Consciousness and Multiple Dimensions (For Non-Philosophers)

Context

The 'hard problem of consciousness' is loosely that of how physical atoms could possibly combine in such a way to create brains, which then create consciousness. Given that atoms are generally deemed to be non-conscious entities, how does consciousness 'emerge' from their combination?

Not everyone agrees that this is a serious problem, and many philosophers and physicists argue that the problem is simply one of limited understanding. They argue that with enough scientific and technological progress, we will understand how atoms combine to create consciousness in a way similar to how we now understand how atoms combine to create liquidity. Neither consciousness nor liquidity are present at the level of atoms, so just as liquidity emerges from the combination of atoms, so can consciousness.

For the purposes of my exploration, however, I simply accept that the hard problem is a problem worth engaging with. I ask the question '*what if* consciousness cannot be explained by understanding how atoms combine in the brain?' Is there another approach that may offer a better explanation?

There are multiple responses to this problem, from the notion that atoms themselves are conscious (panpsychism), to the notion that the physical world exists within consciousness instead of consciousness existing within the physical world (philosophical idealism), and many others. None of these alternative approaches is widely accepted, so I believe that further exploration is warranted.

Introduction to my Approach

My approach to this problem starts with asking the question of whether additional dimensions from those of space and time could add any explanatory power. There are two major concerns with this approach though. The first is in understanding *how* additional dimensions could possibly help explain consciousness. If 3 dimensions of space and 1 dimension of time can't explain consciousness, why would adding additional dimensions solve the problem? The second concern relates to the viability and simplicity of additional

dimensions. If we have no reason to think that there are additional dimensions other than that they may help solve the hard problem, it seems like a huge cost to add them to our understanding of the universe just to explain consciousness.

In order to address the first concern, I revisit my (flawed) thought process from when I was a teenager learning about dimensions. In high school I was taught that the universe consists of 4 dimensions – 3 spatial dimensions and 1 temporal dimension (or 4 dimensions of spacetime as per Einstein's theory of relativity). I learned that if we understood the position and velocity of every particle in the 4 dimensions of spacetime, we would know everything there was to know about the universe. But this struck me as incomplete. It seemed similar to arguing that if we knew the position and velocity of every pixel on a screen, we would know everything there is to know about the moving image on the screen. But I asked myself, what about colour? If we knew the position and velocity of every particle on the screen, we would perfectly describe a black and white image, but would not describe its colour. So, it seemed to me at the time, that the universe must have more than 4 dimensions of spacetime – it must also have a colour dimension.

Upon voicing this concern, I learned that colour *can* in fact, be described in the 4 dimensions of spacetime. Colour is simply the perception of different wavelengths of light, and the wavelengths of light can be described in the 4 dimensions of spacetime. This explanation made sense to me, and I accepted that no additional dimensions are required to explain colour. However, 25 years later, when I first read about the hard problem of consciousness, it occurred to me that additional dimensions may be relevant in explaining consciousness, as the 4 dimensions of spacetime are arguably not sufficient.

I revisit how we can understand additional dimensions and how they could possibly help to explain consciousness below. But first I address the cost of seemingly adding extra dimensions to our understanding of the universe. I accept that the cost of *adding* dimensions would be huge and would likely disqualify my thinking from serious consideration. However, it is important to note that string theory already posits the existence of multiple dimensions 'beyond' those of spacetime. There are numerous versions of string theory, but all of them *require* a minimum of 10 dimensions (some require 11, 26 or 27 dimensions). As such, I am not *adding* any extra dimensions, but rather *reframing* extra dimensions which are already thought to exist.

These extra dimensions are generally thought to be beyond the capacity for human understanding. There are many thought experiments and visualization tools to help us imagine them, but none of these tools allow us to *directly* engage with or understand them. So, it seemed to me, that on the one hand, string theory has additional dimensions that it cannot explain, and the hard problem consciousness could possibly be resolved (or at least engaged with) by utilizing additional dimensions. What if the additional dimensions posited by string theory had some relationship to the mystery of consciousness?

Reframing additional dimensions

In order to unite string theory and consciousness, I argue that the physical 4-dimensional world of spacetime is the 'surface' of a more-than-4-dimensional universe.

This concept is illustrated in figures 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).

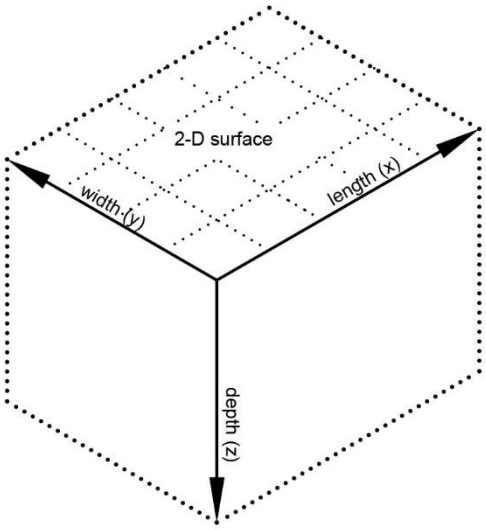


Fig 1 *3D cube with 2D surface*

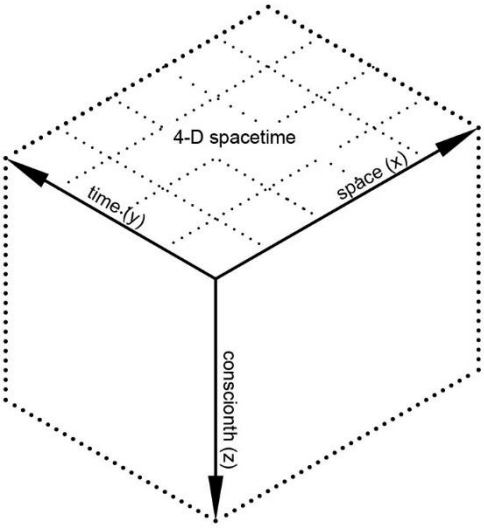


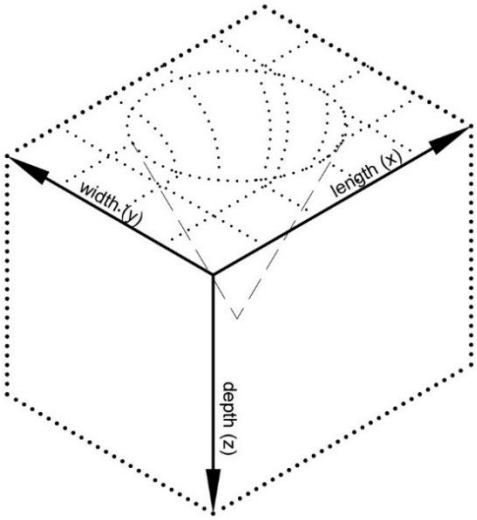
Fig 2 *>4D cube with 4D surface*

Figure 2 shows a similar diagram, but the three spatial dimensions of length, width and depth have been compacted 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’.

The surface of the cube in figure 2 can be said to be a 4-dimensional aspect (or surface) of a more-than-4-dimensional universe and is associated with the physical world of spacetime. This surface lacks any ‘consciounth’ (or more-than-4-dimensionality).

It is only when the 4-dimensional surface *protrudes* into the more-than-4-dimensional realm, that the surface acquires consciounth. Figure 3 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 4 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.



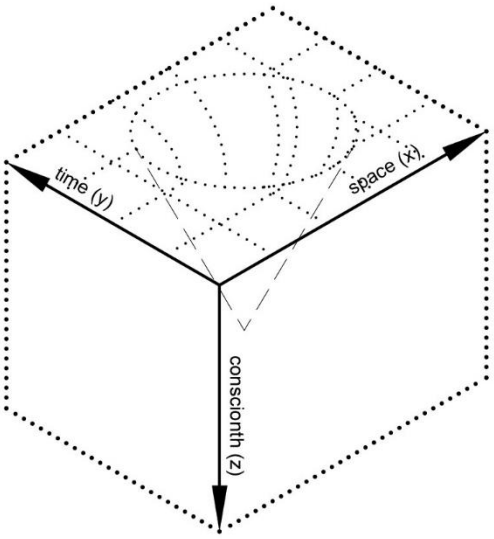


Fig 3 *2D surface ‘protrudes’ into 3D cube*

Fig 4 *4D surface ‘protrudes’ into >4D cube*

I assert that the protrusion of the surface into the consciousal dimension *is consciousness*. So, a table or a cloud exists solely as a 4-dimensional entity and is therefore not conscious. It exists exclusively in spacetime. But a conscious subject of experience, such as you or I, exists as a more-than-4-dimensional entity and is thus conscious. It exists in space-time-consciounth. In this context the brain does not *produce* consciousness but is rather the *surface* of consciousness.

However, critics may argue that this does little to explain consciousness. A circle that protrudes 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 consciounth dimension be? We can arguably conceive of an entity which exists in space-time-consciounth, without conceiving of a conscious subject of experience, so how do these 'extra' dimensions explain consciousness?

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' (Abbot, 1884).

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 consciounth (hence the conscious subjects), and that time is seemingly absent. In other words, it is apparently a spatio-consciousal universe – See figure 5. The subjects of this universe would have an atemporal experience of shape-hood.[1] 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 figure 5.

[1] 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.

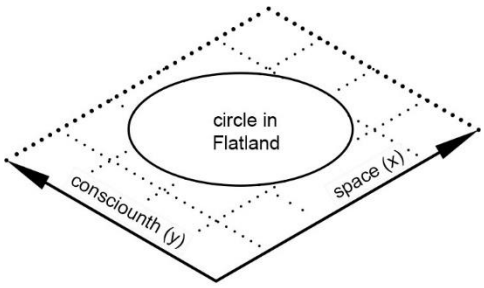


Fig 4 *Circle in a spatio-consciousal universe*

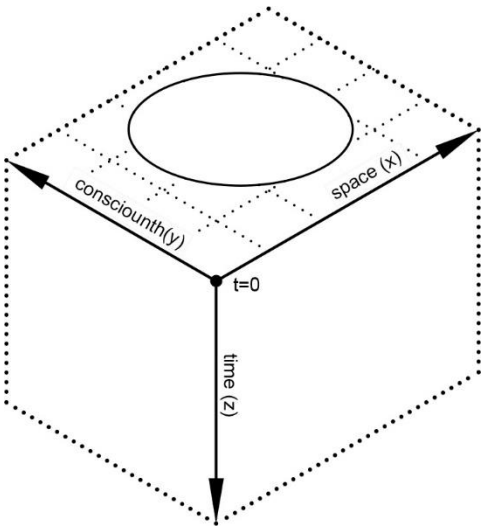


Fig 5 *Circle in spatio-consciouso-temporal universe*

Now imagine that these shapes protrude into the temporal dimension - see figure 6. With this protrusion, the conscious experience of a circle is no longer limited to t=0.

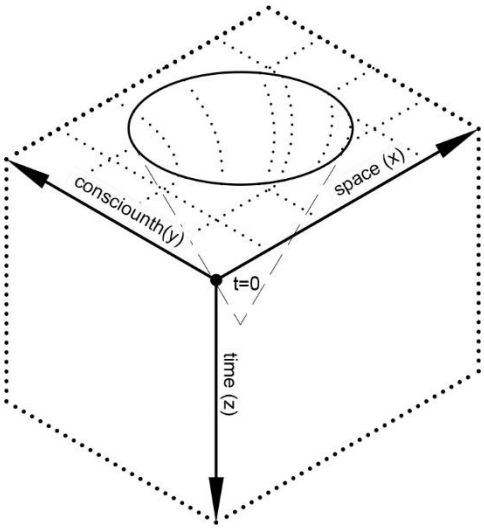


Fig 6 *Circle protruding into temporal dimension*

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 figures 7 and 8.

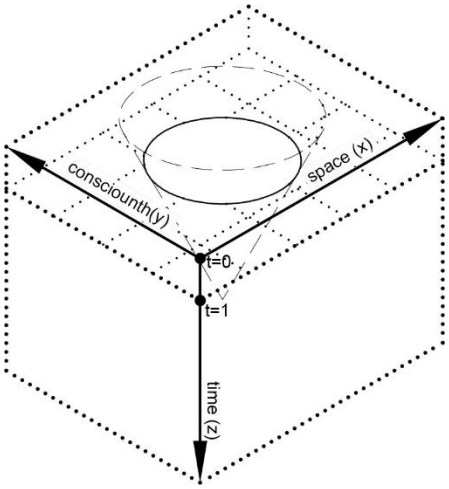


Fig 7 *Smaller circle at t=1*

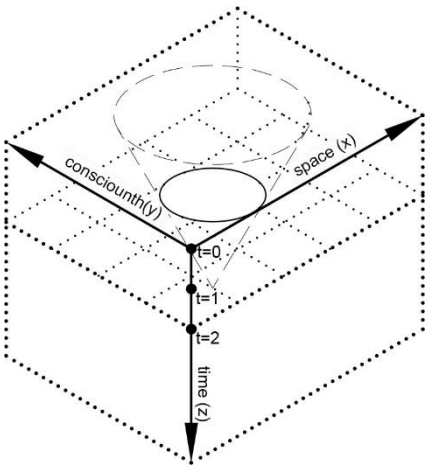


Fig 8 *Even smaller circle at t=2*

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-consciousal 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-consciousal 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 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, protrusion into the consciounth dimension is not a transition from a simple physical existence to a complex 'more-than-physical' existence, but rather a transition from a non-conscious existence to a conscious one.

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 consciousal dimension. Change requires time for its existence, just as consciousness requires consciounth for its existence.

Conclusion

The notion of extra dimensions which are neither spatial nor temporal, but rather related to consciousness, is difficult to visualize and understand. However, the notion of additional dimensions is scientifically viable as illustrated by various forms of string theory. Additional dimensions do seem to have the potential to explain consciousness in a way that 4 dimensions do not, so I believe that it is a theory worth investigating further

For the purposes of this paper, I have omitted all jargon and technical terminology. For anyone who is interested in exploring these ideas further, I recommend reading my article 'Hyperdimensional Neutral Monism: A Dimensional Approach to the Mind-Body Problem'. It is written for philosophers (lots of jargon and technical terms) but is far more comprehensive than this version of the paper which has been formatted for those without a philosophical background.