in was originally introduced by Wollheim to describe the experience the artist intends to generate in a spectator—that of seeing a picture *as* a picture (Wollheim 1987: 44–46). What it is like to see a picture as such is to have a twofold experience where one is aware of both its configuration and the representational content it encodes. In allowing perception of *trompe l'oeil* to constitute seeing-in, we lose the ability to capture the phenomenology of seeing a picture *as a picture*—for here we have pictures that we do not experience as such.[12] Given that the goal of this paper is to characterize the *phenomenology* of virtual reality, I will retain Wollheim's original formulation of seeing-in that requires configurational awareness, since this captures the distinctive phenomenology of experiencing certain kinds of image, even if it does not encompass all picture perception. On this conception of seeing-in, the intended or typical experience of virtual reality is not one of this kind.

4. The experience of virtual reality

I have argued that while many depictive images generate an experience of seeing-in, virtual reality typically does not. What, then, *is* it like to see virtual reality? The obvious answer is that it is not like seeing a picture at all—instead, it is more like seeing objects face-to-face, immediately before you. This is certainly the aim of much virtual reality. Depictive images typically enable seeing-in, where we are perceptually aware of both the configuration of the image as well as its representational content. Virtual reality, meanwhile, lacks such awareness of the image's configuration—the arrangement of lit pixels on a screen that encodes its representational content. In virtual reality, we instead have the appearance that objects are physically there before us, just as when we see objects in everyday perception.

Combining this view of the phenomenology of virtual reality with a natural view of virtual reality's metaphysics—that the virtual objects we see do not really exist—perception of virtual reality is *illusory*. We perceive screens that provide the illusion of objects present around us. Such illusionism is a widely espoused view of virtual reality perception (Grau 2004: 13–18; Lanier 2017: 1; Tavinor 2021: 67–71).[13] Psychologists in fact identify various different illusions that virtual reality can present—illusions that you are really

12 For recent criticism of Tavinor's (2021: 67–70) notion of seeing-in along similar lines, see Terrone (2025: 12).

13 Others, such as David Chalmers (2017: 327, 2022: 215–16), claim that virtual objects exist, and moreover appeal to the controversial thesis of cognitive penetration to maintain that we perceive them with a phenomenology of only *virtually* being there. On this combination of views, our perception in virtual reality is veridical. Macpherson (2020) offers an alternative view on which some aspects of virtual reality perception are illusory while others are veridical.

somewhere else (Slater 2018), that what you see is really there before you (Slater 2009), and that you have a different body (Petkova, Khoshnevis and Ehrsson 2011; Maselli and Slater 2013). A similar illusionist view is natural for *trompe l'oeil* perception—we are ultimately perceiving a canvas, which presents the appearance of objects before us that are not really there (Feagin 1998).

One exception to the illusionist view of virtual reality, however, is cases of 'passthrough', where we are offered a live presentation of our actual surroundings. Here, how things are presented in virtual reality is how they really are—our perception is veridical. Passthrough is arguably *transparent*: it allows us to genuinely see objects and people through virtual reality images, as Kendall Walton (1984) famously argues of photography and David Lewis (1980) of veridical hallucinations. Virtual reality potentially offers an even more plausible case of transparency than photography does, given its minimal delay and presentation of one's immediate surroundings.[14]

An experience like that of face-to-face perception, rather than one of seeing-in, is typically the aim of virtual reality. Yet current iterations of virtual reality often fail to achieve this aim. In the next section, I explore how this can instead generate a subtly different phenomenology.

5. Virtual twofoldness

Thus far, I have considered two different forms of experience that virtual reality might be said to elicit. First, I argued against the view that virtual reality generates an experience of seeing-in. Instead, I argued in the previous section that virtual reality aims at (and often succeeds in) recreating the phenomenology of experiences of the world and the objects around us. At the time of writing, however, virtual reality technology is far from perfect at realizing the above aim. It is therefore instructive to not only consider more refined, future versions of this technology, but additionally to attend to its current limitations, and how these affect the experience that virtual reality generates.

Seeing-in constitutes a *twofold* experience, featuring both a configurational and recognitional aspect: we are both aware of a configuration as well as what this configuration represents. It has largely been underappreciated, however, that one can have a twofold experience *without* seeing-in. Bence Nanay (2005) argues that Wollheim implicitly claims this in introducing the notion, since a twofold experience of both the represented object and the *way* it is represented is necessary for the aesthetic appreciation of pictures, but this is distinct from the twofoldness involved in seeing-in that requires configurational awareness of an image surface.[15] Meanwhile, Murray Smith (2011) examines the twofoldness of character in film and theatre, where audiences attend to both the character and the actor playing them—what is represented and *how* it is represented. Twofoldness describes a particular *structure* of experience where we are simultaneously aware of both the vehicle of

14 See Tavinor (2019) for further discussion of virtual transparency.

15 Nanay (2012) elsewhere offers a discussion of twofold experiences in a very different context—the appreciation of music—which again obviously does not involve seeing-in.

representation as well as its representational content. Seeing-in is just one twofold experience, for perceptual awareness of the physical configuration of an image is just one way we can be aware of the vehicle of representation. There are various other ways we might be perceptually aware of this vehicle without being aware of its physical configuration. Consequently, we can have a twofold experience *without* seeing-in. I will argue that virtual reality frequently offers experiences of this kind.

Not everything we experience when we put on a virtual reality headset is taken to be part of the represented scene. Visual bugs and glitches pervade virtual reality, as they do many developing digital technologies, and consequently we often experience various unintended and non-representational elements. Virtual objects can be pixelated or blurred, giving away their digital nature and lack of physical constitution. The straight edges of objects sometimes appear jagged—known as 'aliasing'—as diagonal lines are rendered across a grid of pixels. We experience these elements, yet we do not take it that the represented object is pixelated or jagged. Consequently, since they are not part of the representational content, these aspects constitute awareness of the vehicle of representation. There is a second aspect to our awareness, simultaneous to our awareness of represented content. Our experience is *twofold*. Yet this is so without our awareness of the configuration of virtual reality images—we have a twofold experience without seeing-in.

Virtual reality's use of the moving image offers further awareness of the representational vehicle. Virtual reality can stutter as individual frames are presented at uneven intervals. We experience 'screen tearing'—a briefly visible line across the screen as half of one frame is presented with half of another. Some glitches in virtual reality might be taken to contribute to the image's representational content—an image in which the lighting of a scene malfunctions might be taken to depict a scene with aberrant illumination.[16] Yet in cases of stuttering and screen tearing, these aspects are not experienced as part of the representational content at all. Instead, our experience constitutes a perceptual awareness of the vehicle of representation—the rapidly changing images we see—of which we are typically unaware in virtual reality and other media of the moving image.

Other awareness of the vehicle of representation can occur through the appearance of virtual objects. In augmented reality, which presents one's real surroundings with virtual objects superimposed, the two are often distinguished through the appearance of the latter. Virtual objects are rendered with a slight translucency to distinguish them from the physical objects we veridically perceive, such that we can easily determine whether an object we perceive is physically, or only virtually, there. When we see such translucent objects in augmented reality, our perception is similarly twofold, since we have awareness of the *way* virtual objects are represented, in addition to *what* they represent—yet without awareness of the configuration of the image as is required for seeing-in.

16 Of course, while this forms part of the *depicted* content, we might still disregard it from contributing to the *fictional* content, as we do typographical errors and other mistakes in literature (Matravers 2014: 131–35). Glitches in digital media such as videogames and virtual reality, however, do sometimes generate fictional content—see Van de Mosselaer and Wildman (2021) and Fisher (2022).

In the above cases, these elements enable awareness of the vehicle of our perception—the headset that generates the images we see. Here, virtual reality functions a little like a mirror, where small blemishes on the surface can give away that we are just seeing an image, rather than our being confronted face-to-face with what the mirror depicts.[17] In cases of passthrough in virtual and augmented reality, however, these elements of virtual reality can additionally generate an experience of *transparency*—they render us aware that we are experiencing our actual surroundings *through* a virtual medium, rather than directly. Here, virtual reality offers an experience more like that when we look through a murky window, aware of the medium while simultaneously seeing through it what lies beyond.

Virtual reality is not alone in offering twofold experiences without our seeing-in. Recognizing this category of experience allows us to capture the phenomenology of other media, such as holograms. Consider being confronted by a hologram such as that of Leia in *Star Wars: Episode IV*. Here, we might have an experience of seeing-in, where, even lacking perception of a surface, we see a configuration of physical space illuminated in such a way as to give rise to a representation of Leia. Now consider a more technologically advanced hologram, lacking the blue hue and tessellation that immediately draw attention to its configuration. Still, the translucency or flickering appearance of a holographic image might render us aware of its vehicle, yet without any perceptual awareness of the hologram's configuration and how this encodes its representational content. Our experience is again twofold without seeing-in—we are not visually aware of the physical configuration that generates the representational content, even though we are made aware that it is only an image through how it appears.[18]

Further examples of twofoldness without seeing-in arguably occur in cases of *inflection*. For most twofold experiences, we can characterize the two aspects independently of one another. For instance, we can be aware of a painted canvas and of Napoleon being represented. Neither aspect needs to be described in terms of the other. In certain special cases, however, elements of the vehicle of representation are *inflected* in the representational content we experience. Michael Podro (1998: 16–17; see also Hopkins 2010 and 2019) introduces the notion with the example of Rembrandt's ink sketch of Jan Cornelisz Sylvius: one cannot describe the depicted hand without reference to its inky configuration. Inflection has predominantly been discussed in the context of seeing-in, where one cannot describe what is represented without reference to the image's physical configuration—for instance, its surface markings. However, inflection can in principle occur within any twofold experience, whereby we cannot describe *what* is represented without reference to our awareness of the *vehicle* of representation.

The case of *trompe l'oeil* street art provides one such example of inflection without seeing-in. While perfectly executed *trompe l'oeil* can render us completely unaware of its vehicle, other cases enable awareness such that our experience of *what* is represented is inflected. At first, when we glance down the street, it appears that there is a gaping chasm in the road. Once we look more carefully, however, our phenomenology

17 On the perception of mirrors, and how it compares to picture perception involving seeing-in, see Voltolini (2021).

18 For discussion of the experience of perfect holograms, see Martin (2012: 340–42) and Hopkins (2020).

can change. We start to have the experience as of a chasm that seems to be comprised of chalk—even as we are unaware of the marked surface and how these markings generate the represented chasm. We can be perceptually aware of the chalky vehicle of the image *without* awareness of its physical configuration—the chalk markings themselves on the road surface.

A similar case of inflection without seeing-in can sometimes occur in our viewing paintings, where we find ourselves 'losing the surface' (Gombrich 1969: 60). We can lose perceptual awareness of the marked canvas (the painting's configuration), yet still experience a phenomenology clearly different from that of seeing the depicted objects face-to-face. We have an inflected experience of objects that appear to be made of paint. Here, we are perceptually aware of both *what* is represented and *how* it is represented—a single, twofold experience—yet we lack awareness of the configuration (the marked canvas) and hence do not see-in.

Virtual reality offers similar cases of inflection without seeing-in. Take the example discussed above of glitched lighting in a virtual reality scene. To characterize what we see represented, we must make reference to the representational vehicle and how this malfunctioning produces strange appearances. Our experience of *what* is represented is thereby inflected by the medium, but still without our awareness of the configuration of the images before each of our eyes.[19]

Of course, many of the above elements of virtual reality that render us aware of the vehicle, such that we have a twofold experience, are visual glitches that developers intend to eliminate. These are elements of *imperfect* virtual reality. Nonetheless, it is important to describe these elements of the actual experience that virtual reality presents, rather than focusing on futuristic, perfect virtual reality. Digital media such as virtual reality and videogames frequently contain such imperfections, which we cannot simply ignore when attempting to characterize our present engagement with them.

Let us briefly review the position I have defended before concluding with two implications first for the design of virtual reality, and second for philosophical debates regarding its metaphysics. I began by denying that virtual reality elicits an experience of seeing-in—the distinctive experience of most depictive images where we are perceptually aware of both a configuration and the representational content it encodes. Our experience of virtual reality typically lacks the former aspect. Instead, I have described two alternative forms of experience that virtual reality can generate. First, as is often its aim, virtual reality can produce experiences with a phenomenology of face-to-face perception. Second, the current state of virtual reality often generates a distinct *twofold* experience due to the presence of various visual elements that render us perceptually aware of the representational vehicle, yet without awareness of these images' configuration.

19 Hopkins (2019) argues that film can generate *temporally* inflected experience, where our experience of the representational content of the moving images we see can only be characterized with reference to the temporal properties of the moving pictures. Virtual reality, in sharing the moving image mechanics of film, similarly seems able to elicit such inflected experiences, again without seeing-in.

6. Implication 1: Deliberate twofoldness

One concern regarding virtual and augmented realities is their manipulative potential, as we may be rendered unable to distinguish virtual and physical elements in our experience. Virtual elements might be added to what we perceive, and physical aspects of the world removed or modified. Advertisers could exploit such capabilities to surreptitiously place products and brand logos in our environment, or governments to hide subversive imagery and events they do not want us to see. Furthermore, that virtual reality could present experiences difficult to distinguish from veridical perception generates concerns about potentially traumatic psychological effects when users take what they perceive to genuinely be occurring (Fisher 2025: §4.2). A related concern is that even if users are *not* deceived into thinking that what they experience is actually happening, the perspectival *similarity* of virtual reality to undergoing real events might still be distressing, triggering strong emotional reactions (Ordóñez Angulo 2023; Fisher 2025: §4.3).

An experience like that of face-to-face perception might be important for artistic and entertainment uses of virtual reality, for its use in training, or in the context of exposure therapy where simulating the experience of feared stimuli is key to its effectiveness. In other cases, however, we might think it necessary to ensure that users remain cognitively aware of the virtual nature of what they experience to avoid the above forms of manipulation and harm.

One way of ensuring that users remain cognitively aware of the virtual aspects of what they experience is through presenting *content* in virtual reality that makes immediately apparent its virtual nature. Virtual objects are sometimes rendered in a cartoonish or highly stylized manner to distinguish them from physical objects. Another strategy, however, is to render users perceptually aware of the vehicle of representation through *how* content is presented. While the elements of virtual reality I discussed in the previous section—pixelation, aliasing, and aberrant lighting—are unintended visual glitches, we can deliberately present similar elements, such as translucent objects, with the aim of ensuring that users remain cognitively aware that some or all of what they experience is only virtual. Rather than a mere unintended aspect of current iterations of virtual reality, the twofold experience I described in the previous section is one we might sometimes *aim* at eliciting. Of course, the presence of the above elements does not guarantee a twofold experience. *Trompe l'oeil* images contain configurational elements visible upon very close inspection, yet we are often initially unaware of them. Even if virtual reality contains noticeable features giving away its virtual nature, we might be initially, or over time become, unaware of these aspects—especially if there are significant other demands on our attention.

Nonetheless, if our goal is to render users cognitively aware that they are in virtual reality, and to signal which elements are virtual and which are physical, we might be best served by employing a mixture of elements that concern *how* content is represented, as well as *what* is represented. Careful thought is required regarding how best to ensure users' cognitive awareness that they are in virtual reality in potentially harmful scenarios. Examination of the phenomenology of virtual reality, however, illustrates that the experience we have of common technical glitches can in other contexts be beneficial in guarding against some of virtual reality's potential harms.

7. Implication 2: Virtual fictionalism

The view I have defended of the phenomenology of virtual reality has further consequences for recent debates regarding the metaphysics of virtual reality. Virtual fictionalism holds that objects and events in virtual reality are fictional and do not exist. Neil McDonnell and Nathan Wildman (2019; Wildman and McDonnell 2020) defend a particular form of virtual fictionalism inspired by Kendall Walton's (1990) influential account of fiction.[20] Walton holds that works of fiction are those whose function it is to serve as *props* in games of *make-believe*—in short, fiction is that which prompts us to imagine various things.[21] McDonnell and Wildman (2019: 391–92) argue that virtual reality meets this criterion—it presents various sounds, images, and haptic feedback that prompt us to imagine—and consequently is fictional in Walton's sense.

Virtual fictionalism is proposed as a *global* view of virtual reality: all virtual reality is fictional in that it merely represents things rather than virtual objects *really existing* (McDonnell and Wildman 2019: 391).[22] For all virtual reality to be fictional in Walton's sense, however, imagination must be prescribed in each instance. One potential way of establishing this would be to hold that our perception of virtual reality necessarily prescribes imagination, and hence *all* virtual reality is fictional. Yet the fact that virtual reality typically lacks seeing-in precludes this initially appealing argument a virtual fictionalist might make.

Seeing-in, as I introduced it above, is a single experience with two aspects: awareness of an image's configuration, and a recognitional awareness of its representational content that Wollheim describes as *analogous* to seeing the object face-to-face. Wollheim (1987: 46–47) himself is notoriously cryptic on what exactly this analogy consists of. Walton (1992: 281–87, 2002: 27–35) takes up the challenge, however, describing the relation between the recognitional aspect of seeing-in and seeing face-to-face in terms of imagination. Walton claims that when we view a picture, we imagine *of this perception* that it is perception of the depicted object. When I view a painting of a lighthouse, I actually see a painting, but I imagine *of my seeing the painting* that it is seeing a lighthouse. Our experience of depictive images is twofold as we *actually* see the image and *imagine* seeing the depicted object. Consequently, the relation between the recognitional aspect of seeing-in and seeing face-to-face is that the former comprises *imagining* seeing face-to-face. Walton's view therefore has the striking result that depictive images are fictional 'by definition' (1990: 351): to be fictional is just to prescribe imagination, and *all* images prescribe

20 While some take fictional objects to exist as abstract, possible, or Meinongian objects, Walton's account involves an *anti-realist* view of fictional objects (Walton 1990). For discussion of alternative fictionalist approaches to virtual reality, see Juul (2019), Beisbart (2019), and Koch (2022: 771–72).

21 This notion of fiction outstrips our ordinary concept, including seemingly non-fictional works such as vivid historical accounts, which equally prescribe imagining (Friend 2008). Interestingly, Walton (2015) has recently abandoned his (1990: 39) claim that a prescription to imagine p is sufficient for p to be fictional. See García-Carpintero (2019) and Friend (2021) in defense of Walton's earlier self, however.

22 The contrast is with David Chalmers' (2017, 2022) *virtual realism,* which holds that objects and events in virtual reality genuinely exist as digital objects on computers.

imagination insofar as they elicit seeing-in. This Waltonian view of depictive images is highly controversial and has received extensive discussion and criticism.[23] For now, however, let us grant it, for I will show that even if it is true, it cannot establish virtual fictionalism as the global view its defenders seek.

McDonnell and Wildman describe our engagement with virtual reality as follows:

> [P]roper engagement with VR is a kind of make-believe, featuring VR specific props and principles of generation. These VR specific props include digital elements like the particular images, sounds, and haptic feedback mechanisms employed by VR systems. Such elements really exist—we see, hear, and feel them whenever we engage with VR applications.
> (McDonnell and Wildman 2019: 391)

Images, sounds, and haptic feedback thereby function as props in games of make-believe. In what sense do these props prescribe us to imagine? One possible answer, drawing on Walton's view of depiction, is that virtual reality images prompt us to imagine that our perception of them is of the things they represent. The same can be held of sounds and haptic feedback—we imagine of our experience that it is of what these elements represent. Consequently, our perception of virtual reality prescribes imagination, and all cases of virtual reality constitute fiction in Walton's sense.

The trouble with this argument for global virtual fictionalism is that, as we have seen, virtual reality offers an atypical form of picturing—one that I have argued usually does *not* elicit seeing-in. Walton claims that seeing-in is to be explained in terms of imagination, but virtual reality often does not generate this experience. Consequently, even if depictive images that enable seeing-in are fictional by definition, as Walton holds, virtual reality images are not. Walton (1992: 291ff) in fact admits a similar point for *trompe l'oeil* images, which I have likened to virtual reality—such images do not generate seeing-in. Since we lack perceptual awareness of the configuration of virtual reality and *trompe l'oeil* images, there is no experience to imagine *of* that it is otherwise. The virtual fictionalist therefore cannot appeal to Walton's (independently dubious) view of depiction to establish that all instances of virtual reality are fictional. To argue for this global fictionalist position, they instead require a different sense of imagination prescribed by all virtual reality.

While this is an issue that deserves fuller discussion, it is worth briefly noting the immediate problem that afflicts one seemingly plausible alternative. The virtual fictionalist might instead opt for a propositional sense of imagination, rather than the perceptual form Walton appealed to. On this view, when we see ourselves swimming with sharks in virtual reality, we propositionally imagine *that we are swimming with sharks*. While this seems to capture how we engage with many cases of virtual reality, the immediate difficulty is to explain how cases of passthrough prescribe propositional imagination. Here, we do not imagine, but rather *believe*, what we see in virtual reality, for we see our immediate surroundings as they actually are. I close, then, with an open challenge for the virtual

23 For criticism, see Budd (1992, 2008), Hopkins (1998: 20–22), Wollheim (1998: 224–25), Nanay (2004, 2021), and Stock (2008). Alon Chasid (2016: 44) has recently offered a refinement of Walton's view that attempts to evade some of these issues.

fictionalist: to provide a sense of imagination prescribed by *all* virtual reality so as to justify a global virtual fictionalism.[24]

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