



Hyperdimensional Neutral Monism: A Dimensional Approach to the Mind–Body Problem

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Abstract

This article introduces the concept of ‘hyperdimensional neutral monism’ as an elaboration and exploration of neutral monism. Neutral monism states that there is a single type of neutral, ontologically primary ultimate, which both the physical and the mental supervene on (Banks *Philosophical Psychology*, 23(2), 173–187, 2010). Hyperdimensional neutral monism (HNM) states that these ultimates exist in a more-than-4-dimensional realm and that the physical world of spacetime is a 4-dimensional aspect of this realm. Consciousness is the localized protrusion of spacetime into more than four dimensions. In order to explain these concepts, I utilize an aquatic metaphor of vortices appearing within a physical ocean. I compare HNM to panqualityism, which is another version of neutral monism (Coleman, *Erkenntnis*, 79(1), 19–44 2014 & *Panpsychism: Contemporary Perspectives*, ed. Godehard Bruntrup and Ludwig Jaskolla (Oxford: Oxford University Press, 2017), pp. 249–282 2016), and cosmopsychism (Shani *Philosophical Papers*, 44(3), 389–437, 2015, Shani & Keppler, 2018) which relies on a similar aquatic metaphor. I argue that HNM is a viable means of addressing the mind–body problem and the hard problem of consciousness (Chalmers, 1996, 2015, *Panpsychism: Contemporary Perspectives*, 179(214), 2017, Chalmers, 2019).

Keywords Neutral monism · Cosmopsychism · Panqualityism · Dimensions · Mind–body problem · Hard problem of consciousness

1 Introduction

In this article, I introduce the concept of ‘hyperdimensional neutral monism’ as an elaboration and exploration of the neutral monism suggested by James, Russel, Mach, and others (Banks, 2010). Hyperdimensional neutral monism (HNM) concurs

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with neutral monism in general, that there is a single type of ontologically primary ultimate, which both the physical and the mental supervene on. But HNM expands on this concept by defining the physical world of spacetime as a 4-dimensional aspect of an ‘ocean’ comprised of these ultimates, and the mental as the protrusion of the physical world of spacetime into the hyperdimensional realm.

I begin this article by exploring neutral monism in relation to various mind–body problems. In part 2, I provide some definitions and conceptual frameworks, which I then utilize in part 3, where I introduce the core concepts of hyperdimensional neutral monism. In part 4, I compare HNM to cosmopsychism (Shani, 2015) to demonstrate the logical viability of HNM as well as to explore some of its core concepts. In part 5, I review the problems facing HNM in particular and neutral monism in general. Finally, in the conclusion I briefly explore how HNM can be applied to other problems facing both science and metaphysics. Throughout this article, I introduce different versions of HNM and explore how each version responds to various challenges.

2 Neutral Monism and the Mind Body Problem

Neutral monism is the thesis that ‘minds and physical objects are essentially two different orderings of the same underlying neutral elements of nature’ (Banks, 2010, 173). Most neutral monists define the underlying elements as neither mental nor physical, but other definitions of neutrality, such as both mental and physical are also utilized (Stubenbug, 2016, 2). Irrespective of the definition of neutrality, neutral monists posit that both mind and matter supervene upon the neutral ultimates.

As the mental and the physical supervene on the same underlying neutral elements, it is the functional relations between the neutral elements that determine whether they are expressed as mental or physical (Banks, 2010, 174). Neutral elements ordered in one specific way manifest as physical objects, whereas the same elements ordered in another way manifest as mental experiences.

As neutral monism refutes the physicalist claim that the mental supervenes on the physical, it is not subject to the hard problem of consciousness, which states that there is an explanatory gap between the mental and the physical (Chalmers, 1996). However, it is subject to various aspects of the combination problem regarding how neutral elements, which are not themselves mental, can possibly combine to create unified conscious entities such as ourselves (Chalmers, 2015, 2017). Also, as both the mental and the physical supervene on neutral elements, the mechanism of interaction between the mental and physical must be addressed (Seager, 2002).

Any successful version of neutral monism will have to explain the following:

1. What are the ultimates and what is their nature?
2. What is the relationship of these ultimates to matter?
3. What is the relationship of these ultimates to mind? (Stubenberg, 2016,1)

In addition to these questions, I also believe it is critical for a successful version of neutral monism to account for:

4. What is the seeming relationship of mind to matter?¹

Sam Coleman addresses these questions in a version of neutral monism called ‘panqualityism’ or ‘panprotopsychism’ (Coleman, 2014, 2016). According to Coleman:

...unexperienced qualities permeate basic matter. Certain portions of matter exhibit a configuration which provides for awareness of the qualities they bear: matter, when specially arranged, can apprehend its own quality, in effect. This is consciousness (2014, 29-30).

As all matter is permeated by these ‘unexperienced qualities’, but not all matter is conscious, these qualities do not need to be experienced to exist.

Just as the sky’s blueness or a fire-engine’s redness persist when no-one is around to see them ... so the qualities of the ultimates persist whether or not any subject is aware of them. A particular ultimate, then, might be phenomenally blue in the way a direct realist ... believes the sky is blue. On neutral monism, when one is aware of a phenomenal blueness, one is directly aware of the qualities carried by ultimates in one’s brain (Ibid, 31).

According to Coleman, it is thus the awareness of qualities which constitutes consciousness. As phenomenal qualities do not have to be experienced in order to exist, awareness is not a fundamental aspect of these qualities. Rather, the qualities need to be specifically arranged to create awareness of themselves, and such awareness is equivalent to consciousness.

As qualities are not necessarily instantiated by subjects, the problem of the combination of subjects (or subject combination problem) does not apply to panqualityism (Chalmers, 2015, 28). However, Chalmers notes that panqualityism is still subject to other forms of the combination problem, specifically in relation to the conceivability of qualitative zombies.² The qualitative zombie argument holds that it is conceivable for there to be beings which are qualitatively identical to us, but which lack consciousness (or awareness of such qualities). This results in a quality/awareness gap, which states that ‘no instantiations of qualities ever necessitate awareness of qualities’ (Ibid, 29). As such, there is an explanatory gap between qualities in and of themselves and the awareness of those qualities.

Coleman addresses this critique by arguing that awareness lacks phenomenology and is rather a purely functional process. He states that awareness is equivalent to ‘the subjective presence to one of qualities’ (Coleman, 2016, 45). However, this begs the question of where ‘subjective presence’ and ‘one’ (or the subject of experience) come from. As such, this moves the critique from a quality/awareness gap to

¹ Alternatively, if mind and matter do not relate directly to each other, then why does it appear that they do?

² Chalmers assumes Hume’s conceivability principle (Chalmers, 1996).

a quality/subject or quality/subjective presence gap. While a detailed discussion of these gaps is beyond the scope of this article, it is sufficient to note that these gaps seem to exist and an alternative approach to panqualityism is worth exploring.

Panqualityism is also subject to other aspects of the combination problem, such as the structure combination problem and the quality combination problem. The structure combination problem for panqualityism is that ‘the structure among qualities instantiated in the brain is very different from the structure among qualities of which we are aware, and it is hard to see how the former could constitute the latter’ (Chalmers, 2015, 29). And the quality combination problem is that ‘it is hard to see how a few primitive qualities ... could yield the vast array of qualities of which we are aware’ (Ibid, 29–30).

Coleman addresses the quality combination problem by likening the combination of qualities to the combination of painted patches on a painting. ‘... [W]e understand the composition of a painting by thinking about the various painted patches filling the canvas: we consider their qualities in isolation, and see how, by assembling the qualitative patches, we obtain the complete image’ (Coleman, 2014, 10). While this resolves the issue of how a few primitive qualities could yield a vast array of qualities, it still leaves open the question of how we are aware of those qualities. As such, panqualityism still faces a quality/awareness gap.

In order to address these issues for panqualityism, as well as to provide further clarification on the nature of ultimates, I introduce the notion of hyperdimensional neutral monism (HNM). HNM concurs with panqualityism that a specific arrangement of ultimates is necessary for consciousness, but it expands upon this notion by framing ultimates, mind, and matter within the context of dimensionality (more on this below). It agrees specifically with the panqualityist assertion that qualities are unconscious qualia which are not necessarily instantiated by subjects, while offering further clarity to address the problems stated above.

3 Definitions and Conceptual Frameworks

I utilize the term ‘dimensions’ in the literal sense in which space and time are considered dimensions.³ According to the scientific theory of general relativity and the metaphysical theory of physicalism, the universe consists of the four dimensions of spacetime, which can be understood as length, width, depth (or height), and time. In contrast to general relativity, and somewhat in line with string theory (see Sect. 5 below), I posit that the universe consists of more than four dimensions, and that the physical world of spacetime is the 4-dimensional aspect or abstract ‘surface’ of this realm (more on surfaces below). I utilize the term ‘realm’ to refer to that which is defined by multiple *types of* dimensions, such as the realm of spacetime, which is defined by both spatial and temporal dimensions.

³ This contrasts with its usage in dimensional analysis, whereby ‘dimensions’ refers to base quantities such as length, mass, temperature, charge, etc.

The concept of surfaces as hypodimensional aspects of hyperdimensional realms is illustrated in Figs. 1 and 2 below. Figure 1 shows a 3-dimensional cube with a 2-dimensional surface. The cube has length (x-axis), width (y-axis) and depth (z-axis), whereas the surface has length (x) and width (y) only. The surface is a 2-dimensional aspect of a 3-dimensional cube. The surface lacks any depth (or 3-dimensionality).

Figure 2 shows a similar diagram, but the three spatial dimensions of length, width and depth have been compactified into a single dimension of ‘space’ on the x-axis. The y-axis represents time. The z-axis represents a dimension orthogonal to the plane of spacetime, and for this axis I introduce the term ‘consciounth’. ‘Consciounth’ is derived from a combination of the word ‘conscious’ with the ‘consonant-th’ as found at the end of the terms ‘lenGTH’, ‘wiDTH’ and ‘dePTH’. I introduce this term as HNM asserts dimensions ‘beyond spacetime’, which are neither spatial nor temporal in nature. Rather, these ‘extra’ dimensions relate to consciousness (more on this below).

The surface of the cube in Fig. 2 can be said to be a 4-dimensional aspect of a more-than-4-dimensional realm and is associated with the physical world of spacetime. This surface lacks any ‘consciounth’ (or more-than-4-dimensionality). It should be noted that while the term ‘consciounth’ is derived from ‘length’, ‘width’, or ‘depth’, it is more comparable to that of ‘space’, as it may contain additional dimensions within it (just as space contains length, width, and depth).

I utilize the term ‘existence’ or ‘existences’ in the broadest sense of the term to refer to ‘that which exists’. I specifically use ‘existences’ in place of terms like ‘entities’, ‘objects’ or ‘subjects’ where appropriate, as these terms imply various

Fig. 1 3-dimensional cube with 2-dimensional surface

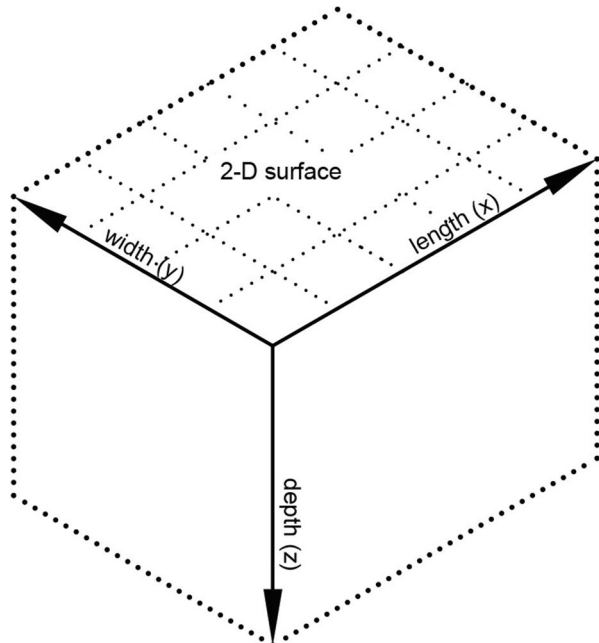
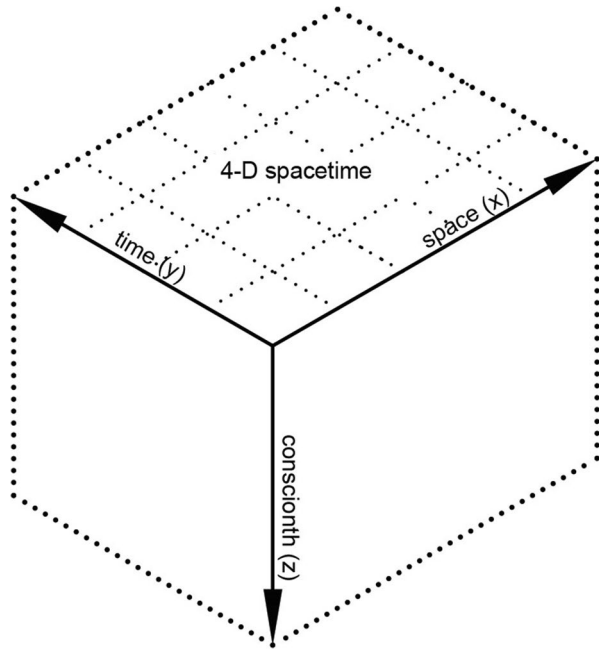


Fig. 2 more than 4-dimensional cube with 4-dimensional surface



metaphysical and ontological assumptions. I refer specifically to ‘objects’ or ‘subjects’ only where the differences between these terms are relevant. Given the assertion that the physical world of spacetime is an aspect of a more-than-4-dimensional realm, existence does not imply physical existence. As such, I accept that existences include not only entities, objects and subjects, but also numbers, thoughts, concepts, hallucinations, etc.⁴

The term ‘hyperdimensional’ means ‘more dimensions than’ and I generally use it to refer to more dimensions than those of spacetime, or ‘beyond spacetime’ (Hardy, 2015, 1015). ‘Hyperdimensional neutral monism’ refers to a type of neutral monism which relies on more dimensions than those of spacetime. However, I also utilize ‘hyperdimensional’ to refer to more dimensions than a comparative existence. For example, the cube in Fig. 1 is the hyperdimensional ground of the plane defined by the dimensions of length (x) and width (y). Conversely, the term ‘hypodimensional’ means ‘fewer dimensions than’ and relates to the notion of ‘surface’ as defined below.

I utilize the term ‘surface’ in an abstract sense to refer to a hypodimensional aspect of an existence. In other words, a plane is the ‘surface’ of cube, in the sense that it is a 2-dimensional aspect of a 3-dimensional existence – see Fig. 3. However, in the abstract sense, the term ‘surface’ refers to all hypodimensional aspects of an existence, so a line or a point can also be the surface of a cube – see Fig. 4. It is in this way that the physical, 4-dimensional world of spacetime is deemed to be

⁴ See Nelson, 2020 for a detailed discussion on existence.

Fig. 3 Plane as surface of cube

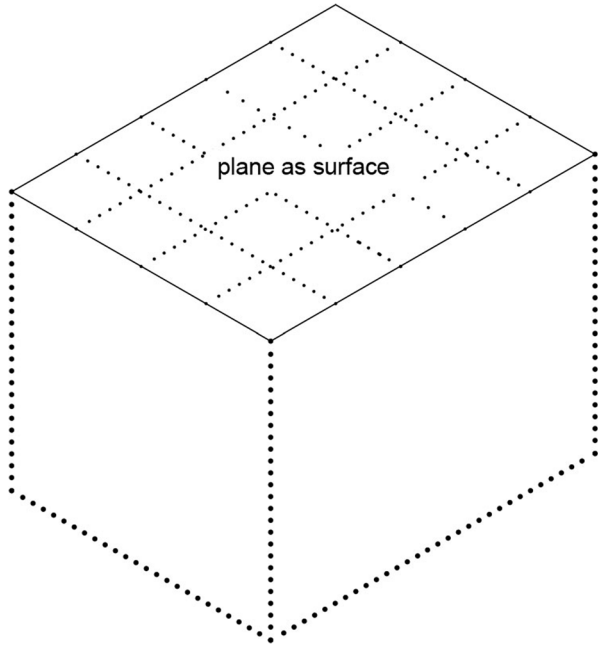
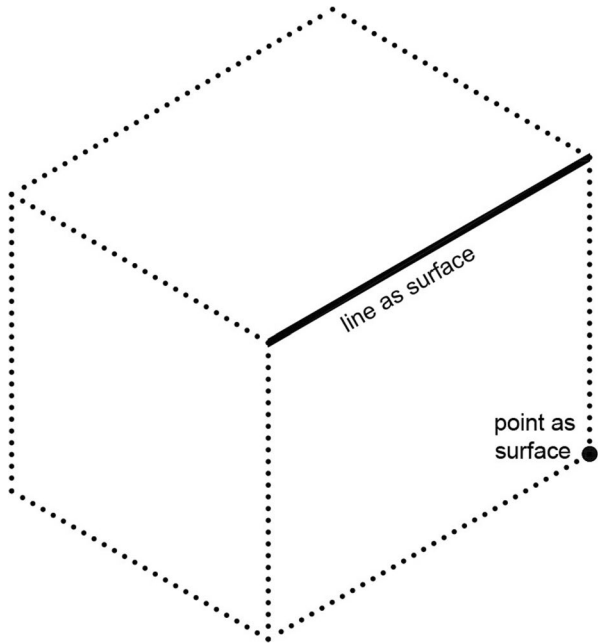


Fig. 4 Line and point as surface of cube



a hypodimensional aspect, or surface, of the more-than-4-dimensional ontological ocean.⁵

4 Hyperdimensional Neutral Monism

4.1 Overview

Hyperdimensional neutral monism states that ultimates exist in more than the four dimensions which define spacetime. These ultimates constitute a more-than-4-dimensional ‘ocean’, the surface of which is the 4-dimensional world of spacetime. As such, the relationship between ultimates and spacetime is a dimensional relationship – spacetime is the 4-dimensional aspect (or surface) of the more than 4-dimensional ocean of ultimates (or ‘ontological ocean’).⁶ This ocean is more than spatio-temporal as it exists within space, time and consciounth. Instead of a spatio-temporal universe, I propose a spatio-temporo-consciounsal universe, of which spacetime is the surface—see Fig. 2 above.

Subjects of experience appear within this ontological ocean as protrusions of the surface into the dimension of consciounth. These protrusions can be likened to whirlpools or vortices appearing within an ocean of water (Shani, 2015).⁷ Just as physical vortices have surfaces which are part of the surface of the ocean, subjects of experience have bodies (including brains), which are part of the physical world of spacetime.

It is within this framework that I explore the relationship between brains and consciousness (or the objective and subjective). Contrary to the physicalist assertion, brains do not create consciousness; and contrary to the idealist assertion, consciousness does not create spacetime within which the brain exists. Rather, *I assert that the human brain is the surface of human consciousness*. Or more specifically, the human brain is the 4-dimensional spatio-temporal aspect of human consciousness; And human consciousness exists in the hyperdimensional realm of space–time–consciounth.

4.2 Intrinsic vs Extrinsic Curvature

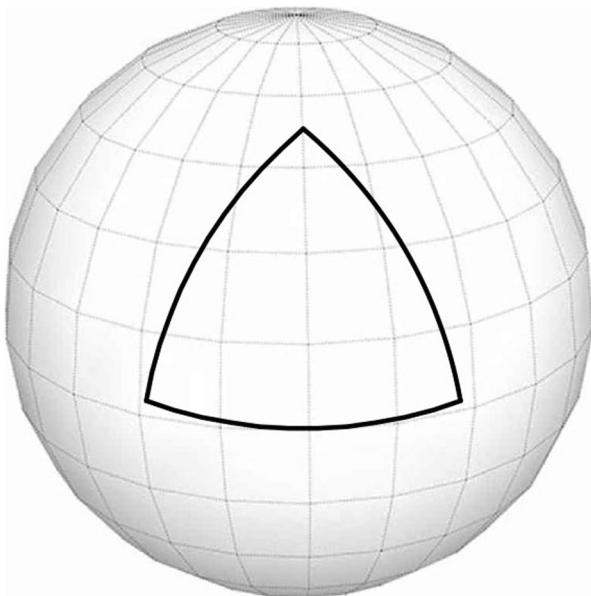
A vortex is a 3-dimensional entity, as compared to the 2-dimensionality of the surface of the ocean (excluding time for both). However, the surface of a physical vortex is still 2-dimensional, as all physical surfaces in spacetime are, by definition, 2-dimensional. For the purposes of this article however, I assume that the curvature of the surface of the vortex is extrinsic, meaning that it curves into a higher dimension and therefore must exist within three dimensions or more (Casey, 2012).

The difference between intrinsic and extrinsic curvature is important and can be seen in Figs. 5 and 6 respectively. Intrinsically curved surfaces can be thought of

⁵ The surface of a finite element can also be conceived of as the intersection of two finite or infinite elements. For example, a line can be seen as either the surface of a finite plane, or the intersection of two planes. For simplicity, I utilize surface, rather than intersection, throughout this article.

⁶ Ultimates can be conceived of as zero-dimensional points.

⁷ The metaphor of vortices, whirlpools, or localizations as subjects of experience is a common tool amongst idealist and cosmopsychist thinkers. In addition to Shani, see Kastrup (2014), Mathews (2011), and Nagasawa and Wager (2017). The notion of vortices has no relationship to Cartesian vortices, which refer primarily to planetary motion.

Fig. 5 Intrinsic curvature

as stretched flat planes, whereas extrinsically curved surfaces can be thought of as rolled flat planes.

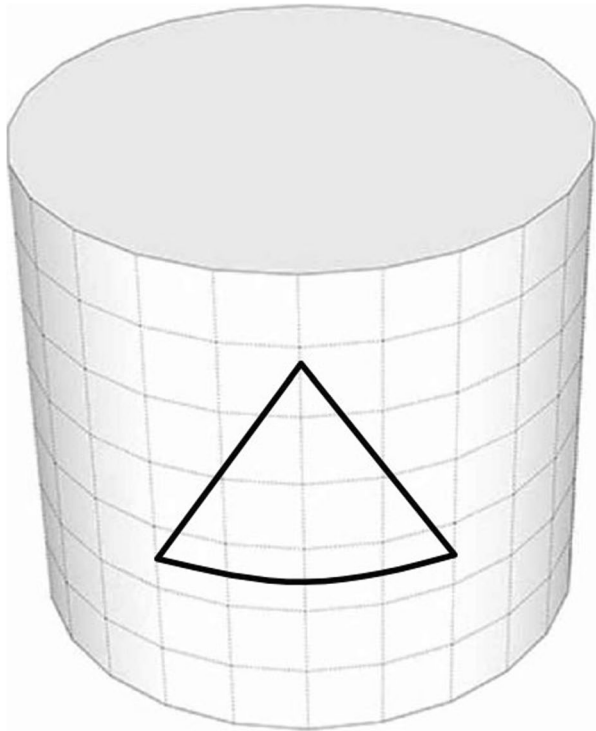
Intrinsically curved surfaces⁸ do not maintain the geometric rules of flat surfaces and they do not require additional dimensions to describe their curvature. For example, on an intrinsically curved plane such as the surface of a sphere, parallel lines converge, and the angles of a triangle are greater than 180° ⁹ (see Fig. 5). Intrinsic curvature can be completely determined by measuring angles and distances on the surface without reference to the manner in which the surface is embedded in its hyperdimensional space (for example by measuring the angles of a triangle) (Ibid).

Extrinsically curved surfaces such as the surfaces of cylinders on the other hand, maintain the geometric rules of flat surfaces but require additional dimensions to describe their curvature. For example, on the surface of a cylinder, parallel lines do not converge, and the angles of a triangle equal 180° (see Fig. 6). Extrinsic curvature is not detectable without reference to the manner in which the surface is embedded in its hyperdimensional space (because the angles of a triangle equal 180° regardless of the extrinsic curvature) (Ibid).

Einstein's theory of general relativity asserts intrinsic curvature of spacetime and therefore does not require additional dimensions beyond those of spacetime. In contrast, HNM asserts extrinsic curvature of spacetime (in addition to the intrinsic curvature of general relativity) and therefore does require additional dimensions. I

⁸ Also known as Gaussian curved surfaces.

⁹ A sphere has a positive intrinsic curvature. For a negative intrinsic curvature, such as a hyperbolic plane (or saddle) parallel lines diverge, and the angles of a triangle are less than 180° .

Fig. 6 Extrinsic curvature

therefore utilize the terms ‘extrinsic curvature’ and ‘dimensional protrusion’ in relation to surfaces interchangeably.

4.3 Consciousness and Dimensional Protrusion

Having introduced the notion of extrinsic curvature, we can see that a vortex is not just a complex combination of atoms. Critically, a vortex is also the extrinsic curvature of the surface of the ocean, or the protrusion of the surface into three dimensions. It is through this protrusion that the surface acquires depth. Similarly, it is not just the complex combination of qualities that results in the formation of consciousness, but the protrusion of the 4-dimensional surface (spacetime) into more than four dimensions. It is through this protrusion that spacetime acquires consciounth.

Figure 7 shows how the surface of an ordinary, volumetric cube can protrude into the dimension of depth. This surface now exists in three dimensions (including depth) and can no longer be described solely in planar terms. Figure 8 shows a similar diagram for the more-than-4-dimensional cube, of which the surface is the 4-dimensional world of spacetime. The surface now exists in more than four dimensions (including consciounth) and can no longer be described solely in spatio-temporal terms.

I assert that the protrusion of the surface into the consciounal dimension is consciousness. I utilize Nagel’s definition of consciousness, which states that “An

Fig. 7 2-dimensional surface 'protrudes' into 3-dimensional cube

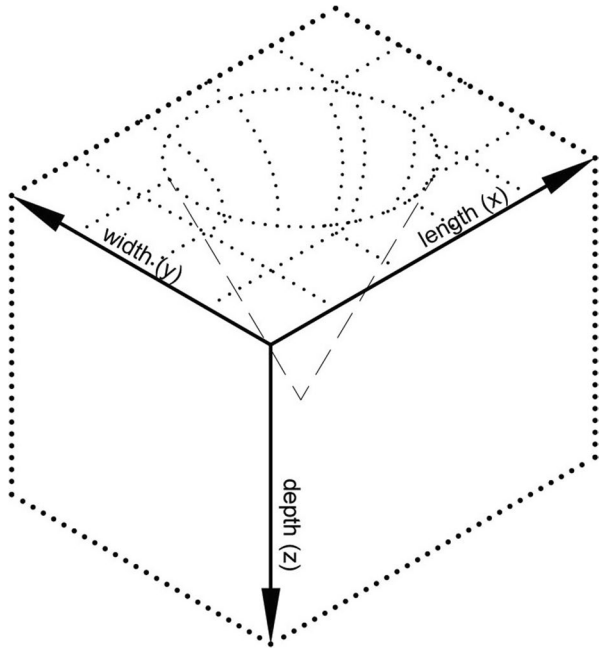
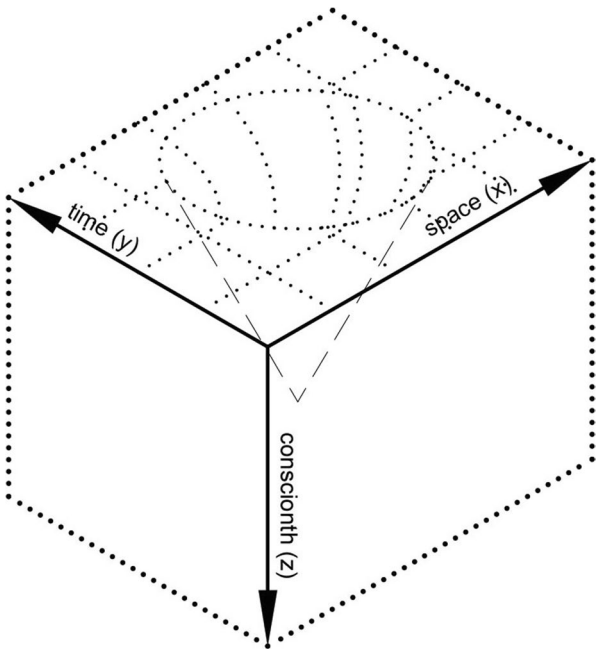


Fig. 8 4-dimensional surface 'protrudes' into more than 4-dimensional cube



organism has conscious mental states if and only if there is something that it is to be that organism—something it is like for the organism” (Nagel, 1974, 1).

In order to explain the relationship between dimensional protrusion and consciousness, a deviation from both panqualityism and the aquatic metaphor is required. According to panqualityism, awareness is identified with the act of reflective access to phenomenal qualities of one’s own brain. As such, awareness is a purely functional process, and consciousness is therefore an emergent phenomenon (Shani, 2021).

Shani states that according to panqualityism:

Primordially, the world is a collection of Edenic qualities [phenomenally qualified ultimates], ... but nothing in this default-state configuration of reality is conscious: there is neither awareness nor perception, nor feelings of any sort; indeed, no *subjective dimension* whatsoever. (Ibid, 6, italics added)

In contrast to panqualityism, HNM asserts that the fundamental dimension of conscionth is the subjective dimension. But this is not a ‘dimension’ in the sense that the ultimates experience it in the form of awareness, perceptions or feelings. Rather, it is a dimension in the sense that the ultimates exist within it as well as within the dimensions of spacetime. The relationship between ultimates and space–time–conscionth is analogous to the relationship between fundamental matter and spacetime.

Thus, I am not claiming that there are additional spatio-temporal dimensions beyond the four that we perceive. Rather, I am claiming that there are additional dimensions beyond the four that we perceive, and that these additional dimensions are not spatial nor temporal, but rather conscional. To exist as a spatio-temporo-conscional entity, is to be a conscious subject of experience which has a physical existence in spacetime.

As the conscionth dimension is in some ways neither spatial nor temporal, and in other ways more than spatial and temporal, it cannot be conceived of in spatial or temporal terms. Rather it must be conceived of in terms relating more closely to consciousness. Here, the deviation from the aquatic metaphor is required. While the assumption of depth by a 2-dimensional surface is identical to a 3-dimensional object (a cone), the assumption of depth by the 4-dimensional surface is identical to a hyperdimensional subject – a conscious subject of experience.

There is a relationship here with identity theory, which asserts that consciousness is identical to the brain (Lewis, 1966, 1980; Smart, 2000). But under HNM, the identity relationship is not between consciousness and the brain, but rather between consciousness and the hyperdimensional existence, of which the brain is the surface. And if consciousness itself is identical to a hyperdimensional existence, then a specific state of consciousness is identical to the structure of the hyperdimensional existence, or the way in which the surface protrudes into the conscionth dimension. For example, rather than pain being synonymous with C4 firing (to use an oft used, over-simplified example), it is synonymous with a specific hyperdimensional structure, which corresponds to C4 firing. This correspondence is not a logical (a priori) necessity, but rather a natural (a posteriori) result of hyperdimensional laws. As such, pain is a priori identical to a particular hyperdimensional structure, and it corresponds, a posteriori, to C4 firing.

It should be noted, however, that the proposed identity relation between a conscious subject or conscious experience and a specific hyperdimensional existence seemingly introduces another explanatory gap, as one can imagine a hyperdimensional existence, which does not correspond to a conscious experience. In other words, HNM zombies appear to be conceivable. I will address this concern in part 5 below.

4.4 Consciousness and the Brain

The identification of hyperdimensional existences with conscious subjects of experience can be further explicated through more diagrams of dimensionality. Figure 9 shows two seemingly identical circular patterns on a simple plane consisting of a rigid checkerboard pattern. The circular patterns have far greater complexity than the checkerboard context which surrounds them. The circular patterns, however, are only identical when viewed from a particular vantage point, orthogonal to the plane itself.

Figure 10 demonstrates that these patterns are not identical when viewed from another angle. In this diagram, we can clearly see that the circle on the left is actually a cone (or vortex), while the circle on the right is a planar circle as it originally appeared in Fig. 9. While the circle on the right does, in fact have more complexity than the checkerboard context, it is still a 2-dimensional object and therefore does not have any depth.

These diagrams demonstrate the relationship between brains, which exist in the four dimensions of spacetime, and subjects of experience which exist in the hyperdimensional realm of space–time–consciousness. To assume that the universe is fundamentally 4-dimensional is equivalent to the assumption in Fig. 9, that the circular patterns and their contexts are 2-dimensional. Based on this assumption, it seems that the circular patterns are differentiated from their context purely in terms of complexity. The circular patterns are more complex than their surroundings, just as brains are more complex than their physical surroundings.

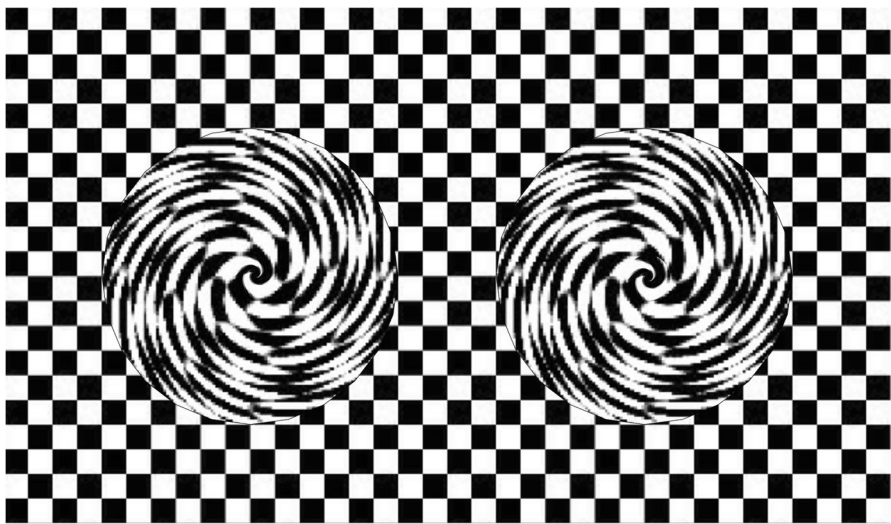


Fig. 9 Two seemingly identical circles with greater complexity than their context



Fig. 10 The ‘circle’ on the left is actually a cone. It only appears identical to the circle on the right from the specific perspective of Fig. 9

This complexity is generally assumed to be what creates consciousness, at least from a physicalist perspective.¹⁰ Given that physicalists assume that the universe is spatio-temporal, they assume that consciousness must also be spatio-temporal as it is a part of the universe. Hence, the only thing which differentiates a brain from a table or a cloud, is its relative physical complexity. It is this complexity, the argument goes, which must create consciousness, as there are simply no other tools available.

However, from the perspective of Fig. 10, we see that the difference between (what we previously called) circular patterns, and their context is not just one of complexity, but one of dimensionality. We see that what seemed like a circular pattern on the left is actually a vortex or a cone. As the surface of this vortex is extrinsically curved, it protrudes into the dimension of depth. Likewise, the difference between brains and tables or clouds is not just a difference of complexity, but also of dimensionality. A brain, which is the surface of a subject of experience, is extrinsically curved and thus protrudes into the dimension of consciounth. This protrusion is consciousness.

The differentiation between consciounth and consciousness can be seen here. Consciounth is the dimension(s) which is (are) orthogonal to spacetime, whereas consciousness is the protrusion of spacetime into the dimension(s) of consciounth. In this way, consciounth is an ontologically fundamental dimension like space and time, whereas consciousness supervenes on both spacetime and consciounth.¹¹

It is crucial to note that consciousness is described not just in terms of consciounth, but rather in terms of space–time–consciounth. Just as a vortex exists in 4 spatio-temporal dimensions, consciousness exists in more than four spatio-temporo-consciousal dimensions. While depth may be necessary for the existence of a vortex, it is not sufficient. Vortices exist in three spatial dimensions and one temporal dimensions. Similarly, while consciounth may be necessary for the existence

¹⁰ Other theories such as integrated information theory (Tononi, 2012) also correlate complexity with consciousness. For IIT, however, it is complexity of information, rather than complexity of physical composition which creates consciousness.

¹¹ While consciousness supervenes partly on the physical dimensions of spacetime, HNM can be differentiated from physicalism in that spacetime supervenes on the ontological ocean and is thus derivative rather than fundamental.

of subjects of experience, it is not sufficient. Subjects exist in three spatial dimensions, one temporal dimension and at least one consciounth dimension.¹² As such, protrusion into the dimensions of consciounth can be seen as a means of obtaining a spatio-temporo-consciounth existence. It is this spatio-temporo-consciounth existence which is identical to a subject of experience.

Given that spacetime is necessary for consciousness, an account of the relationship between spacetime and consciousness is critical. While I have thus far engaged with the dimensional relationship between brains and subjects of experience, a detailed discussion of the functional relationship between brain states and mental states is still required.

When I, as a subject of experience, experience the red-ness of a fire engine, a particular wavelength of light is reflected off the surface of the fire engine into my retina. My retina then sends signals to my brain. The fire engine, my retina, and my brain are all part of the physical, objective world of spacetime. But my retina and brain are also part of a system which is extrinsically curved in the dimension of consciounth and are therefore part of a system which is consciounth. The objective facts of the light hitting my retina and my retina sending a signal to my brain are subjectively experienced as a result of the dimensional protrusion of the system. The consciounth of this system combined with the specific qualities corresponding to the redness of the fire engine, is the subjective experience of seeing red.

The notion of subjective experience can be defined as a specific perspective combined with a private qualitative field. Coleman states that.

[t]he idea of being a subject goes with being an experiential entity, something consciounth of phenomenal qualities. That a given subject has a particular phenomenological point of view can be taken as saying that there exists a discrete ‘sphere’ of consciounth-experiential goings-on corresponding to this subject... A subject, then, can be thought of as a point of view annexed to a private qualitative field. (2014, 15-16)

Private qualitative fields have two essential components – unity and boundedness (Miller, 2018, 142–143). Unity refers to a ‘conjoint phenomenology..., i.e. there is something which it is like to have [phenomenal experiences] ‘together’ (Ibid). Boundedness refers to being ‘phenomenally unified and... not phenomenally unified with any other experience...’ (Ibid).

According to HNM, my experiences are unified by virtue of the fact that they occur within the same existence, whose surface protrudes into the dimension of consciounth. The experience of the red-ness of the fire engine is conjoined with the experience of the sound of the fire engine by virtue of the fact that these experiences occur within the same unified existence. And the existence itself is unified by virtue of the fact that it protrudes into the dimension of consciounth. Just as a physical vortex serves to unify its constituent

¹² I generally refer to the dimension of consciounth as a single dimension for the sake of simplicity. However, just as space is compactified into 1 dimension, the same can be said for consciounth. Different explanatory gaps can potentially be addressed by protrusions into different dimensions of consciounth. Speculatively, the dimensions of consciounth could conceivably consist of the dimensions of awarenth, experienth, etc. Alternatively, dimensions of consciounth could be linked to the hedonic dimensions of pleasure and pain (Mørch, 2017). Dimensions of consciounth will be explored in future work.

atoms into a constantly fluctuating unified object, a dimensional protrusion of the surface of the ontological ocean serves to unify its constituent qualities into a constantly fluctuating unified subject. But as this subject has a spatio-temporal aspect, it must also have an objective aspect. As such, it is both a subject and an object. This aligns with the fact that a subject of experience also corresponds to an objective physical body.¹³

Furthermore, experiences are bound by virtue of the fact that they occur within one protrusion and not another. Simply put, I experience the red-ness of a fire engine which I am looking at, while you do not, because the light from the fire engine is hitting my retina, but not yours. As my retina is part of a protrusion which corresponds to me, while your retina is part of a protrusion which corresponds to you, I experience the red-ness of the fire-engine, while you do not.

4.5 Consciousness and Life

So, who or what is conscious? Or in the HNM framing, what types of physical existences protrude into the dimension of consciounth? It is clear from our own experience that humans are conscious. And it seems reasonably safe to assume that apes, cats and dogs are conscious. But what about bees and worms? Or cells and viruses? What about fundamental matter, such as atoms or subatomic particles? Are computers or computer networks conscious? Could they become conscious?

I argue that the threshold for dimensional protrusion corresponds with the existence of life. According to this threshold, all life protrudes into the dimension of consciounth, while all inanimate objects do not. In other words, inanimate objects are spatio-temporal, while all life forms are spatio-temporo-consciounth.¹⁴

This understanding broadly aligns with common intuitions regarding consciousness. It is generally assumed (at least by non-panpsychists) that non-living existences are non-conscious, regardless of their complexity. For example, computers or networks of computers are generally deemed to be non-conscious, even though they have high levels of complexity. While the complexity of the internet may rival or surpass that of the brain of a worm, intuition (or *my* intuition at least) would have us accept the consciousness of a worm before it would accept the consciousness of the internet.

However, this does not imply substrate dependence. HNM does not assert that only life can protrude in the dimension of consciounth, but rather that only life does protrude into the dimension of consciounth and therefore only life is conscious. The link between life and consciousness is a posteriori rather than a priori. If computers protruded into the dimensions of consciounth, they would also be conscious. But, so long as they exist solely in the realm of space–time, they are not. As such, in order

¹³ Thank you to the Philosophia anonymous reviewer for pointing out that under HNM, a subject of experience also has an objective aspect.

¹⁴ This does not imply that consciounth is unnecessary for the existence of inanimate objects. Rather all spatio-temporo-consciounth dimensions, including consciounth, are necessary for inanimate existences, in the same way that all spatio-temporal dimensions, including depth, are necessary for the existence of the surface of the ocean.

for us to create conscious computers, we would need to understand how to extrinsically curve them in the dimension of consciousness. Creating complex spatio-temporal existences will simply not be sufficient.

One objection to the proposed correspondence between consciousness and life is that there is a vague line between living and inanimate forms. In other words, there is no consensus on the definition of 'life'. As such, the life-inanimate distinction seems arbitrary or artificial.¹⁵

However, the fact that there is no consensus on the definition of life corresponds with the fact that there is no consensus on which existences are conscious. The proposed correspondence between life and consciousness is therefore a correspondence between two categories which both evade a consensus. As such, why couldn't they correspond with each other?

Another objection to the correspondence between life and consciousness is that of why molecules or atoms don't also protrude into consciousness? Why draw a line at life, rather than allowing for consciousness 'all the way down'? The main difference between bunches of molecules and living existences is in terms of complexity and organisation—but this raises the question of why that particular complexity or organisation? Why not rather adopt a panpsychist version of HNM which allows for consciousness at all levels of complexity?¹⁶

The problem with a panpsychist version of HNM is one of parsimony. Like most versions of panpsychism, panpsychist HNM would ascribe consciousness to atoms, molecules and/or sub-atomic particles. But unlike more traditional forms of panpsychism, these conscious particles do not add any explanatory power in the context of HNM. Under other forms of panpsychism, conscious particles are required in order to explain macro-level consciousness. They ascribe consciousness to atoms in order to explain how consciousness arises in humans. However, HNM explains human consciousness through dimensional protrusion, so conscious particles are simply not required. In the context of HNM, conscious atoms do not contribute anything. As such, the version of HNM which establishes the threshold for consciousness at life is qualitatively more parsimonious than a panpsychist version of HNM which ascribes consciousness to all matter.

Furthermore, the question of 'why that particular complexity or organization' is misleading in the context of HNM. The complexity or organization is not what corresponds to consciousness. In fact, as demonstrated in Figs. 9 and 10 above, it is possible to have an identical physical structure without corresponding to consciousness. We can see that hypodimensional complexity can correspond to its hyperdimensional ground but is not required to. Physical complexity is thus an indicator of dimensional protrusion but is not equivalent to it.

As such, HNM would challenge the statement that the main difference between bunches of molecules and living existences is one of physical complexity. Rather HNM states that the main difference is that living forms are spatio-temporo-conscious existences while bunches of molecules are spatio-temporal existences. In

¹⁵ Thank you to the Philosophia anonymous reviewer for this critique.

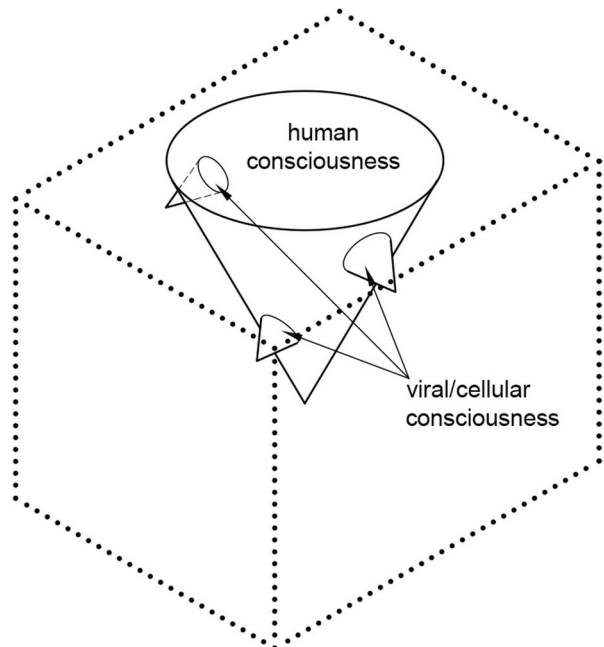
¹⁶ Thank you again to the Philosophia anonymous reviewer for these questions.

this light, just as computers which protrude into the dimension of consciounth would be conscious, complex arrangements of molecules which are physically identical to living organisms, but do not protrude into the dimension of consciounth, would not be conscious. This alludes to a version of physicalist zombies, which I will revisit in Sect. 5 below.

The correlation between life and consciousness may also seem to present a form of the combination problem for HNM. If viruses and cells are conscious, then how do they combine to create human consciousness? However, this problem is based on a misinterpretation of HNM. According to HNM, the dimensional protrusion of viruses and cells do not *combine* to create human consciousness. Rather, both viral and human consciousness are protrusions of the surface into the realm of space–time–consciounth, and these protrusions may occur at different, but interrelated scales. Viral consciousness does not combine to create human consciousness; and human consciousness does not de-combine to create viral consciousness. Rather, viral and human consciousnesses are interrelated spatio-temporo-consciounth existences – see Fig. 11.

Readers may note that the cardinal axes of space, time and consciounth have been omitted in Fig. 11. This omission allows for a further clarification, in that human consciousness and viral/cellular consciousness seem to protrude from different surfaces—human consciousness protrudes from the top surface of the cube, whereas viral/cellular consciousnesses protrude from the surface of the human vortex. The point, however, is that both humans and viruses/cells are spatio-temporo-consciounth existences as a result of their respective protrusions. As such, we see that the critical issue regarding consciousness is existence in the realm of space–time–consciounth.

Fig. 11 Relationship between related spatio-temporo-consciounth existences



We see that the surface protrusions obtain such existences and the dimensions of space, time and consciousness are all equally fundamental and equally necessary for consciousness.

It is important to note that just as the physical structure of a virus is radically different from the physical structure of a human, viral consciousness is radically different from human consciousness. As Nagel notes, “our own experience provides the basic material for our imagination, whose range is therefore limited” (Nagel, 1974, 3). As such, we cannot imagine what it is like to be a bat or a virus. However, this does not preclude the possibility that bats and viruses are conscious. Rather, according to HNM, viruses and bats are conscious, but as their consciousnesses (or spatio-temporo-conscious existences) are radically different from human consciousness, we simply cannot imagine what it is like to be them.

5 Hyperdimensional Neutral Monism and Cosmopsychism

While hyperdimensional neutral monism is a form of neutral monism, it shares a reliance on the aquatic metaphor with various forms of idealism (Kastrup, 2014) and cosmopsychism (Nagasawa & Wager, 2017; Shani, 2015; Shani & Keppler, 2018, Mathews, 2011). I therefore utilize this metaphor to compare HNM to cosmopsychism as well as to explain various subtle aspects of HNM. I also note that HNM is likely to be subject to the ‘incredulous stare’ objection (Shani, 2021) even from the fringes of panpsychism and panqualityism, and I therefore note the similarities between HNM and cosmopsychism as a means of inferring metaphysical viability and respectability.

For the purposes of this article, I focus specifically on the similarities and differences with cosmopsychism as defended by Itay Shani (2015, Shani & Keppler, 2018).¹⁷

Shani defines the seven postulates of cosmopsychism, loosely as:

1. The cosmos as a whole is the only ontological ultimate there is, and it is conscious (2015, 408).
2. The cosmos as a whole is prior to its parts (priority monism) (Ibid).
3. The cosmic consciousness (or ‘absolute’) has a concealed and revealed side. The concealed side is the ‘intrinsic dynamic domain of creative activity’, and the revealed side is the ‘outer, observable expression of that activity’ (Ibid, 410). This is termed the ‘lateral duality principle’.
4. The absolute can be likened to a vast ocean of consciousness.
5. Cosmic consciousness is like a vacuum in quantum field theory. It is the background against which local interference patterns are discerned as phenomenal states.
6. Individual entities are dynamic constructions within the absolute.

¹⁷ There are many differences in the utilization of the metaphor between idealism and cosmopsychism. These differences are beyond the scope of this article.

7. The relationship between individual entities and the absolute can be likened to aquatic metaphors of the relationship between vortices within the ocean and the ocean itself (My list, derived from Shani, 2015).

Postulates 6–7 are the basis for the comparison between HNM and cosmopsychism and are thus mostly taken as a given. The primary difference between cosmopsychism and HNM with regards to these postulates is that cosmopsychism deems individual entities to be ‘dynamic constructions’, whereas HNM deems them to be dimensional protrusions. As such, cosmopsychism identifies human consciousness with a localization of cosmic consciousness— ‘a knot or bulge of consciousness with an appearance of self-containment’ (ibid, 418) – whereas HNM attributes human consciousness to a protrusion into the fundamental dimension of consciounth.

This difference relates to postulates 4–5, which seem to be at odds with the HNM claim of neutral ultimates insofar as they allude to the primacy of consciousness. However, I believe that the fundamentality of consciousness can be de-coupled from the metaphor of an ocean which serves as the background against which local interference patterns are discerned. As such, I accept postulates 4–5 on the basis of the metaphor and engage with the issue of the fundamentality of consciousness in relation to postulates 1–3. It is on these postulates that I focus.

Postulates 1 and 2 share some common ground, as they both refer (directly or indirectly) to token priority monism – there is one ontological ultimate, and all ‘parts’ of the ultimate are dependent on that ultimate for their existence. The first postulate states that the one ontological ultimate is conscious.

Regarding the claim of monism, HNM clearly identifies with type monism in general, as it states that there is one type of fundamental ‘stuff’ in the universe (hence the ‘monism’ in ‘hyperdimensional neutral monism’). This assertion, however, says nothing about token monism as stated in the first and second postulates of cosmopsychism. Token monism as per cosmopsychism is priority token monism as opposed to existence token monism (Schaffer, 2010). Priority token monism accepts that parts exist, but that the whole is prior to such parts. It is a top-down, rather than bottom up, approach.

Based on the assertion that ultimates combine to create the ontological ocean, HNM appears to identify with token priority pluralism (or atomism) as opposed to token priority monism. There are many qualities, and these qualities combine to create the ontological ocean.

But is HNM necessarily a token pluralist view? Why should we necessarily assume that the qualities constitute the ocean, instead of the ocean being comprised of the qualities? Why must the qualities be prior to the ocean? While HNM is compatible with either token monism or token pluralism, I argue that token monism is preferable for two primary reasons. The first reason is that of parsimony. Based on the arguments presented thus far, both physical objects and conscious subjects (or subjective experiences) can be accounted for by the surface of the ontological ocean and its protrusion into the dimension of consciounth respectively. As such, there is simply no need for the ocean itself to further supervene on parts. The ocean itself is sufficient for the existences

of which we are aware (objects and subjects), so the supposition of qualities which constitute the ocean in a bottom-up manner is unnecessary and therefore unparsimonious. This does not imply that qualities do not exist. Rather, qualities exist, but they supervene on the ontologically primary ocean. It is a top-down, rather than bottom-up supervenience relation.

The second advantage of priority token monism is based the arguments that Schaffer (2010) presents in relation to quantum entanglement. Two particles can be said to be entangled when ‘[no] matter how far apart the particles are, a spin measurement on one will immediately set the spin state of the other to the opposite’ (ibid, 52). This seems to require ‘communication’ between the two particles at a speed faster than light, which is impossible according to the laws of general relativity. Alternatively, however, if the physical universe is deemed to be a monistic whole, no ‘communication’ between the particles is required, as both particles are defined by their mereological relation to the whole.

While a detailed discussion of quantum entanglement is beyond the scope of this article, Schaffer notes that the entangled universe displays an ‘unbroken wholeness’, which can be seen as evidence to support token monism (ibid, 53). And while critics may note that Schaffer applies his arguments for token monism specifically to the physical world, he also notes that if token monism is true, it is true with metaphysical necessity (ibid, 56). I therefore accept his arguments in favour of priority token monism and apply such monism to both the spatio-temporal aspect of the universe as well as the spatio-temporo-conscious universe.

The cosmopsychist notion that the single monistic ultimate is conscious is also worth exploring in detail. According to cosmopsychism, the ocean as a whole is conscious.¹⁸ But according to HNM, it is the protrusion of the surface of the ontological ocean into the dimension of consciousness which is identical to consciousness. The relationship between surface and consciousness is critical here, and consciousness alone is insufficient.

The importance of the surface can be seen through the holographic principle as postulated by Stephen Hawking and Jacob Bekenstein. Loosely, the holographic principle states that ‘...the amount of information you can cram into a region of space is proportional to the area of the surface surrounding that space...’ (Hoffman, 2019, 105).¹⁹ While the holographic principle relates to the amount of information which can be described by the surface, I argue that it is relevant to consciousness as well. As such, a deep ocean with no surface protrusion would not be conscious, but a shallower ocean, with pockets of surface protrusion would contain pockets of consciousness. It is in this way that the cosmic whole is not conscious, but protrusions of the surface of the cosmic whole are.

¹⁸ Shani & Keppler argue that the cosmic consciousness can be likened to a zero-point field, in which case the phenomenal nuances lie dormant, and would thus not constitute actual subjective experience (2018, 401).

¹⁹ Information can be defined as the number of yes/no questions you need answer to fully specify a system (Wheeler, 2018).

HNM is thus differentiated from cosmopsychism. Whereas cosmopsychism states that the ocean as a whole is conscious and that macro-consciousnesses are localizations or ‘knots’ of the whole, HNM argues that the protrusion of the surface is necessary for consciousness. As such, the ontological ocean as a whole is not (necessarily) conscious, but consciousness exists within it because of the extrinsic curvature of its surface within the dimension of conscionth.

An exploration of postulate 3 offers further clarification on the relationship between HNM and cosmopsychism. According to Shani, the lateral duality principle states that:

the absolute exemplifies a dual nature: it has a concealed ... side to its being, as well as a revealed ... side ... The revealed dimension of the absolute constitutes the structural domain of observable regularities ... while the concealed dimension corresponds to an inscrutable categorical domain which grounds this observable order.... Since there is nothing outside the absolute, its revealed side must be thought of as revealed to observers constructed and situated within the ocean ... To such observers, ... it appears as what ... we identify as physical nature. (2015, 410-11)

In its cosmopsychist framing, the revealed side, which is equated with the physical universe, is dependent on the existence of observers. While Shani explains that these observers must be within the ocean as there is nothing outside of the ocean, the dependence on revelation to these observers nonetheless alludes to a form of idealism. While Shani differentiates cosmopsychism from idealism, this specific claim overlaps with idealism in general – that the physical world is grounded by mental facts (Chalmers, 2019, 2).

In contrast to cosmopsychism, HNM does not posit that the physical supervenes on the mental. As the protrusion of the surface into the conscionth dimension is equated with consciousness, the physical world of spacetime is prior to the phenomenal world of consciousness.²⁰ However, HNM is not a form of physicalism as it posits that the physical world is an aspect of the fundamental ontological ocean, rather than a fundamental ontological ultimate in and of itself.

It is important to note the relationship between a surface and a disposition to a specific revelation. In physical space, when we look at an object, we see the surface of that object, as the interior is concealed from us. Furthermore, it is the properties of the surface which determine the objects appearance. This relationship implies a similarity between cosmopsychism and HNM. Whereas cosmopsychism asserts that the physical world is the revealed side of the ultimate, HNM asserts that the physical world is the surface of the ultimate (or the surface of the ocean composed of ultimates from a token pluralist position). But if the surface is disposed to reveal the ocean in a particular way, then perhaps the revealed side and the surface are one and the same. Perhaps the ‘revealed dimension of the absolute’ is none other than the surface of the ontological ocean.

The notion of dimensionality is relevant to exploring the concealed side too. Shani states that.

²⁰ This does not mean that spacetime is prior to conscionth, however.

... no concrete system consists merely of a revealed form, an observable causal structure, without also comprising a concealed intrinsic dimension... It follows that all concrete objects, all relatives, are abodes of consciousness ... However, that all relatives are loci of experience does not imply that they are subjects of experience... [W]hether or not [a system] is endowed with a unified consciousness depends on the nature of its causal organization. (2015, 416)

The cosmopsychist notion that all concrete objects are ‘abodes of consciousness’ is contrary to that of HNM. In the context of HNM, such a statement is equivalent to stating that all parts of the surface have depth, which is clearly false. Rather, only those parts which are extrinsically curved have depth. Likewise, only those parts of spacetime which protrude into the consciounth dimension are conscious.

Shani acknowledges that ‘abodes of consciousness’ are not necessarily subjects of experience, and in agreement with panqualityism, states that causal organization determines whether a system is ‘endowed with a unified consciousness.’ HNM has explanatory potential here as it specifies what type of causal organization is required to endow a system with unified consciousness. A system with an extrinsically curved spatio-temporal surface into the dimension(s) of consciounth is conscious, while a system with an intrinsically curved spatio-temporal surface (or a system with a ‘flat’ spatio-temporal surface) is not.

6 Refuting Criticisms

In this section, I respond to various critiques which could be levelled at HNM. The first critique is the argument from parsimony, which has two components. The first component is that the extra dimensions posited by HNM are unparsimonious, and that a simpler solution, which does not require such dimensions would be preferable. The second component is that even if we accept the additional dimensions, why would we posit hyperdimensional qualities (or a single hyperdimensional ultimate) which exist in these dimensions? Wouldn’t it be simpler to accept the additional dimensions where they offer explanatory power, but omit the additional hyperdimensional qualities or monistic ultimate? In responding to this critique, I introduce (and problematize) an alternative to HNM, which I call ‘hyperdimensional physicalism’.

The next critique regards the causal interaction between mind and body as well as causal closure of the physical world. If the mental and physical exist in different dimensions, how could they possibly interact with each other? And if the physical world is the 4-dimensional surface of a hyperdimensional reality, then how could it possibly be causally closed as science seems to suggest?

The third critique refers to the issue of explanatory gaps and HNM zombies. As HNM claims an identity relation between the protrusion of the surface of the ontological ocean and a subject of experience, this identity relation needs to be explained. In other words, *why* is the protrusion of the surface identical to a subject of experience. Failure to adequately address this critique simply moves the

explanatory gap from a quality/awareness gap to a protrusion/awareness or protrusion/subject gap.

The fourth critique concerns the quality and structure combination problems as discussed above. The final critique regards the definition of the term ‘neutral’ in hyperdimensional neutral monism.

6.1 The Argument from Parsimony

The first critique is that the supposition of additional dimensions is unparsimonious. Introducing additional dimensions seems to be a heavy price to pay to explain consciousness.

There are two responses to this concern. The first is to note that all philosophies of mind are subject to a milieu of problems, such as the hard problem of consciousness, the combination problem(s), or the problem of causal interaction. No theory seems to adequately address these issues, so a radical reframing seems justified. As additional dimensions can allow for consciousness without positing brute emergence (as per physicalism) or conscious atoms/particles (as per panpsychism), it seems like an option which, at the very least, is worth exploring.

The second response is to note that numerous scientific theories, in particular various string theories, allow for more than four dimensions. Specifically, most types of string theory predict either 10 or 26 spatial dimensions and 1 temporal dimension (Kaku, 2016). Some of these dimensions can exist within spacetime, while others can be seen to contain spacetime (such as various ‘brane’ theories) (Kaku, 2012). While the intricacies of string theory are beyond the scope of this article, the string theory assertion that there are more than four dimensions than those of spacetime serves to provide validity to the similar assertion made by HNM. While the string theory assertion is far from proof of more than four dimensions, it demonstrates that the assertion can be compatible with rigorous scientific thinking and is not necessarily a crackpot assertion.

Furthermore, the fact that string theory asserts more than four dimensions demonstrates the parsimoniousness of HNM. HNM is not adding additional dimensions, but rather reframing additional dimensions which are already thought to exist. While string theory posits the existence of more than four spatial or temporal dimensions, HNM asserts that the additional dimensions are neither spatial nor temporal, but rather conscious.

The claim of more than four dimensions differs from that of string theory on an epistemological as well as metaphysical level. Metaphysically, the claim differs regarding the type of dimensionality – the additional dimensions are neither spatial nor temporal. But these dimensions also differ regarding epistemic access. The additional dimensions posited by string theory generally do not relate directly to human experience (Wertheim, 2018). However, the additional dimensions posited by HNM are the ground for conscious human experience. The assumption of the dimension of consciousness is what allows for it to ‘be like something’. This is a critical distinction. Rather than extra-spatio-temporal

dimensions being outside of conscious human experience, they are deemed to have the most intimate relationship with conscious human experience. In a sense, these dimensions (or protrusions into these dimensions) are not beyond our consciousness; they are our consciousness.

As such, I argue that HNM is more parsimonious than sting/brane theories as well as both physicalism and panpsychism. It is more parsimonious than string/brane theories because the introduction of additional dimensions relates to something that we know exists (consciousness), rather than something which is beyond human comprehension (additional spatial or temporal dimensions). It is more parsimonious than physicalism as it does not require brute emergence of consciousness. And it is more parsimonious than panpsychism as it does not require conscious atoms.

Critics, however, may accept the additional dimensions as both parsimonious and scientifically viable, but question the existence of an ontological ocean (or qualities which constitute the ontological ocean) which exists in the hyperdimensional realm. If consciousness is identical to the protrusion of spacetime into space–time–consciounth, why not accept these dimensions, but discard the ontological ocean and its qualities?²¹ Spacetime can seemingly curve into the realm of space–time–consciounth without positing any additional elements or qualities beyond those of spacetime. In other words, could we rather assert that the previously termed ‘surface’ of the ontological ocean is a self-contained²² existence in the way that we usually conceive of spacetime, rather than a hypodimensional aspect of a hyperdimensional ocean?

See Figs. 12 and 13 for a graphic illustration of this argument. Figure 12 shows HNM as previously conceived – a spatio-temporo-consciousal ocean, the surface of which is the physical world of spacetime. Figure 13 shows a similar spatio-temporo-consciousal realm, but the physical world of spacetime is not a hypodimensional aspect of the ontological ocean. It is a self-contained ‘plane’ rather than a hypodimensional aspect of a ‘cube’.

This is a valid approach which states that the physical world is fundamental, but consciousness is the extrinsic curvature of the physical world in the dimension of consciounth. As it posits the physical as the fundamental ontological ground, it is most closely linked to physicalism. However, it deviates from physicalism in that it requires the existence of the consciounth dimension for spacetime to extrinsically curve within.²³ I call this alternative theory ‘hyperdimensional physicalism’.

²¹ Thank you to the *Philosophia* anonymous reviewer for challenging me on the necessity of the ontological ocean.

²² I utilize the term ‘self-contained’ to refer to an existence which does not supervene on a hyperdimensional ground but is rather an existence in and of itself.

²³ Readers may also note similarities between hyperdimensional physicalism and physicalist panpsychism as per Strawson (2017). However, these theories differ in that physicalist panpsychism argues that there is nothing beyond spacetime, whereas HNM posits space–time–consciounth. Furthermore, panpsychist physicalism asserts conscious fundamental matter, whereas hyperdimensional physicalism attributes consciousness to the extrinsic curvature of spacetime. As such, under panpsychist physicalism atoms are conscious, whereas under HNM, they are not.

Fig. 12 HNM

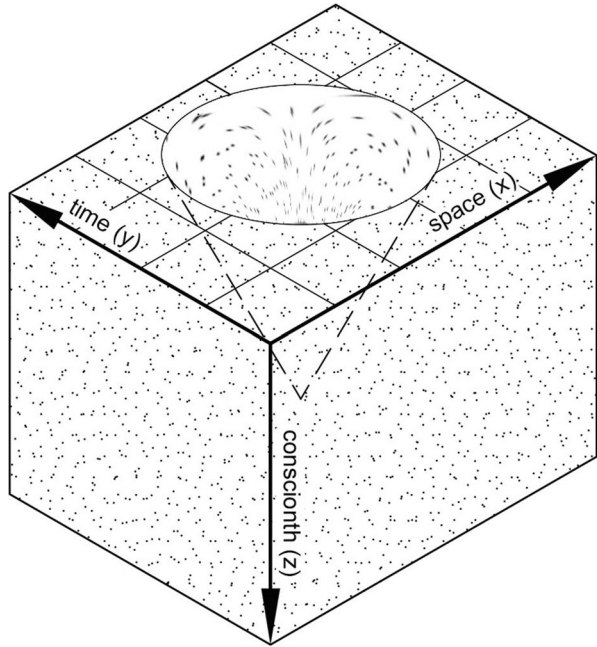
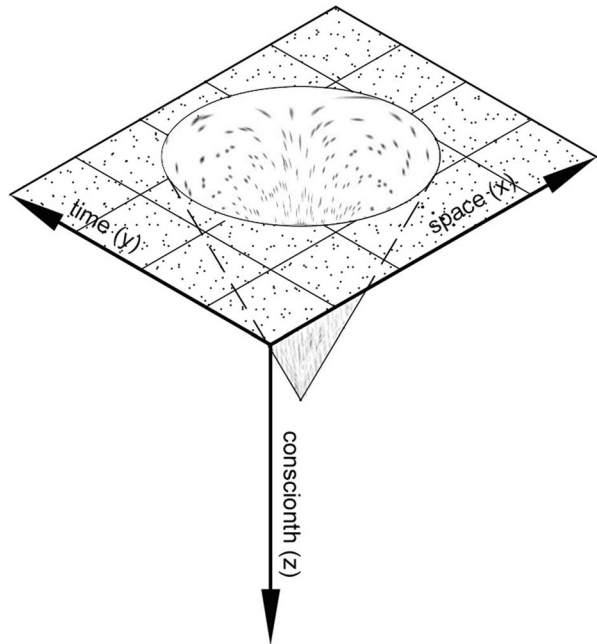


Fig. 13 Hyperdimensional physicalism



Hyperdimensional physicalism has the advantage of parsimony, as it states that consciousness is simply the extrinsic curvature of spacetime into space–time-consciousness. As such, while it still requires hyper-dimensions, it does not require (nor does it allow for) an ultimate (or ultimates) which exist in these dimensions other than those on the self-contained plane of spacetime.

This is an exciting alternative which warrants further study. However, for the purposes of this article, I simply note my primary objection, which is the problematic notion of self-contained, hypodimensional existences within hyperdimensional realms. In the 4-dimensional world of spacetime, all seemingly 3-dimensional spatio-temporal entities are hypodimensional aspects of 4-dimensional grounds. For example, the 2D surface of the ocean (3D if we include time) is a hypodimensional aspect of the 3D ocean itself (4D if we include time). Also, a 3D object with no extension in time amounts to a non-existent object.²⁴ Given that hypodimensional entities within hyperdimensional realms are impossible in 4-dimensions, there is no reason to believe that they are possible in more than four dimensions. Hence the idea of four-dimensional spacetime as a self-contained ‘plane’ in more than four dimensions is problematic. While this is far from a knock-down argument, I take it as sufficient for the purposes of this article and leave detailed discussions of hyperdimensional physicalism for future work.

6.2 Causal Interaction and Causal Closure

Regarding the issue of the relationship between mind and body, critics may argue that HNM faces a similar challenge to dualism – that of the problem of causal interaction. If the mental and physical exist in a differing number of dimensions, how could they possibly interact with each other? (Carter, 2014, 62).

However, the notion of causal interaction between mind and body misses the point of the dimensional relationship between them. Given that mind and body are different dimensional aspects of one thing, they correlate with each other, but do not interact with each other. The 4D ocean can be said to ground the surface of the ocean, but we would not say that it causally interacts with it.²⁵

A thornier problem for HNM regards the causal closure of the physical world. It seems to be a well-accepted theory that the physical world is causally closed, but if the physical world is the surface of the ontological ocean, how could it possibly be causally separable from the ontological ocean?

The issue of causal closure is, to my mind, the thorniest issue for HNM. In order to address this issue, I contest the claim of causal closure of the physical world. While this is clearly an unpopular approach, which seems to put any theory at odds with most current scientific thinking, it is a viable approach for HNM. And while this approach may be unpopular, it is not inconceivable.

Quantum physics provides an avenue by which the physical universe may not be causally closed. While an analysis of quantum physics is beyond the scope of this article, it is important to note that quantum physics allows for the prediction

²⁴ Thank you to the *Philosophia* anonymous reviewer for this insight.

²⁵ Thank you to both *Philosophia* anonymous reviewers for highlighting the distinction between interaction and correlation.

of *probabilities* of quantum events but not the prediction of actual events. It can predict, with incredible accuracy, that a specific outcome will happen a specific percentage of the time, but it cannot predict what outcome will happen in a single trial. Furthermore, quantum physics seems to involve the collapse of the quantum wave function upon observation or measurement, and thus *seemingly* relies on consciousness itself (Carroll, 2017).²⁶

Both the probabilistic nature of the quantum world, and the seeming dependence on observation or measurement are problematic for quantum physics, and one approach to resolving these problems is the introduction of hidden variables. The ‘hidden variables’ approach states that there are unobservable entities (or dimensions) which have explanatory power for the predictive nature of quantum physics. In some versions, this approach states that the reason why quantum events seem to be probabilistic is simply because we don’t have all the necessary information (Ibid, 166).

HNM is committed to the idea that the probabilities are determined by what happens beneath the spatio-temporal surface, which constitutes a hidden variable. And since what happens beneath the spatio-temporal surface (or within the spatio-temporo-consciousness realm) is linked to consciousness and consciousness, it is not surprising that observation or measurement play a role in the quantum realm. As such, HNM is committed to the unpopular idea that the physical universe is simply not causally closed. Rather, the physical universe is subject to hyperdimensional laws, of which the physical laws we have already discovered are a subset, just as the surface of the ocean is subject to physical laws, of which planar laws are a subset.

It should also be noted that, while beyond the scope of this article, hyperdimensional physicalism has the advantage of causal closure, as nothing exists beyond the physical world, even as the physical world is extrinsically curved within space–time–consciousness.

6.3 HNM Zombies and the Explanatory Gap

Regarding the issue of the explanatory gap and the existence of philosophical zombies, critics will contend that HNM simply moves the bump under the rug, as there is still an explanatory gap between the protrusion of the surface into the dimension of consciousness and the existence of a conscious subject of experience. A circle extended in the spatial dimension of depth can result in a cone or a cylinder, but obviously the resultant 3D form is not conscious. So, if protrusion into another spatial dimension is not identical to a conscious subject of experience, why would protrusion into the hypothesized consciousness dimension be? We can arguably conceive of a hyperdimensional existence in space–time–consciousness, without conceiving of a conscious subject of experience, so HNM zombies are thus conceivable, or so it could be argued.

²⁶ Other theories, such as the ‘many worlds theorem’ posit that the wave function does not actually collapse. Rather, all possibilities happen in different universes, and we just find ourselves in one of the many universes.

Given the difficulty in visualizing additional dimensions which are neither spatial nor temporal, I propose a thought experiment, loosely based on Edwin Abbott's 1884 novel 'Flatland' (Abbott, 2015).

Imagine a hypothetical 2-dimensional world, which contains 2-dimensional conscious subjects. These subjects can be thought of as two-dimensional shapes, such as circles or squares. For the purposes of this thought experiment, let us imagine that this world is described by the dimensions of space and consciousness (hence the conscious subjects), and that time is seemingly absent. In other words, it is apparently a spatio-conscious universe – See Fig. 14. The subjects of this universe would have an atemporal experience of shape-hood.²⁷ As time is absent from their universe, their consciousness would clearly be very basic. Thought would be impossible as thoughts require a temporal progression of consciousness. Likewise, experiences of music, movement, and change in general would be impossible.

Let us now imagine that time exists but is perpendicular to this plane and thus is not recognized by the inhabitants of Flatland. Given that Flatland exists at a specific value for time, we, as three-dimensional observers, can say that Flatland is defined by $t=0$ —see Fig. 15.

Now imagine that these shapes protrude into the temporal dimension—see Fig. 16. With this protrusion, the conscious experience of a circle is no longer limited to $t=0$.

At $t=1$, the experience of the circle is smaller, and again it is smaller at $t=2$. In other words, the experience of an atemporal circle becomes the experience of a shrinking circle. In other words, the circle experiences change. See Figs. 17 and 18.

We can now imagine the relationship that the inhabitants of Flatland would have to change or dynamism. As the inhabitants protrude into the dimension of time, they would have dynamic experiences. But as they do not recognize the existence of the temporal dimension, they would have no way to explain dynamic experience. We could imagine them scouring the spatio-conscious universe (in some weird, atemporal way) in search of change, but from our perspective, we can see that they will never find it in the spatio-conscious universe. In order for them to explain change, they would need to understand that the universe is spatio-consciouso-temporal and that certain shapes protrude into the temporal dimension. They would need to understand that change is the protrusion into the temporal dimension.

The significance of this for HNM is hard to overstate. This is not the transition from a circle to a cone (even though it looks like it in the above diagrams). Rather, this is a transition from an atemporal experience to a dynamic one. It is a transition from a world which can be described by nouns, such as circles or squares, to a world which requires verbs, such as shrinking, folding, rotating, or more generally changing. Similarly, according to HNM, protrusion into the consciousness dimension is not a transition from a simple physical existence to a complex hyperphysical existence, but rather a transition from a non-conscious existence to a conscious one.

²⁷ I refer to their experience as 'atemporal' rather than 'static', as 'static' refers to unchanging over time, whereas time does not seem to exist in this hypothetical universe.

Fig. 14 Circle in a spatio-consciounth universe

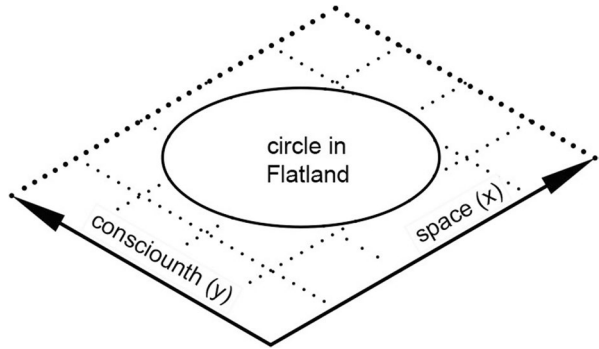
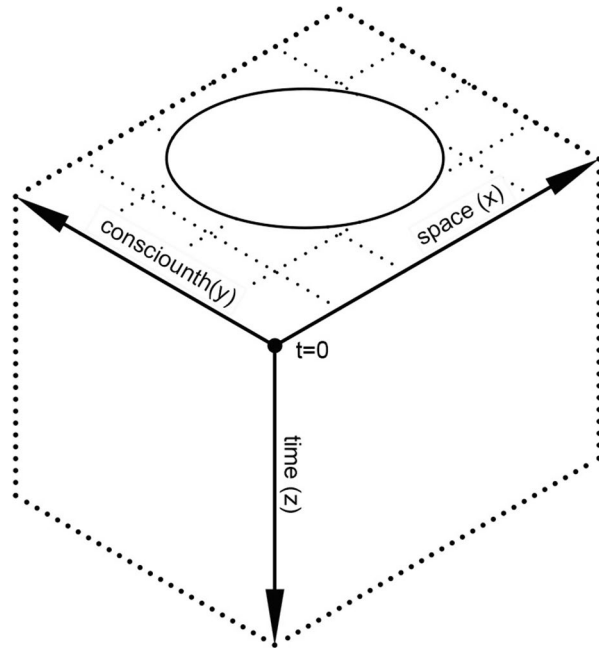


Fig. 15 Circle in spatio-consciounth-temporal universe



Based on this thought experiment, the original question of why protrusion into the consciounth dimension is identical to consciousness, can now be equated to asking why protrusion into the temporal dimension is identical to change. Just as there is no explanatory gap between change and protrusion into the temporal dimension, there is no explanatory gap between consciousness and protrusion into the consciounth dimension. Change requires time for its existence, just as consciousness requires consciounth for its existence.

Fig. 16 Circle protruding into temporal dimension

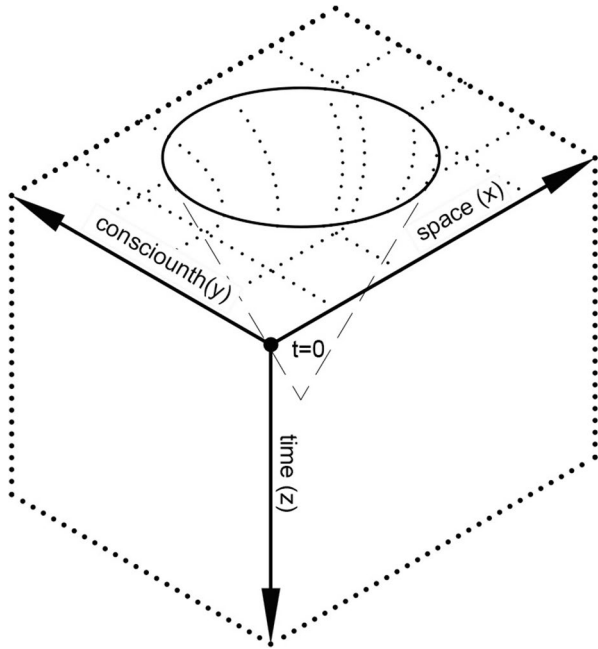


Fig. 17 Smaller circle at t=1

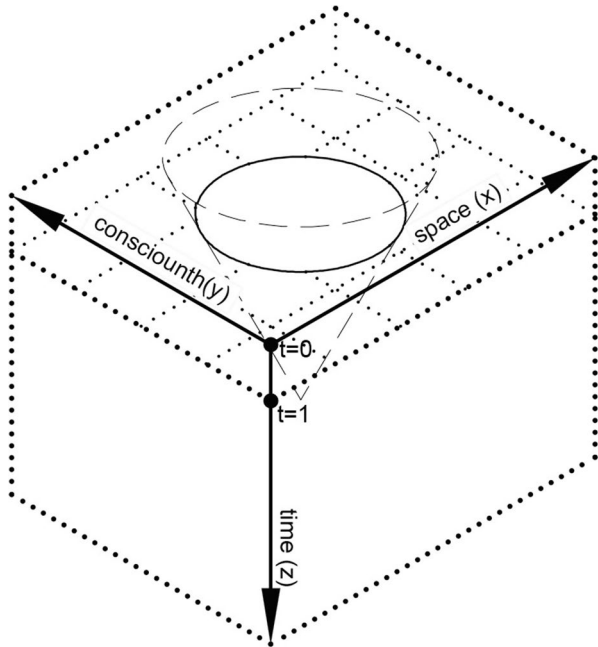
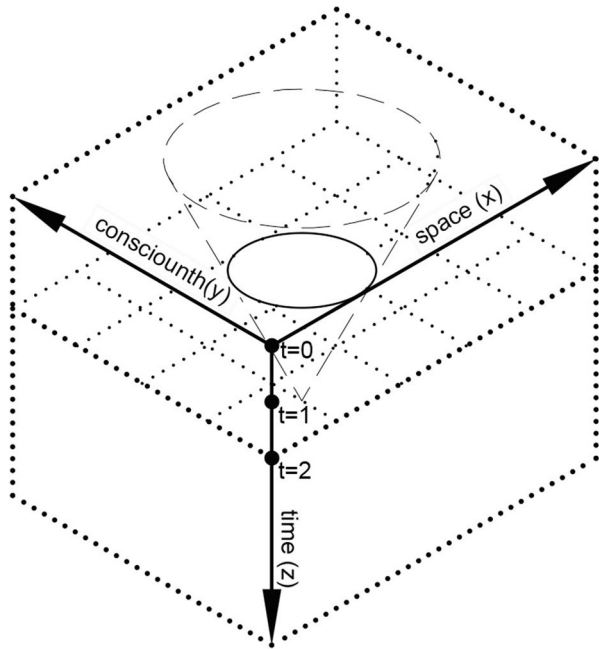


Fig. 18 Even smaller circle at $t=2$



6.4 The Structure and Quality Combination Problems

As noted above, Chalmers states the structure and quality combination problems in relation to neutral monism as follows:

1. Structure combination problem – how can the qualities instantiated in the brain constitute the qualities of which we are aware?
2. Quality combination problem – how can a few primitive qualities yield the vast array of qualities of which we are aware? (Chalmers, 2015, 29–30)

As the physical universe is deemed to be the surface of the ontological ocean and conscious subjects are deemed to be dimensional protrusions within that ocean, it should be unsurprising that the physical and the mental have radically different structures. As the surface and the volume of the ocean exist in different dimensions, their structures have a non-isomorphic relationship. Again, this can be seen in Figs. 9–10 above. Under HNM, the mismatch between the structure of the physical and that of the mental is as unsurprising as the mismatch between the structure of the 2-dimensional surface of the ocean and that of 3-dimensional vortices within the ocean.

As the structure combination problem assumes that the qualities instantiated in the brain constitute the qualities of which we are aware, it assumes an isomorphic relationship between the qualities in the brain and the qualities of which we are aware. However, the refutation of this assumption, and the acceptance of a non-isomorphic relationship as seen above, seems adequate to counter the structure combination problem.

Next, the quality combination problem of how a few primitive qualities could possibly yield the vast array of qualities of which we are aware. Again, dimensionality is central, but the response to this problem also requires reference to token monism or pluralism as discussed above.

If one assumes a token monist position, the ontological ultimates are not a few primitive qualities, but a single quality which encompasses all the qualities in the universe, including those of which we are aware. If that is the case, the single ultimate quality is simply comprised of all the qualities which are localized within it.

On the other hand, under the token pluralist position, ultimates combine to create a hyperdimensional ocean. As these ultimates are not themselves hyperdimensional, it seems that hypodimensional entities can combine to create a hyperdimensional system. For example, points can be arranged in such a way as to create a line, a plane, or a volume. This ability allows for the generation of complexity from simplicity. Just as points can combine to create complex lines, shapes and forms if combined in multiple dimensions, simple qualities can combine to create a vast array of qualities. And in contrast to panqualityism, there is no explanatory gap between the vast array of qualities and awareness of these qualities, as per the discussion above.

6.5 Critiquing the Term ‘Neutral’

One critique levelled at all forms of neutral monism regards the use of the term ‘neutral’. Mach, James and Russell all used terminology that leaned towards experience, when defining neutrality. ‘Sensations’, ‘pure experience’, and ‘sensations and percepts’ respectively, all tend towards the phenomenological and are thus critiqued as being non-neutral (Stubenberg, 2016, 3). But what of neutrality as it pertains to HNM?

Critics might ask, if the physical is a hypodimensional aspect of the ontological ground, how could the ontological ground be ‘non-physical’ or neutral?²⁸ However, this critique assumes that neutral is defined as non-physical or non-mental, rather than more than physical or more than mental. HNM utilizes the term ‘neutral’ in a way which is both neither physical nor mental as well as more than physical and mental.

This can be seen through an exploration of dimensionality in the spatio-temporal universe. As stated above, a cube can be seen as the hyperdimensional ground of a plane (see Fig. 1 above). However, the description of the relationship between a cube and plane is ambiguous. How would we define the dimensionality of a cube in relation to a plane? Is a cube ‘non-planar’? In some sense it is, as ‘planar’ can be defined as 2-dimensional, whereas a cube is 3-dimensional, so a cube is therefore ‘non-planar’. However, this description is not specific, as a line or a point are also ‘non-planar’. In order to specifically describe the dimensional relationship, I have utilized the terms hypo- and hyper-dimensional to describe these relationships. A cube is therefore hyper-planar, while a line or a point are hypo-planar. So, to describe a cube as non-planar, may be technically correct, but it is also not specific. In order to describe a cube in relation to a plane, we would say that it is both non-planar as well as hyper-planar.

²⁸ Thank you to *Philosophia* anonymous reviewer for this question.

Given this understanding, we can see that the ontological ocean is neither mental nor physical, as well as more than mental and more than physical. In other words, the ontological ocean is ‘neutral’ in relation to both the mental and the physical.

7 Conclusion

In this article, I have introduced multiple versions of hyperdimensional neutral monism. While these versions differ on numerous issues, they all rely on the notion of the non-spatial and non-temporal dimension of consciousness. Many of the arguments outlined above remain speculative, but I believe that the notion of a spatio-temporo-conscious universe has the potential to address many of the issues related to the mind–body problem.

In addition to the mind–body problem, HNM has the potential to address other issues concerning both metaphysics and science. For example, HNM has explicative power regarding the relationship between consciousness and the early universe.

According to physicalism, the physical universe existed for billions of years, without the existence of consciousness. Then one day, presumably with the origins of life, consciousness miraculously emerged. In contrast, according to panpsychism and idealism, consciousness is fundamental, so no brute emergence is required, but then consciousness must have preceded life. While not metaphysically impossible, intuition (at least my intuition) seems to indicate that this is unlikely.

HNM, on the other hand, allows for the existence of the physical prior to the mental, without the need for brute emergence of the mental. The surface of the ontological ocean existed before protrusions of the surface appeared. As the ontological ocean developed, its surface increased in complexity. This complexity resulted in protrusions into the dimension of consciousness. As such, consciousness developed along with the increase of complexity associated with life, but no brute emergence is required.

In addition to the relationship between consciousness and the early universe, future work will include investigations into other issues, such as defining hyperdimensional laws, the relationship between conscious experience, subconsciousness, and the collective unconscious; quantum mechanics; string- and brane- theories (and their multiple dimensions); dark energy and matter; evolution; and a detailed analysis of hyperdimensional physicalism. For now, however, HNM can be seen as a viable engagement with various mind–body problems, and a ground for further research and exploration.

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