The World of Screen Creatures

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> **Context** · Some scholars have put forward constructivist world models in which the purported external world is constructed from experience (i.e., there is a constructive relation between them). However, scholars disagree about whether experience is generated by the brain and results from the perception of the purported external world (i.e., whether there are generative relations and perceptual relations). > **Problem** · Do we need to maintain perceptual relations or generative relations in a constructivist world model? > **Method** · I propose a world model where our world is composed of a large number of screen creatures, and this is compared with the world model in the irrealist virtual world theory. There is a constructive relation in both world models, but only the second world model contains generative and perceptual relations. I provide reasons to doubt that the world model in the irrealist virtual world theory can provide sufficient reasons for involving generative or perceptual relations. > **Results** · We should accept the world model composed of screen creatures as the model of our world; we do not need to retain perceptual or generative relations in a constructivist world model. > **Implications** · This article points out that perceptual relations stem from a misunderstanding of certain correlations between experiences. This will generate some new ideas when considering the mind–matter problem. > **Constructivist content** · This article discusses how to deal with generative and perceptual relations using constructivist world models. > **Key words** · Conscious experience, constructivism, mind–matter problem, irrealism, representationalism, the hard problem, virtual world theory.

Introduction

« 1 » In Liu (2022a, 2022b) I develop a *constructivist worldview* based on Nelson Goodman's starmaking constructivism and argue that all features in the purported external world are constructed from conscious experiences.[1] I classify all features of the world into lc-properties and pc-properties and argue that the former are constructed by language and the latter are constructed from phenomenal experience. Considering that language can be understood as related linguistic experiences, all features are constructed from experience. I also claim that experience is neither generated from activities in the brain nor is a perception of the purported external world (Liu 2022a: Footnote 21, 2022b: §5). In other words, there is a *constructive relation* between experience and the purported external world, but there is no *generative relation* or *perceptual relation* between them (see the next section for an explanation of these relations). However, these publications do not provide detailed arguments for the claims about generative and perceptual relations. Hence, one of the aims of this article is to articulate a world model that provides locations for experiences and the purported external world (including the brain) and makes the view about removing generative and perceptual relations more concrete and plausible.[2] In contrast, Jan Westerhoff (2016, 2020) proposes an irrealist virtual world (IVW) theory that also holds the view that the purported external world is constructed from a representational interface that corresponds to perceptual experience. Moreover, the IVW theory suggests that experience is generated from activities in the brain, and perceptual experience results from the perception of the purported external world. Considering the above similarities and differences between the constructivist worldview and the IVW theory, these concepts should be compared to determine whether a constructivist world model needs to contain a generative or a perceptual relation.

« 2 » The following section introduces the world model in the IVW theory. This is followed by a proposal of a new world model that does not contain any generative or per-

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1| Some terminology clarifications are needed. Representationalism, the virtual world theory, and realism accept an "external world" in the common-sense way of speaking (i.e., an external world independent of experience). Westerhoff's IVW theory, Liu (2022a, 2022b), and my new world model (as presented in Section "World of Screen Creature") do not accept such an external world in the common sense, but understand the purported external world as constructed from experience (or from the representational interface). Correspondingly, I use "the external world" or "external objects" (with quotation marks) when I refer to representationalism, the virtual world theory, or the realist understanding of the world, and use "the purported external world" or "the purported external objects" when I discuss Westerhoff's IVW theory, Liu (2022a, 2022b), or my new world model.

2| It is worth noting the difference between the terms "world model" and "model" as used in this article. The term "world model" describes the basic structure of our world. For example, Westerhoff's world model includes the elements of the inner surface of the spheres, and the purported external world (considered a part of the virtual world) is constructed from these elements. More-over, his world model contains both the generative and perceptual relations (see § 8). My world model is composed of a great number of screens, and there is only a constructive relation between the content on screens and a 3D environment (see §§15, 17). In contrast, the term "model" refers to a constructed structure. For instance, according to Westerhoff's theory, the virtual world is a model constructed by our brains. In my world model, the 3D environment is a constructed model.

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ceptual relation and is compatible with the constructivist worldview. Finally, the two world models are compared to achieve the second aim of this article, which is to argue that we do not need to retain a generative or perceptual relation in a constructivist world model. Moreover, rejecting the generative relation in the second aim can be construed as an attempt to resolve the hard problem in the philosophy of mind (see section "R4").

IVW theory

« 3 » The IVW theory, proposed by Westerhoff (2016, 2020), is a combination of the virtual world (VW) theory and irrealism. The VW theory was developed from traditional representationalism in which the typical pattern of perception is as follows (Westerhoff 2016: 511):

$$\text{perceiver} \rightarrow \text{percept} \ || \ \genfrac{}{}{0pt}{}{\text{veil of}}{\text{perception}} \ || \leftarrow \text{object}$$

"External objects" cannot be directly perceived because they are behind a veil of perception. The percepts, with which a perceiver can be directly acquainted, are merely the "representational objects" (of the associated "external objects") (Westerhoff 2020: 65). For example, perceivers can be directly acquainted with sense data, which is the representational object rather than the "external objects" themselves. In representationalism, the "external world" plays an important role because it brings about perception. Westerhoff (2016: 512f, 2020: 65f) argues that most traditional representationalism is not compatible with naturalism, as it is difficult to locate sense data in a naturalistic framework. He also argues that it is difficult to explain how sense data can break "the appearance/reality distinction" (Westerhoff 2020: 65). That is, sense data share some features with "external objects" but are also connected to the internal mind of the perceiver.

« 4 » The VW theory (Revonsuo 1995; Dawkins 1999; Lehar 2003; Metzinger 2009; Westerhoff 2016: 508f) is a new development of representationalism, and it is compatible with naturalism. The VW theory suggests that the world we live in is virtual. In other words, our familiar environment, which includes ordinary objects such as rocks and trees, is, strictly speak-

ing, a virtual world. The virtual world is a model constructed by our brains based on "sensory input" received from the "external world" (Westerhoff 2016: 511).[3] For example, Thomas Metzinger (2009: 6f, 23) argues that the content of a person's conscious experience can be construed as a real-time simulated world, and a person's brain is what generates it. The real-time simulated world is so immersive that the person cannot become aware that they are facing an image in a virtual world; instead, they believe that they are perceiving and interacting with the "external world." Westerhoff argues that the VW theory is compatible with naturalism in the sense that the virtual world does not need to be mind-dependent (like sense data) and can be spelled out in naturalistic terms. Moreover, unlike sense data, the features of the virtual world do not directly share features with the "external world"; they can be different. Thus, brains in the "external world" can fulfil their function according to the naturalistic framework.

« 5 » Westerhoff (2016: 47–50, 2020: 517–521) classifies the VW theory into strong and weak accounts. In the strong account, there is a considerable correspondence between features in the virtual world and in the "external world." Westerhoff argues that the difficulty of the strong VW theory is that we cannot gain a perspective external to the virtual world. If we agree with this premise, then we cannot compare the virtual world with the "external world." According to the weak VW theory, the "external world" merely exists, but we cannot say anything more about it. Westerhoff argues that even the notion of existence belongs to the conceptual resources in the virtual world. Thus, if we cannot gain a perspective external to the virtual world, then we cannot apply the notion of existence to the "external world."

« 6 » Westerhoff (2016: 521f, 2020: 52–57) then proposes the IVW theory,

which can also be seen as a world model.[4] The IVW theory integrates the VW theory and irrealism.[5] Along the line of irrealism, Westerhoff argues that the purported external world is constructed from the representational interface and cannot exist outside of the virtual world. First, he explains the notion of the *representational interface* using a *metaphor of a sphere* (or a spherical metaphor, in Westerhoff's terms); that is, a person's representational interface can be understood as a sphere with a one-meter diameter that is centred on the person's navel (Westerhoff 2020: 53f, 80). The inner surface of the sphere works like a television screen that the external environment is projected onto, and a person sees the inner surface. Thus, the elements of the inner surface correspond to the person's visual perceptions. Other perceptions, such as sound, touch and so on, can be added to the inner surface. As a result, the elements of the representational interface cover all of our representations and make up the virtual world. Second, he argues that the purported external world is already conceptual "through and through" and all of our conceptual resources are in the virtual world and are derived from the elements of the representational interface (2020: 63). Hence, the purported external world is a complex structure constructed from the representational interface. Westerhoff (2016: 513f, 2020: 99–142) also argues that other entities in the internal world, such as the self or the perceiver, are constructed from the representational interface.[6]

3| Antti Revonsuo (1995: 49f, 55) provided a more specific explanation of the notion of virtual. Those features in our familiar environment may appear far away from our bodies, but the neurophysiological activities underlying these features are located in our brains. Therefore, it is proper to understand these familiar features as virtual.

4| In this article, I construe the IVW theory as a world model and subsequently compare it with my own world model. As a result, the terms "the IVW theory," "the IVW theory's world model," and "Westerhoff's world model" are used interchangeably.

5| Irrealism questions the independent existence of the external world. Irrealists such as Goodman argue that external objects are constructed, and the use of language (or its conceptualisation) plays an important role in this construction.

6| In the constructivist worldview, the self and the perceiver are also constructed from experience (Liu 2022a: §36, 2022b: §3). As long as these internal entities are constructed, they will not affect the argument in this article. Hence, I do not discuss these internal entities in detail, and

« 7 » The first advantage of the IVW theory is that it is compatible with the naturalistic framework in the sense that brains still have the same function as in the VW theory, that is, the virtual world is generated from activities in the brain. The second advantage of the IVW theory is that it avoids the problem of the external perspective in the strong or weak accounts of the VW theory because the represented (i.e., the purported external world) is still inside the realm of the virtual world.

« 8 » According to the IVW theory, there are two relations between the representational interface and the purported external world. One is a constructive relation, in which the purported external world is constructed from the representational interface, and the second is a perceptual relation, in which the elements in the representational interface are the result of perceiving the purported external world. In other words, there are *perceptual processes* in the IVW theory's world model. The perceptual process is understood as a series of neurological activities, including, for example, a purported external object stimulating our nerve-endings, stimuli passing to the brain, and the brain generating a comprehensive conscious experience involving different senses (Westerhoff 2020: 52). Although Westerhoff does not pay attention to explaining the generation of the perception from activities in the brain (i.e., a generative relation) in detail, his perceptual relation requires the generative relation as an important step.[7]

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most of the discussion is about the purported external world.

7 | On one hand, Westerhoff accepts the generative relation in the VW theory (for example, see the name of his 2016 publication, "What It Means to Live in a Virtual World *Generated* by Our Brain," emphasis added). On the other hand, I agree that Westerhoff's (2016, 2020) main purpose for proposing IVW theory is to relocate the purported external world to the realm of the virtual world, rather than to discuss the generative relation (see Westerhoff 2016: 521). Thus, this article is a development of rather than an objection to Westerhoff's world model. In other words, after involving the constructivist relation in a world model, we could continue to discuss whether the world model still needs a generative relation.

« 9 » The next section proposes a new world model that can roughly be seen as removing the perceptual and generative relations from the IVW theory's world model. The new world model is compatible with the constructivist worldview, which will be discussed in the Section "Similarities and differences" below.

World of screen creatures

« 10 » Westerhoff (2020: 53f) explains the IVW theory by virtue of a metaphor of a sphere and the inner surfaces of spheres working like television screens. Similarly, the world model articulated in this section will use the world of screen creatures as a metaphor that also begins with screens.[8] Suppose that a universe, U, has only seven screens. The universe U can have many screens, but I have specified their number as seven for clear articulation. The content displayed on the seven screens duplicates the content on seven screens in a first-person shooter (FPS) video game. FPS games, like Valorant and Counter-Strike: Global Offensive, usually present a designed 3D environment scene on several players' screens. Suppose that the game's 3D environment includes the sky, ground, walls, buildings and characters. Each player controls a character in the 3D environment to participate in a skirmish. We can also say that each character has a corresponding screen and each screen has a corresponding character. What is shown on a screen is the scene of the 3D environment seen from the perspective of the corresponding character. We can say that the series of images on a screen is from the first-person perspective. Now, we duplicate the seven series of images in the FPS game to the seven screens in universe U. Similarly, we can say that images on one screen in the universe U are also the images of a 3D environment from the first-person perspective of a corresponding character (the 3D environment and characters in universe U are explained below). To explain it

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8 | Many scholars consider the problem of the conscious experience (or the external world) by appealing to metaphors, and screens are also a common element in these considerations (Stroud 1984: 33; Revonsuo 1995: 47).

well, I need to clarify again what is contained in my world model and what is used solely to explain the content in my world model, but my world model itself does not include it. My world model is the universe U, which only contains the seven series of images, at this stage. The seven series of images on the seven screens in the FPS game and the seven physical screens used in the above FPS game are not in my world model, and I use them only to explain what the images on my world model are. It is also worth noting that in universe U, no perceivers are in front of any screen. Moreover, the universe does not contain physical screens, only the content on the screens (i.e., seven series of images). The difference between a physical screen and the content on a screen can be understood as the difference between a physical monitor and a series of images in an FPS game. Hereafter I sometimes use "screens" for short, even though what I am referring to is the content on the screens.

« 11 » Just like in FPS games, there are correlations between the change of content on a screen and the movement of the corresponding character in universe U. For example, when a character turns left, the image on the associated screen turns left, that is, the image becomes the scene that will be seen by the character after they turn left. The result may be that the image of a building on the left of the character starts to appear on the screen. Moreover, in the other screens that show this character, the character also turns left. We can say, then, that the content on the screens corresponds to the corresponding character's visual experiences in the following sense: under a realist understanding, if the 3D environment exists and a person performs the same movements as the character, then the change in the person's visual experiences will be the same as the change of content on the screen.[9]

« 12 » Just like Westerhoff adds other perceptions to the representational interface, the content on the screens can be extended to cover other types of experiences,

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9 | In this article, I assume that realists still accept the appearance of conscious experiences. This is a position close to the identity theory of consciousness (rather than eliminative physicalism) (see type-a and type-b materialism in Chalmers 1997).

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for example, auditory experiences, tactile experiences, bodily sensations, conscious thoughts (which can be words or sentences displayed at another additional bottom part of the screen), mental imagery, emotions and so on.[10] In this sense, we can reproduce a person's conscious experiences on a screen.

« 13 » The screens can also be construed as intelligent screens that can think and reason, and we can understand the intelligence of screens in a purely behavioural sense. This does not mean that the intelligence is identical to certain behaviours, but rather that the intelligence is illustrated by what happens on the screen, which can be construed as the behaviour of the screens. For example, after the aforementioned change of images on a screen – the image of a building to the left of a character starts to appear on the screen – a sentence appears at the bottom of the screen associated with a conscious thought: "I am turning left." This can be seen as the intelligent screen's conscious thought, through which we know the intelligent screen's understanding of their environment and of who they are (this will be explained below). We can also understand the intelligent screens' utterances or communications similarly, that is, mainly through the change of visual experiences, auditory experiences and bodily sensations on the screens. For example, under a realist understanding, when a person is speaking and other people are listening, they have several series of related visual experiences, auditory experiences and bodily sensations. If these series of experiences are duplicated on several screens in universe U, then we can say that these screens are speaking and listening. As these screens are intelligent, I call them *screen creatures*. Correspondingly, universe U is called *the world of screen creatures* (WSC); a world composed of a large number of screen creatures.

« 14 » Based on screen creatures' behaviours, it is reasonable to suppose that many of them understand their world in a realistic way.[11] This is illustrated by the aforementioned screen creature's conscious thought of "I am turning left," which means that they understand themselves as characters living in a 3D environment. These screen creatures have similar visual experiences (and other types of experiences) to ours. Based on our perceptual (especially visual) experience, many people believe that we are living in an independent 3D environment, and that each person has a body. Hence, it is natural that many screen creatures make similar inferences based on similar evidence and, therefore, understand their environment and themselves in the same realistic way.

« 15 » However, as the WSC is merely composed of screens, we need to re-explain the screen creatures' understanding. Just as players in an FPS game can construct a 3D model from 2D images on their screens, screen creatures can do the same.[12] The 3D environment in the WSC is constructed by screen creatures from the content on screens, especially from the parts corresponding to visual experiences. The 3D environment contains many constructed 3D objects, for example, the sky, the ground, buildings, characters and other ordinary objects. In the WSC, each screen creature is a screen and should regard the screen as its "body." However, screen creatures mistakenly construe the constructed 3D environment as an independently existing "external world." Moreover, each screen mistakenly takes the character corresponding to it as its body. Each character is a 3D object constructed mainly from people-shaped images in the centre of the corresponding screen and other people-shaped images associated with characters on other screens.

« 16 » Following the realist line of thought, screen creatures understand the content on a screen as their experience, which is generated from the activities of constructed brains, and perceptual experiences are the result of their perception of the "external world." We also need to re-explain this point in the context of the WSC. First, there are still *perceptual phenomena* in the WSC, which are the correlations between, on the one hand, the changing positions of our bodies and sensory organs and, on the other hand, the change in our conscious experience. For example, when a character turns their head left, the building to the left-hand side of the character appears in their experiences, that is, it appears on the corresponding screen. Perceptual phenomena are straightforward descriptions of perceptions, and they are prior to (or neutral with respect to) the more complicated explanations given by other theories. Second, there is no perceptual relation in the WSC. In the constructed 3D environment, there are still processes, which include 3D objects, say, an orange, stimulating a character's nerve-endings, stimuli passing to the character's brain, and even the brain generating some muscle signal to control the character's hand to grasp the orange. However, such processes in the 3D environment do not generate the content on screens, for example, the perception of the orange, and cannot be counted as perceptual processes. In this sense, there are no perceptual processes in the WSC. We can understand this point by considering an FPS game, which includes scenarios of observing the reaction of a character's neural and muscle systems when the character is looking at an orange. The activities in the character's brain do not generate the content on the corresponding screen.

« 17 » Perceptual phenomena are explained as certain correlations between different content on screens, or more precisely, between the content from which the changing positions of our bodies and sensory organs are constructed and the content that is understood as the associated changing experience. For perceptual phenomena to appear in the WSC, the content on the screens must match a regularity, which can be called the first-person principle (i.e., the content on a particular screen is the scene of the constructed 3D environment observed from

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10 | These types of experiences, among others, are listed in Chalmers's (1996: 6–11) classification of the content of conscious experiences.

11 | Since I reject the realist understanding of the world in this article, the descriptions after "understand their world in a realistic way" (in §14) and after "Following the realist line of thought" (in §16) are a misunderstanding of the WSC by some screen creatures; the view articulated after "we need to re-explain screen creatures' understanding" (in §15) and "We also need to re-explain this point" (in §16) is the proper interpretation of the situation in the WSC.

12 | I do not insist that the content on screens must be 2D, for visual experiences can be 3D. The 3D environment can be construed from these 3D visual experiences. Speaking of 2D content fits the FPS games analogy. Hereafter I use "2D" and "3D" to distinguish content on screens and constructed environments.

the corresponding constructed character's perspective). The first-person principle can be extended to cover other types of experiences besides visual experiences.[13]

« 18 » The key views held by the screen creatures, who follow the realist line of thought, are as follows:

- The "external world" exists (independently of experience).
- Perceptual experiences are the result of the perception of the "external world" and experiences are generated by activities in the brain.

I call their views the realist understanding of the world. If there is a world that meets these two conditions, I will call it the realist world. Roughly speaking, compared to the realist understanding of the world, both the IVW theory and WSC reject the first point of view. The difference between the IVW theory and WSC regards the second point of view. Hence, comparing the WSC and IVW theory helps to answer the question of whether we should retain a perceptual relation (and a generative relation) in a constructivist world model.

Comparison

« 19 » Before making a detailed comparison, I should stress that the WSC is not a refinement of Westerhoff's world model. If this were so, the argument for the WSC would begin from the same assumptions used by the IVW theory (e.g., the mainstream view in cognitive science that the brain produces a kind of virtual world, composed of our experiences). The WSC is an alternative to the

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13 | FPS game mechanisms allow changing the observation point from a first-person one. For example, in the game PlayerUnknown's Battlegrounds, people can switch between the first-person perspective and the third-person perspective. From the third-person perspective, the observation point is not fixed to the character's eyes but can be understood as the observation point of a drone flying behind and above the character. Similarly, the WSC setting also permits regularities that are different from the first-person principle; therefore, we can explain some of our special experiences, such as out-of-body experiences in drug use, dreams or reports of near-death experiences.

IVW theory. There are two ways to argue for an alternative world model. One can reject the IVW theory and related points of view, for example, the view that the purported external world is constructed from conscious experiences (outlined in the similarities and differences section), the view that the world model is only committed to the existence of the representational interface (presented in the R2 section) and the view that all explanatory power should arise from the representational interface (see the R3 section for more details). Such an argument has to provide independent justification, that is, it cannot use the related points of view in the IVW theory because these views have been rejected and an alternative has been offered. In contrast, I argue for another kind of alternative world model from the perspective of those who already accept the IVW theory as the preferred world model of our world and agree with the related points of view. From this starting position, I argue that the WSC is preferable by comparing two world models using general criteria such as empirical equivalence, parsimony and explanatory power. Moreover, my argument can use the related points of view in the IVW theory because I agree with them. In other words, my world model is far removed from the realist understanding of the world, but fortunately, the IVW theory is halfway between my world model and the realist understanding of the world. Thus, I argue that if the IVW theory is accepted along with some of the related points of view, then it is possible that, following the aforementioned criteria, people could be persuaded to adopt the WSC instead.

Similarities and differences

« 20 » Before comparing the WSC and IVW theory according to the aforementioned criteria, some of the key similarities and differences between them need to be clarified. Following the clarification, I argue that the WSC is compatible with the constructivist worldview and, thus, can be construed as a supplement to the constructivist worldview.

« 21 » The first point to make is that, on the one hand, the content on WSC screens is similar to the elements of the representational interface in the IVW theory because both of them correspond to conscious ex-

periences. Considering the metaphor of a sphere, the elements of the representational interface in the IVW theory can be understood as different types of perceptual experiences.[14] In the WSC, the content on screens includes other types of experiences, for example, conscious thought, mental imagery, emotions and so on. This is a reasonable extension, because both other types of experiences and perceptual experiences are contents of conscious experience and we should treat them as on a par. Westerhoff pays more attention to keeping the analogy between the IVW theory and the normal understanding of space; therefore, he describes the sphere as being a similar size to a person that is located around the person's navel. However, considering that space is constructed from the representational interface in the IVW theory, we should have more freedom to shape the interfaces, such as by construing them as a screen in FPS games. From the content on these screens, a 3D environment containing normal space can also be constructed.

« 22 » Second, both the WSC and IVW theory hold that the purported external world is constructed from experiences (from the content on screens in the WSC and from the representational interface in the IVW theory). In other words, the two world models agree with the constructive relation. However, the mechanisms of construction in the two world models are a bit different. Westerhoff argues that the purported external world is fully conceptualised, and a conceptual resource can only be derived from the elements of the representational interface. In contrast, the construction relation in the WSC follows the mechanism of the constructivist worldview. That is, the purported external world is composed of lc-properties

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14 | Westerhoff locates the representational interface in a naturalistic framework and this means that he may not agree that the representational interface is mind-dependent, like experience in common sense is. However, as the generative relation is in question in this article, the location of experience in the mind–matter dichotomy (or other frameworks) is still an open question rather than a condition to reject this understanding at this stage. We could understand the representational interface element as experiences in the sense that they have the same forms.

and pc-properties, and these properties can be explained as constructed from language (which can be understood as linguistic experience) and experience respectively. After extending the scope of the constructans to cover experiences, we can find the constructans for all properties (even those manifesting before the appearance of language) and make sure that the manifestation of properties is not prior to the appearance of associated constructans in a straightforward way. This is the main advantage of construction in the constructivist worldview with respect to construction by virtue of conceptualisation.[15]

« 23 » Third, the key difference between the WSC and the IVW theory is whether there is a perceptual relation (or a generative relation). The IVW theory is a development of the VW theory, and both retain a perceptual relation. More precisely, in the IVW theory, the representational interface is the perception of the purported external world and is generated by the brain, although the perception of the purported external world and the brain are inside a virtual world. In contrast, in the WSC, there is no perceptual relation, and perceptual phenomena are explained by correlations between different content on the screen. If the content on the screen meets the regularity of the first-person principle, then the perceptual phenomena can be obtained.

« 24 » To some extent, the WSC can be understood as a kind of eliminative phenomenalism, because it agrees that experience (the content on screens) is all there is in the sense that the purported external world (and other internal entities, such as the self or the perceiver) is constructed from experience. Westerhoff (2016: 521f, 2022: 55f) understands eliminative phenomenalism as claiming that the right-hand side of the veil of perception in the typical pattern of perception is emptiness.[16] He objects to eliminative phenomenalism by arguing that eliminative phenomenalists who make a claim about the right-hand side of the veil of perception require a perspective that is

external to the virtual world, but we cannot gain such a perspective.

« 25 » However, this objection is not suitable for the WSC. The WSC rejects the entire pattern of perception and, thus, should not be construed as making a claim about the right-hand side of the pattern. First, I reject the entire pattern of perception in the sense that such a pattern does not have an instance in our world. In other words, we can imagine and discuss this imagined pattern, but our world does not possess this pattern. Second, Westerhoff's external perceptive problem is not suitable for my objection to the pattern of perception. The rejection of the right-hand side requires external perception; however, the rejection of the pattern of perception is based on experience and does not require external perception. If opponents cannot provide a plausible explanation of the pattern of perception in our world based on experience, it can be considered a rejection of the pattern of perception. I doubt that they can provide a plausible explanation, and this article is written to substantiate my doubt. Third, a view that explicitly rejects (or supports) the right-hand side, is based on accepting the pattern of perception (as a pattern of our world), which defines the right-hand side. Without accepting the pattern of perception, rejecting (or supporting) the right-hand side cannot even get off the ground. Thus, my approach is to explain away the right-hand side rather than outright rejecting it.

« 26 » We could understand that the WSC tries to explain perceptual phenomena merely by virtue of correlations between different experiences, and this kind of explanation is from an internal perspective of the realm of experience. Correspondingly, the expression that universe U is composed of a great number of screens does not imply that these screens are organised like many DVDs in a rack, because the space between the DVDs does not have a counterpart in universe U. Rather, we should understand the content on a screen as an aspect of the universe, which is constructed from these aspects. The term "aspect" in this sentence can be understood similarly to how it is used when we say that the series of images displayed on a single screen during an FPS game is one aspect of the 3D model constructed from these 2D images. This is the

proper understanding of the WSC from the internal perspective of screen creatures.

« 27 » After clarifying the similarities and differences, I also need to demonstrate that the WSC is compatible with the constructivist worldview; therefore, the mechanism of construction in the constructivist worldview can be adopted and the WSC construed as a detailed articulation of my claims about generative and perceptual relations (see the introduction section). My argument for the constructivist worldview is divided into two parts (Liu 2022b: §2). The first part of my argument was that the purported external world is constructed by virtue of experience. By appealing to the WSC, I reject the perceptual relation and the right-hand side of the typical pattern of perceptual relations, where the purported external world located in realist understanding becomes meaningless. This implies that the purported external world should be explained inside the realm of experience, which aligns with the first part of my argument. The second part of my argument was that experience is constructed. This part is also compatible with the WSC, because the content on screens (experience) in the WSC does not need to be foundational or exist independently and can be constructed if we analyse it further.

« 28 » The following sections present an argument for the view that we should prefer the WSC over the IVW theory based on the following reasons:

R1 The WSC and the IVW theory are empirically equivalent.

R2 The WSC and the IVW theory have similar degrees of parsimony.

R3 The WSC and the IVW theory have similar degrees of explanatory power.

R4 As the WSC provides a simpler explanation for perceptual phenomena, it is doubtful that the same explanantia would be sufficient for the more complicated explanation of the perceptual phenomena (i.e., perceptual relations) in the IVW theory.

R1 Empirical equivalence

« 29 » I argue that the WSC and the realist world (rather than the world in the IVW theory) are empirically equivalent, considering that people are more familiar with the realist understanding of the world

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15| See Liu (2022b: §18) for articulation of other advantages.

16| See the typical pattern of perception at the beginning of the IVW theory section.

than the IVW theory.[17] This argument is also suitable for the empirical equivalence between the WSC and IVW theory because it is not affected by whether the "external world" independently exists or is construed (this is the main difference between the realist understanding of the world and the IVW theory). First, we cannot distinguish whether we are living in the WSC (as screen creatures) or a realist world (as people) by virtue of observations in daily life. In the WSC, the content on screens can cover different types of experiences. Suppose that a person moves in a 3D environment in the realist world and has certain perceptual experiences and other experiences. These experiences can be precisely reproduced on a screen in the WSC when the corresponding character of the screen moves in a similar way and in a similarly construed 3D environment.

« 30 » Moreover, appealing to neuroscientific experiments (or other scientific experiments) does not help in distinguishing whether we live in the WSC or a realist world. This is because all neuroscientific experiments in the realist world can be reproduced at the level of experience in the WSC. More precisely, participants' conscious experiences and observers' observational experiences in an experiment can be precisely reproduced on some screens in the WSC. From these experiences, some screen creatures construct 3D bodies, brains and instruments and believe that these 3D objects exist independently. They also see the same readings from 3D instruments and collect the same data as experiments carried out in the realist world. Considering an FPS game that implements a scenario of a neuroscientific experiment can help us understand this point. The realist world (or the world that meets the IVW theory) and the WSC are empirically equivalent in the sense that people cannot distinguish what kind of world they are living in, either by observation in daily life or by neuroscientific experiments.

« 31 » Opponents may object that their preference for the realist world model (or the IVW theory) over the WSC is not based on observation in daily life or by neuroscientific experiments. For opponents who hold

a realist view, in principle, we can respond to their objection using the line of thought I presented in Liu (2022b: §7). I pointed out that the realist view stresses that matter (including the brain) exists on a foundational level, and the existence of experience depends on matter. However, empirical equivalence implies that opponents cannot argue that the realist view is to be preferred by appealing to the difference in observational experience or experimental data. Opponents can only argue for their preference by appealing to a pattern of thought, that is, how we choose to deal with observational experiences or experiment data. However, arguing that matter is foundational (or arguing for an associated realist world model) purely by virtue of our thought pattern is not plausible and is "to an extent, self-stultifying" (Liu 2022b: §7).

« 32 » For opponents who adopt the IVW theory, the above response is not suitable, because the theory suggests that matter (the purported external world) is not at a more foundational level with respect to experience (the representational interface); rather, matter and experience (ontologically) depend on each other. Hence, we need to consider the factors discussed in the subsequent sections to decide our preference.

R2 Parsimony

« 33 » Westerhoff (2020: 57–61) believes parsimony is an important reason for people to adopt the IVW theory. According to the IVW theory, all entities in the purported external world (and other internal entities, such as the self or the perceiver) are constructed from the representational interface. The IVW theory is only committed to the representational interface, but not to anything behind the representational interface or any entity existing independently of it. Compared to theories that accept the independent existence of the "external world," such as traditional representationalism and other VW theories, the IVW theory is more parsimonious.[18]

« 34 » The WSC has similar ontological commitments concerning the IVW theory. The purported external world (i.e., the constructed 3D environment) (and other internal entities, such as the self or the perceiver) is also constructed from experience (i.e., the content on the screens). The WSC does not need to be committed to more entities than the content on the screens, as these correspond to the representational interface in the IVW theory and are committed to similar entities. Hence, the WSC has a similar degree of quantitative parsimony compared to the IVW theory.

« 35 » Moreover, after considering the purported external world as constructed, Westerhoff (2016: 521) argues that the IVW theory only needs to be committed to one kind of entity. Foundationalism, which is accepted by other VW theories and traditional representationalism, holds that the represented (i.e., the "external world") and its representations are foundationally different kinds of entities. In contrast, the IVW theory changes the metaphysical status of the purported external world because it is constructed from the representational interface. Thus, the represented (the purported external world) and its representations (the representational interface) can be the same kind of entity. This means that the IVW theory is qualitatively more parsimonious than foundationalism. Note that the representational interface and the purported external world are the same kinds of entity because there is a constructive relation (rather than a perceptual relation) between them. In the WSC, the constructed 3D environment and the content on the screens also have a constructive relation; therefore, they are not foundationally different kinds of entities either. In this sense, the WSC has the same qualitative parsimony as the IVW theory.

« 36 » Westerhoff (2020: 57, Ch. 3) argues that the IVW theory is anti-foundationalist and does not need to commit to any foundational entities. If we consider this as a kind of parsimony, the WSC has the same feature. As shown in the similarities and differences section, the WSC is compatible with the constructivist worldview. There-

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17| This empirical equivalence is also useful in the objection to the naturalistic framework in R4.

18| Although this article mainly compares the WSC with the IVW theory, it also suggests how to argue why we should prefer the WSC over a realist understanding of the world. In the following paragraphs, I argue that the WSC and the IVW theory have similar parsimony. Hence,

like Westerhoff's argument, parsimony is also an important reason for preferring the WSC over a realist understanding of the world.

fore, by appealing to the second part of my argument, we can continue to argue that experiences (i.e., the content on screens) as bundles of properties are mutually constructed. In other words, the WSC does not commit to any foundational entities either.

R3 Explanatory power

« 37 » Apart from the similar parsimony, it is also arguable that the WSC and the IVW theory have similar explanatory powers. The explanatory power of the IVW theory comes from the representational interface. Westerhoff (2020: 60) claims that by virtue of the representational interface, we can explain "everything that needed explaining." The content on screens in the WSC covers elements of the representational interface; thus, the content on screens can provide explanatory power not less than the explanatory power of the representational interface.[19]

« 38 » Moreover, the explanatory power provided by the content on screens is sufficient for the explanation of perceptual phenomena in the WSC. As argued in the WSC section, if the content on screens meets the first-person principle, the perceptual phenomena can be obtained. The perceptual phenomena are explained by correlations between different content on screens, more precisely, between the content that is associated with the change of experience and the content from which the changing positions of our bodies and sensory organs are constructed. This can be seen as the shortest explanatory path in the sense that the explanandum (perceptual phenomena) is explained by virtue of the correlation among explanantia (the content on screens) without any intermediate steps. Hence, it is reasonable to doubt that the similar explanatory power is also sufficient to explain the

more complicated mechanisms underlying perceptual phenomena in the IVW theory. This doubt is presented in the next section.

R4 No sufficient explanatory power for the perceptual relation

« 39 » The IVW theory retains perceptual relations, so the explanatory path of perceptual phenomena from explanans (i.e., the representational interface) includes explaining how brains (and sensory organs) are constructed from the representational interface and how such constructed brains (and sensory organs) can generate proper perceptions (i.e., elements of the representational interface). I agree with the first part of this explanation but doubt the second part, which is the generative relation.

« 40 » My doubt is supported by some overall comparisons between the WSC and the IVW theory. The explanans in the WSC (i.e., the content on screens) and the explanans in the IVW theory (i.e., the representational interface) are similar. From the same explanans, if there is already a shorter explanatory path for perceptual phenomena, then the more complicated explanatory path involving extra explananda (i.e., generative relations) would be superfluous. Note that generative relations are explananda rather than explanantia, as these mechanisms in the IVW theory are not directly part of the representational interface. We should adopt the shorter explanatory path, unless we have another strong reason to involve a generative relation.

« 41 » Next, I argue that we do not have strong reasons for involving a generative relation, because we can illustrate that brain activities do not generate experience, and the argument for the generative relation is problematic in principle. Overall, the generative relation is difficult for scholars. Trying to explain the generation of experience from the activities of the brain is called the hard problem (Chalmers 1995). Scholars have not yet given a satisfactory answer to the hard problem. The situation can be summed up as follows:

❝Either you already believe that science is going to give you a correct identity statement, or you don't and you think that there is always going to be something left over, the phenomenal aspects of conscious experience.❞ (Hardcastle 1996: 11)

People who do not believe in the *identity relation* (or the generative relation) can take the WSC as a detailed world model to demonstrate how we still need an extra statement that describes the content of conscious experiences after any statement about brain activities.[20] Considering the situation in an FPS game, which implements a scenario of observing the activities in a character's brain, can help us understand this point. The character's brain activities are the activities within a 3D object (the brain), which is constructed from the part of images about the character's brain while it is being observed. At the same time, the character's conscious experiences are the images on the corresponding screen of the character. These two sides are clearly different things. Hence, in the FPS game (or the WSC), after making statements about the former, we still need an extra statement that describes the latter, and there are only correlations between these two sides.[21]

19| Explanatory power may vary depending on different mechanisms of construction. However, even if we do not adopt Westerhoff's mechanism of construction by virtue of conceptualisation and instead adopt the construction worldview, the content on screens still has enough explanatory power, because the construction worldview provides a tenable way to construct the purported external world (and other internal entities) by virtue of experience (the content on screens).

20| Some scholars' related discussions are about the identity relation; that is, experience is identical to activities in the brain. My rejection of the generative relation can also be applied to the identity relation because these two relations speak of the same thing from two different perspectives. If we are talking about phenomena, we say that phenomenal experiences are generated from the activities of the brain. If we stress that only matter exists as a foundational layer, we say that experiences are identical to the activities of the brain. My line of thought is that either the generative relation or the identity relation is stronger than correlations and thus experiences (i.e., the representational interface or the content on screens) cannot give sufficient reason to involve stronger generative relations or identity relations. Therefore, my following statements may also cover the identity relation, depending on the context.

21| Piet Hut and Roger Shepard (1997: 310) also point out that realists misunderstand correlations between experience and brain activities as identity relations: "After all, effectively jamming a printer does not 'prove' that computer processing takes place in the printer heads; nor does switching channels on a TV 'prove' that the information in the channels is produced inside the TV set." The WSC gives a detailed world model to demonstrate how this misunderstanding can happen (for many screen creatures).

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« 42 » For people who already accept the identity/generative relation, such as people who accept the IVW theory, we can generally doubt their belief by appealing to the WSC. Identity/generative relations lack direct empirical evidence because of the phenomenological transparency feature.[22] When a person observes a purported external object, such as an orange, they see the orange directly, but at the same time, they cannot witness the full perceptual process, in which the orange stimulates our nerve endings, stimuli pass to the brain and the brain generates a comprehensive perception involving different types of experiences. This is explained as the perceptual process being transparent to the person when their perceptual experiences are occurring. However, a more straightforward description of this situation is that brain activity and changes to experiences are observed/recorded (in whatever ways) as separate phenomena (with certain correlations). Explaining these separate phenomena as an identity/generative relation must be a global view based on a certain background framework, as this is not a simple assertion based on particular witnessable events.

« 43 » A typical underlying background framework is the naturalistic framework. Westerhoff (2016: 512f) agrees with this framework, because he construes compatibility with the naturalistic framework as an advantage of the IVW theory (or the VW theory). However, by appealing to the empirical equivalency feature, we can cast doubt on the central belief of the naturalistic framework, that is, that matter is the foundational layer (and experience ontologically

22| See Westerhoff (2016: 509f; 2020: 52f) for the notion of phenomenological transparency.

depends on matter). As argued in the R1 section, since the WSC and the realist understanding of the world are empirically equivalent, the argument for the central belief can only appeal to a pattern of thought. This kind of argument is not strong or plausible.

« 44 » The advocate of the naturalistic framework may respond that we can still maintain this framework to some extent (i.e., we can retain an identity/generative relation), even if the central belief is false. An example of this line of thought is the IVW theory, which retains the generative relation and in which there is a circular dependence between matter (the purported external world) and experience (the representational interface) (Westerhoff 2020: 57). However, I argue that if the central belief is not plausible, the identity/generative relation gains less credibility. First, an important reason to retain the identity/generative relation is that it can explain perceptual phenomena. However, the WSC provides an alternative explanation that requires weaker correlations rather than a stronger and more difficult identity/generative relation (see §38). Second, without the central belief, we could consider the construction of purported external objects (and even all features in the world) from experience. Hut and Shepard (1997: 307) state "There is clearly room for physical objects within experiences; it is not at all clear whether there is room for experience within physical objects." Roughly speaking, constructing physical objects from experience is easier than construction in the opposite direction. For example, the constructivist worldview can be seen as a tenable way to construct purported external objects from experience. Westerhoff also argues that all features can be constructed

from (or can be explained by) the representational interface. Another reason to retain the identity/generative relation is that the relation can bridge experience (or the internal world) and the "external world" as well as explain the correlation between these two sides. However, in constructivist world models, a constructive relation already bridges experience and the purported external world and explains the correlation between them. To summarise, after we remove the restriction from the central belief of the naturalistic framework (especially after we accept a constructivist world model), we cannot see the need to involve the identity/generative relation because we could consider constructing the purported external world (matter) from experience, and such a construction is easier and involves a simpler mechanism (i.e., correlations) than the identity/generative relation.

« 45 » Until now, I have illustrated that experience and brain activities are separate, the identity/generative relation lacks witnessable evidence and the associated underlying background framework is problematic. The failure of the central belief in the naturalistic framework also undercuts the requirement for involving an identity/generative relation; therefore, we do not have a strong reason to involve it (i.e., the longer explanatory path of perceptual phenomena) in the world model.

Conclusion

« 46 » Considering empirical equivalence, there is no empirical evidence to suggest that we can distinguish whether we live in a world that aligns with the IVW theory

or the WSC. In comparing parsimony and explanatory power, the WSC and the IVW theory are similar. Explanatory power is sufficient for the explanatory path of perceptual phenomena in the WSC; however, it is not enough to involve the generative relation (or a more complicated explanatory path of perceptual phenomena) in the IVW theory. Therefore, we should choose the WSC as the preferred world model, in which we are screen creatures living in the WSC.

« 47 » The WSC provides a novel way to explain the perceptual phenomena, which can appear in a world that has neither the perceiver nor the perceived (in common sense), and to construe the perceptual relation (or the generative relation) as a systematic misunderstanding of certain correlations between different experiences. This means that the hard problem can be resolved in an eliminative way. In other words, we do not need to explain how experience is generated from brain activities because there is no such generative relation.

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