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Consciousness and Higher Dimensions of Space

Abstract: *This paper reviews the present status of the material dualist theory of brain–consciousness relations. I cover first the history of its development by Priestly, Broad, Price, Carr, Jourdan, and myself. The theory is then described with its basis in higher-dimensional geometry, the phenomenology of consciousness, the neurological concept of the body image, and the application of Leibniz’s Law to the current dominant identity theory of brain–consciousness relations. A model based on Flatland is developed to illustrate the theory followed by a discussion of its application to recent findings in NDE cases together with the use by Jourdan (2000) and Brumblay (2003) of higher-dimensional geometry to account for the remarkable phenomenology revealed. Finally I discuss possible ways to test the theory by experiment.*

Key words: Higher-dimensional space, phenomenal consciousness, perception, body image, Leibniz’s Law, NDEs

The dominant theory of mind–brain relations and consciousness in the nineteenth century and before was Cartesian dualism. During the twentieth century this theory was gradually displaced by the monistic identity theory (IT). This theory states that all mental events — perceiving, thinking, feeling, etc. — are identical to particular brain events. It is generally believed by scientists today that the great increase of our knowledge of the events disclosed in the brain by the new imaging techniques during conscious activities (A), added to the plethora of information gained by a host of other techniques in

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neuroscience, have established IT to be true as firmly as Darwin's theory of evolution. At the same time research by introspectionist psychologists and neurologists into the phenomenology of consciousness has accumulated abundant evidence about consciousness itself (B), as this is experienced by the human subject.

However, it has recently become apparent that there are difficulties with IT that have been skated over by its supporters. Leibniz's Law of the Identity of Indiscernibles states that for two entities, or series of events, to be identical they must exhibit identical properties. This, the events in the brain discovered by programme A above, and the entities and events discovered by programme B, spectacularly fail to do — in that they possess almost no properties in common. The events in A can only be described as neural correlates of consciousness (NCCs). As Ayer (1950) pointed out long ago, information about how NCC neurons operate does not provide information about how these NCCs are related to the correlated events in phenomenal consciousness studied in programme B. It is a simple fact of logic that if a is *correlated* with b then a cannot *be* b. The relationship between neuronal activity and events in phenomenal consciousness has to be tackled via theories designed to do just that. Recently a new theory — material dualism — has emerged that does this.

The real problem with Cartesian dualism was not that it is difficult to see how an unextended and immaterial entity, i.e. Descartes' account of the mind, could interact with its extended and material brain (which H.H. Price, 1953, showed is no problem in the logic of causation at all) but that the property 'unextended' does not apply to consciousness when this is studied properly. Our visual and somatic sensations, and their attendant images, are certainly extended in a space called technically 'phenomenal space'. Visual scientists have been able to avoid recognizing this awkward fact by their simultaneous use of two mutually incompatible theories of perception — the naïve realism of folk psychology and the scientific 'representative theory'. The former states that our visual sensations are literally direct views of external physical objects. The latter says that our sensations are representative constructions of the nervous system, and are not direct views of external objects. Visual scientists compromise and try and cram phenomenal space and its contents into the brain. This can only be done if these events are coded somehow in the brain. The problem then arises of how this code is decoded to yield the uncoded phenomenal visual field that we experience described by Crick (1984) as '...our inner visual picture of the external world'. No satisfactory answer to this question has been found.

The earliest form of material dualism (MD) was put forward by Hindu psychologists of the classic era. They suggested that the mind was material like the body, but of a form of matter so diaphanous as to be undetectable by ordinary instruments. The great chemist Joseph Priestly took up this topic:

But how anything could have extension, and yet be immaterial, without coinciding with our idea of mere empty *space*, I know not. I am therefore bound to conclude, that the sentient principle in man, containing ideas which certainly have parts [is] not the simple, indivisible, and immaterial substance that some have imagined it to be; but something that has real *extension* and therefore may have the other properties of matter. (Priestly, 1777)

The Cambridge philosopher C.D. Broad took the next, and very significant, step in 1923 when he wrote:

For reasons already stated, it is impossible that *sensa* should literally occupy places in scientific space, though it may not, of course, be impossible to construct a space-like whole of more than three dimensions, in which *sensa* of all kinds, and scientific objects literally have places. If so, I suppose, that scientific space would be one kind of section of such a quasi-space, and e.g. a visual field would be another kind of section of the same quasi-space. (Broad, 1923, pp. 392–3)

The next advance was contributed by the Oxford philosopher H.H. Price (1953), who saw that these two entities must be connected by a new type of causal relation that connects events in parallel universes. Further details of this new theory were supplied by Smythies (1956), who provided links with both neurology and introspectionist psychology. The concept that phenomenal space and physical space are ontologically different spaces has also been expressed by Ayer (1950), Russell (1948), and Moore (1971). Bernard Carr (2008) was the first physicist to enter this field when he published his theory that phenomenal space and physical space are both cross sections of a higher-dimensional space. He writes: ‘My proposal is that mental and physical space can be integrated into a communal space which is higher dimensional, in the sense that it has more than the three dimensions perceived by our physical sensors. This involves what I call a “Universal Structure”’ (see Smythies, 1994, pp. 149–50 for details).

In recent years new theories in physics, including string theory and brane theory, have postulated that the universe has more than three spatial dimensions. Of these, the most interesting for our purpose is brane theory. This supposes that ‘our’ physical universe is spatially a 3D membrane or ‘brane’ that forms a bubble-like structure in a higher-dimensional space. This expanded concept of the universe

may contain a very large number of other branes, or 'parallel universes', all extended in an overall superspace — the 'Bulk' — which has a very large, perhaps infinite, number of dimensions. However, brane theorists have always considered that other branes must be filled with matter like our own brane, made up of quarks, photons, etc. — perhaps with slight differences in the physical constants of nature: yet this is purely an assumption. There may be such branes, but there may also be other parallel universes that could empirically contain anything. There is thus scope that some of them could contain consciousness modules.

The term 'consciousness module' needs a brief explication. If I examine my own phenomenal consciousness, I discover it to contain five different sensory fields. Two of these — the visual field and somatic field (called in neurology the 'body image') — are spatial (as are their attendant mental images). The visual field has spatially extended sensations (patches of colour) and has a limited extent. When I am in the dark I still experience a visual field, but it is now a uniform black, and still limited, expanse. Retinally blind people still experience this black visual field. The visual field is only lost in cases of cortical blindness due to damage to the occipital lobe. The familiar 'body image' that we experience all day and every day is also extended in space. Common sense (folk psychology) still believes that this entity just is the physical body. However, we now know that it is not. The body image is a construct of the representative mechanisms of perception. As the great Viennese neurologist Paul Schilder wrote in 1942:

The empirical method leads immediately to a deep insight — that even our own body is beyond our immediate reach, that even our own body justifies Prospero's words, 'We are such stuff as dreams are made on: and our little life is rounded by a sleep.' (Schilder, 1942)

Other contents of phenomenal consciousness, however, lack extension in space. An odour does not have a shape, a sound does not have a border, and the subjective self and its thoughts are not extended in phenomenal space. Descartes' error may be traced to this fact, since he mistook the Self and its thoughts for the mind, when they only compose a part of the mind. But the whole complex of extended and unextended parts that make up an individual human consciousness form a limited spatial entity that we can call the 'consciousness module'.

A lower-dimensional model (i.e. Flatland as described by the mathematician E.A. Abbott in his book of that name published in 1884) can

be used to illustrate this new hypothesis. In the old model, Flatlanders thought that their plane — Flatland — constituted the whole of the universe. Then, one day a sphere, passing through their world, intruded upon their perceptions as a small circle that suddenly appeared out of nowhere, grew bigger, then diminished, to disappear as mysteriously as it came. It took the Flatlanders a long time to work out that Flatland was actually only a cross section of Cubeland that lay all round them in a direction they never knew existed. It took them even longer to discover that a part of a Flatlander's organism actually lies in Cubeland. A Flatlander actually exists as a 2D physical body, equipped with sensors located in Flatland (which is one 2D section of Cubeland) plus a 2D 'consciousness module' located in another parallel, or intersecting, 2D section of Cubeland. These two sections share one dimension in common so their total is 3 not 4 dimensions. The consciousness module is a piece of mechanism that abstracts information from the immediately adjacent (from the third dimension) brain of the Flatlander and projects this in the form of sensations upon the especially constructed screens before which the Self of the Flatlander is located. The Flatlander can move his body around in Flatland itself, which results in different pictures being cast on his sensory screens. In such a situation one can easily see how the Flatlanders had mistakenly thought of themselves as being located inside their physical bodies and looking out of their eyes directly at Flatland itself instead of what they were actually doing, which was to be looking at their TV-like sensory screens inside their consciousness modules located in another 2D slice of Cubeland.

The new theory thus involves a paradigmatic change in our concepts of space, time, consciousness, and the role of the brain. The theory gives the following account of visual perception. The human organism consists of two parts located in different subsections of a higher-dimensional space — the material and extended physical body and the material and extended consciousness module. These two are connected by trans-dimensional causal relations (that we can call psi-gamma on the afferent side and psi-kappa on the efferent side). The new theory gives the following account of vision. Light rays reflected off external physical objects enter the eye and form a topographic image on the retina. This transmits impulses to the brain that leads to extremely complex and widely distributed changes in neuronal activity. Some of this neuronal activity activates a series of purely unconscious reactions that modulate behaviour in numerous ways. The rest of this neuronal activity forms the target for psi-gamma, which, transmitted to the visual field, results in the formation of visual sensations

in phenomenal consciousness that 'represent' what is going on in the outside world in a manner similar to how television works. Somatic sensation has a similar system that constructs the body image. Hearing, smell, and taste have related systems.

In the efferent direction, the Self can activate neurons in the motor cortex via psi-kappa to guide voluntary behaviour. We can observe the physical body and brain by perception, and we can observe the interior of the consciousness module by introspection of our sensory and image fields. But we cannot observe the part of the system that lies between these two because it lies outside the reach of light rays (for perception), and for the same reason that we cannot see through the screen of a TV set into the works beyond (for introspection).

When I examine the limited flat, roundish 2D expanse of my phenomenal visual field I can easily imagine that it is like the screen of a TV set. This is black when I am in the dark. The screen of my TV set is black when the set is switched off. Then when I open my eyes, the field becomes filled with patches of colour that perpetually move and change as I look around at the changing world round me. The patches of colour on the screen of my TV set do the same. After-images in my visual field look very like after-glows on the screen of old-fashioned TV sets.

In reply to critics who might say that the new theory does not obey Occam's Law, I would reply that the question at issue is a matter of empirical fact. The theory describes a set of events that are certainly possible. It is just as 'speculative' to claim that higher-dimensional space is empty, or does not exist, as to claim that higher-dimensional space exists and is occupied in the manner described. The theory cannot be dismissed on metaphysical or linguistic grounds. What we are dealing with are facts. Predictions are now needed that can be tested by experiment (see further on this below). Then it might be asked what scientific benefits does the theory have to offer. These are several.

- (1) It solves the dichotomy between the results of neuroanatomical and neurophysiological studies of the brain and the results of introspective studies of phenomenal consciousness. The latter describes pictures in the visual field that neuroscientists are unable to find in the brain. The answer may be that the pictures exist but are not located in the brain.
- (2) It solves the binding problem. This problem arises because it is difficult to account for the fact that, whereas the colour, movement, and shape of objects are processed in widely separated regions of the brain, nevertheless, in the final image in the visual

field the colour, shape, and movement of the image are represented as an integrated whole. This, of course, is not the only solution proposed. Others, based on higher-level integration, or synchronous gamma wave activity, have been proposed (Smythies *et al.*, 2012).

- (3) A larger problem is that the projection to the right half of the visual field in phenomenal consciousness (where sensations are located) comes from the right stimulus field (where physical objects are located) via the left hemisphere (because of the optic nerve partial crossover): and the projection to the left half of the visual field in phenomenal consciousness comes from the left stimulus field via the right hemisphere — yet there is no sign of this dichotomy, no hint of any gap or junction line in the middle, in the cyclopean visual field that we experience. In the new theory the visual field in phenomenal consciousness is constructed by abstracting information from the brain via psi-gamma and presenting it to the observing Self on a single screen.
- (4) The theory can also account for the results of reliable research by parapsychologists. We only have to suppose that the afferent psi-gamma causal process that unites the brain and the consciousness module has not only a normal focus on the brain but, in addition, a penumbra that allows information to be picked up from other minds (telepathy), other objects (clairvoyance), and future events (precognition). Likewise the efferent psi-kappa causal process may have a penumbra that would allow for psychokinesis.
- (5) The theory can also account for the remarkable findings reported by Jean-Pierre Jourdan (2000; 2010) in his examination of cases of near-death experiences. In particular, he focuses upon the singular nature of the changes in the perception of the physical world that occur during the period when the EEG is flat. He confirms previous reports that (i) the interior of objects can be seen in clear detail, as well as objects behind walls and inside cupboards, etc. (ii) Objects can be seen clearly and simultaneously from all directions. Normally when we look at someone we can see only his front side: in some cases of NDEs the subjects see his front, sides, and back simultaneously in a Picasso-esque way. (iii) The field of vision can expand to 360 degrees. This expansion can extend to the time dimension as well, and the object is seen as a 4D object in space-time as described in the theory of special relativity. A particularly detailed and comprehensive account of these phenomena in blind people has been given by

Ring and Cooper (1997). Jourdan suggests that these experiences are based on the location of the observing Self in a fifth dimension relative to the events in the operating room and other locations in the 4D spatio-temporal physical world being observed in some cases of the NDE state (Jourdan, 2011). This hypothesis was independently suggested by Brumblay (2003). During an NDE what happens may be a shift in its field of observation away from its normal site within the consciousness module, out into the wider space around from where the physical world may be observed 'directly'. It may be as though the prisoners in Plato's cave were released from the stakes to which they were tied and were able to leave the cave and get a glimpse of the world outside.

The new theory implies that the physical universe exists to supply the Self with bodily existence as well as providing a means of communication between human minds. When the physical body is destroyed at death the Self would presumably have no further use for the consciousness module and would leave it (as it appears to be doing in the cases Jourdan reports) to exist in some other manner in its location in the fifth dimension, reincarnate in this universe or some parallel universe, or as Bernard Carr (2008) has suggested, progress up a series of higher dimensions in a manner akin to that suggested by Buddhism.

Lastly, can the new theory be tested by experiment? I have suggested one possible way. If psi forces really react on their penumbra, it might be possible to set up a system of other tiny particles, at Eccles' 'high degree of poise', that could detect them (Eccles, 1953). I have suggested elsewhere (Smythies, 1994) that the Ehrenhaft phenomenon might be worth re-examining in this context. Ehrenhaft, at that time Professor of Physics at the University of Vienna, reported that small dust particles spinning in a light vacuum in a strong beam of light executed complex and regular helical patterns that he could not explain using the known laws of physics (Rabel, 1951). These particles might be reacting to the penumbra of a scanning psi force — see Smythies (1994) for details. Jourdan (2010) has also detailed a series of experiments that can test the theory. These experiments involve testing, under rigorous experimental conditions, the ability of people undergoing an NDE to perceive objects hidden from their normal view (in drawers, behind pieces of furniture, inside people's pockets, the other side of walls, etc.). These experiments require a good deal of patience as they involve monitoring a series of serious operations, many of which will not result in an NDE.

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