Theories of Non-local Consciousness: A Review and Framework for Building Rigour

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If you think you have a solution to the problem of consciousness,
you haven't understood the problem.
(Blackmore & Troscianko, 2018, p. 1)

1 Introduction

Over the last few decades we have seen increasing attempts by scientists to understand the nature of consciousness, a topic that until relatively recently was considered purely philosophical and beyond empirical study. Most of this effort has focused on developing theories in which mind is either equivalent to, or arises from, the brain; in other words, where consciousness is an emergent property of a fundamentally physical world. Growing dissatisfaction with the adequacy of such an approach has seen attention turn to models in which consciousness is regarded as non-local, and is not exclusively generated by neuronal activity, but rather extends beyond the brain and body in some way. This alternative view of consciousness appears more in keeping with certain commonly-observed phenomena that are difficult or impossible to explain using a physicalist approach.

In this essay we review and compare some of these theories of non-local consciousness and offer suggestions for how to increase their rigour and so help to deliver more sustained progress towards a scientific explanation of one of humanity's most fundamental unanswered questions. Our essay comprises the following sections:

Section 1: This introduction, which addresses core definitions of what is consciousness and what is a theory.

Section 2: A brief examination of four categories of leading physicalist and largely neuroscientific theories of consciousness. (pp. 5-9)

Section 3: A review of eleven prominent theories of non-local consciousness where consciousness is described as being quantum, hyperdimensional, associated with fields, everywhere, and 'all there is'. This is the heart of our essay. (pp. 10-31)

Section 4: A consideration of the evidence for 'disturbing' phenomena that are often ignored or explained away by mainstream science but nevertheless appear to suggest that consciousness is non-local rather than purely physical in nature, and how well theories of non-local consciousness might account for these. (pp. 31-50)

Section 5: A comparative analysis of all the theories considered (physicalist and non-local) including how well they address defining properties of consciousness, whether they meet the criteria

[1] We hereby confirm that AI tools have not been used in the production of this essay, that all included material is the authors' own work, and that all material drawn from other sources is cited or quoted as appropriate.

of a good scientific theory, and into which philosophical category of theories of consciousness they may belong. (pp. 50-56)

Section 6: A proposal for developing theories of non-local consciousness through parapsychological experiments that could serve to refine or reject aspects of each theory, and how these theories might benefit from adopting a more inclusive and integrated approach with other theories of consciousness. (pp. 56-65)

Section 7: Our summary conclusion. (pp. 66-67)

1.1 What is Consciousness?

In order to evaluate theories of consciousness, we must first establish what we mean by 'consciousness', and identify the defining properties for which a competent theory should be able to account. Unfortunately, as Frith and Rees (2017, p. 12) complain, "consciousness studies are frequently criticised for failing to define precisely what consciousness is. In this respect, there has been little change over the past two centuries".

We take as our starting point the guidelines for this essay prize, which describes consciousness as 'first person subjective awareness'. In this sense, consciousness seems distinct from any other phenomenon that has been subject to scientific investigation in that it is only directly accessible to the perceiver themselves, whereas all other phenomena are in principle public and accessible from a third person perspective. This suggests an explanatory gap between a physical description of an experience and the subjective feeling of that experience. Bridging this gap has led this to be known (with some understatement) as the 'hard problem of consciousness' (Chalmers, 1995), and the subjective experiences themselves as 'qualia' (e.g., Robinson, 2004).

Jackson (1982, p. 127) describes this explanatory gap as follows:

> Tell me everything physical there is to tell about what is going on in a living brain, the kind of states, their functional role, their relation to what goes on at other times and in other brains, and so on and so forth, and be I as clever as can be in fitting it all together, you won't have told me about the hurtfulness of pains, the itchiness of itches, pangs of jealousy, or about the characteristic experience of tasting a lemon, smelling a rose, hearing a loud noise or seeing the sky.

He illustrates this point with a thought experiment involving Mary the neuroscientist:

> Mary is a brilliant scientist who is, for whatever reason, forced to investigate the world from a black and white room via a black and white television monitor. She specialises in the neurophysiology of vision and acquires, let us suppose, all the physical information there is to obtain about what goes on [in the brain and rest of the body] when we see ripe tomatoes, or the sky, and use terms like 'red', 'blue', and so on. She discovers, for example, just which wave-length combinations from the sky stimulate the retina, and exactly how this produces via the central nervous system the contraction of the vocal chords and expulsion of air from the lungs that results in the uttering of the sentence 'The sky is blue'...
>
> What will happen when Mary is released from her black and white room or is given a colour television monitor? Will she learn anything or not? It seems just obvious that she will learn something about the world and our visual experience of it. But then it is inescapable that her previous knowledge was incomplete. But she had all the physical information. Ergo there is

> more to have than that … It is so hard to deny the central claim that one can have all the physical information without having all the information there is to have.

This concern is shared by many philosophers of mind, for example in relation to 'knowledge by acquaintance' (the direct subjective awareness of experience) (Russell, 1911), and when making a distinction between 'access consciousness' (what we are able to describe about an experience) and 'phenomenal consciousness' (the full and rich depth of an experience, which is beyond description) (Block, 1995). Related properties considered characteristic of qualia are that they are "necessarily owned and necessarily private to their owners" (Tye, 2017, p. 18), and that they are experienced as unitary and integrated, despite their supposed neurophysiological architecture seeming dispersed and fragmented (e.g., Burwick, 2014). A theory of consciousness would need to account for these subjective properties in terms of physical properties or processes, or alternatively explain how this impression is illusory.

There are further defining features of consciousness. For example, Frith and Rees (2017) ask "Are there different kinds of consciousness?" A satisfactory theory should be able to explain variations in conscious experience or 'states of consciousness', such as from sleep, anaesthesia, meditation, consumption of psychedelics, and physiological damage such as an injury or degenerative conditions like dementia. If a theory of consciousness is based primarily in neurology, it should also be able to explain how radically different experiences can be manifested by a common brain substrate; that is, how entirely different perceptual experiences, bodily sensations, felt reactions, passions, emotions, and moods can be manifested by apparently similar neural activity.

Frith and Rees (2017) also ask, "What is consciousness for?" If all of the functions of consciousness can be achieved by sub-regions of the brain to which we do not ordinarily attribute consciousness, then why is there a need for us to have awareness at all? This is known as the *zombie problem*, because it supposes the idea of a human who completely lacks subjective experience but who is still capable of responding to their environment in the same ways a conscious person would (see Kirk, 2005). If zombies could exist and were functionally indistinguishable from their conscious counterparts, then this begs the question of what purpose or evolutionary selective advantage consciousness might offer (Mørch, 2023). A theory of consciousness might reasonably be expected to explain why conscious experiences are necessary and how consciousness could yield a selective advantage.

A related problem is the question of free will. Whilst most people have a strong perception that they exercise meaningful conscious choices in the world, many physicalists claim that this is just an illusion, albeit a powerful one. They argue that the deterministic nature of physical processes does not allow for free will, and that all features of consciousness, including thoughts, decisions and behaviours can be fully explained in terms of biological, chemical, and physical processes, our personal histories, and the circumstances of our immediate environment (e.g., Harris, 2012; Hossenfelder, 2020). They suggest that this deterministic view has been experimentally confirmed, particularly by Libet's (1985) findings that conscious decisions to act spontaneously reflect unconscious brain processes that occur prior to those decisions having been made. This apparently undermines our strong perception that 'we' have control over our conscious decisions. However, some argue that free will is not illusory and that the findings of quantum physics in particular allow for a world with genuine agency (e.g., Kastner, 2016). It has also been suggested that Libet's findings do not rule out free will and that this interpretation is mistaken (Herrmann et al., 2008; Schurger et al., 2012). Whether or not free will is a genuine phenomenon, its nature is nevertheless a defining feature of consciousness that must either be accounted for or persuasively discounted.

Frith and Rees (2017) go on to ask how we can differentiate between entities that are conscious and those that are not. Are there properties of systems that are credited with being conscious, such as humans, cats, and octopuses, that differentiate them from systems that are not, such as planets, waterfalls, and atoms? This is reminiscent of Nagel's (1974) notion of consciousness as "something that it is like to be", such as the experience of being a bat, even if we are unable to know what that would actually feel like. But such judgements are highly subjective. Hofstadter and Dennett (2001) describe how we can notice the correspondence between our own inner experience and outer behaviour such as when a feeling of pain from touching a hot surface is accompanied by a yell and the rapid removal of our hand. On this basis, we may be willing to allow that similar outer behaviour in others is indicative of their having a similar private experience of pain; in other words, that they too are conscious. People's willingness to make such an attribution can be affected by superficial similarities, so that it may be easier for them to ascribe an inner world to anthropoid animals such as gorillas and chimpanzees than it might be to, say, dolphins and whales, or even slugs and starfish. Such a subjective demarcation is clearly unsatisfactory, and a theory of consciousness should provide us with more explicit criteria for deciding which entities have that quality of being "something that it is like to be". Alternatively, a theory may propose that all entities are 'conscious', but this must be without rendering consciousness so uniform and ubiquitous that the term loses any explanatory value.

In summary, then, an effective theory of consciousness should offer a coherent way of understanding at least the following defining properties of consciousness, namely that it is fundamentally subjective, private, personal, and unitary, and encompasses phenomenal features that seem to resist description in physical terms (i.e., qualia). It should account for the occurrence of different states of consciousness. It should explain why we have conscious experiences at all when it is possible to conceive of a functionally equivalent zombie. It should explain (or persuasively discount) free will. Finally, it should be able to differentiate conscious things from non-conscious things.

1.2 What is a Theory?

Beyond the question of how it might explain these features of consciousness, we also need to evaluate the merit of any proposed theory of consciousness on purely scientific terms. For this, we need a clear sense of what makes for a good scientific theory. A theory or model attempts to reduce a large set of diverse observations to a more manageable and coherent set of principles, often by way of analogy (Frigg, 2006; Roe, 2019). One theory may be preferred to another on the grounds that it accommodates the same set of observations but does so more succinctly or parsimoniously. Additionally, a theory should be able to explain observations across as wide a range as possible, or should be able to offer reasons why certain observations are excluded. Thus, it needs to be comprehensive, and one theory may be preferred to another on the grounds that it can account for a wider range of observations that are deemed to be examples of the phenomenon.

As well as accounting for existing observations, a theory should also be able to make predictions that can be tested by future observations. Importantly, it should be possible that such predictions might not be confirmed. In other words, it needs to be falsifiable. Indeed, the more implausible any particular prediction might be, the more weight is given to its confirmation (Popper, 1959; but see, e.g., Singham, 2020). A theory should thus encourage us to think about phenomena in new and surprising ways, drawing attention to neglected or unanticipated properties. This means that we would give additional credit to a theory that is in some respects unexpected. A theory should propose a set of testable hypotheses that can sustain a programme of research, which, if well-designed and adequately

resourced, should accumulate further evidence about the nature and character of the phenomenon in question. Thus, a theory needs to be directive.

In summary, as well as reviewing theories of consciousness for their ability to account for the features of consciousness we have described, we also aim to assess their merits as good scientific theories with respect to the properties of parsimony, comprehensiveness, falsifiability, unexpectedness, and directiveness.

2 Physicalist Theories of Consciousness

We have noted that most scientific effort towards developing theories of consciousness has been conducted with an assumption that the universe is fundamentally physical and can be completely explained in physical terms. Physicalist theories thus seek to describe the ways in which co-ordinated neural activity gives rise to the various aspects of conscious experience. This basic premise of physicalist theories of consciousness has been evocatively summarised by Francis Crick in his book, *The Astonishing Hypothesis*, in which he states (Crick, 1994, p. 1):

> Your joys and sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behaviours of a vast assembly of nerve cells and their associated molecules … You're nothing but a pack of neurons.

In this section we briefly consider a number of leading theories of this physicalist type to note whether they are able to account for our suggested defining features of consciousness and to gauge the extent to which they meet the criteria we have identified for a good theory. Seth and Bayne (2022, p. 439) describe how "recent years have seen a blossoming of theories about the biological and physical basis of consciousness", and suggest that these theories largely fall into four prominent approaches:

- Higher-order theories propose that consciousness is comprised of mental states that are representations of more primitive mental states.
- Global workspace theories focus on the suggestion that background thoughts or processes enter the foreground of our awareness when they are 'broadcast' across a workspace distributed across the brain.
- Re-entry and predictive processing theories suggest that the brain works as a kind of prediction machine that tests 'best guesses' about the nature and content of the outside world against incoming data, and refines its model of reality accordingly.
- Integrated information theory proposes that if the information that a whole system can generate exceeds the information that can be generated by its individual parts then the system can be deemed as having consciousness, and that this can be calculated as a value (phi).

The following description of these theory categories is necessarily brief; the interested reader can find more detailed descriptions in Schneider and Velmans (2017), and comparative analyses are offered by Del Pin et al. (2021), Doerig et al., 2021 and Seth and Bayne (2022).

2.1 Four Approaches to Neurobiological Theories

Higher-order theories (HOTs) suppose that consciousness is comprised of mental states that are representations of more primitive mental states (Carruthers, 2017). Basic mental states are essentially perceptions that represent external stimuli. Awareness (or consciousness) is caused by higher level,

metacognitive, perceptions of these basic perceptions. Carruthers (2017, p. 289) illustrates this with the example of how we might become conscious of something that has the colour red: "by perceiving the redness, I am aware of it; and by perceiving my percept of redness, I am aware of *it*; and it is the latter awareness that renders the former phenomenologically conscious" [emphasis in original]. Thus, awareness is understood as inherently linked to the person perceiving something in a way that could account for an experience's subjective 'feel'. This approach also offers a mechanism to account for why certain types of neural processing are conscious and others are not (Seth & Bayne, 2022, pp. 444-445). This class of theory addresses the zombie problem because it suggests that consciousness arises from higher order representations, meaning that zombies are, by the theory's definition, metaphysically impossible. However, this approach struggles to explain what such higher-order processes are for, or why they should embody the particular subjective phenomenal properties that they have. Higher order processing is typically said to involve the anterior cortical regions of the brain, especially the prefrontal cortex (Lau & Rosenthal, 2011), though precisely which anterior regions are implicated is still debated (Brown, Lau & LeDoux, 2019).

Global workspace theories (GWTs) characterise neural processing as involving "a distributed or decentralised style of functioning in which the detailed work is done by billions of specialised neurons and neuronal groups, with no single command centre" (Baars, 2017, p. 233). Background thoughts or processes can enter the foreground of our awareness when they are 'broadcast' across a neuronal workspace that is distributed across the brain. While the fronto-parietal regions are considered to be the 'hub' of the global workspace (Mashour, 2013; Yaron et al., 2022), the network of connected areas is dynamic and does not have a single defining pathway or feature. Rather, it can be thought of as a moving 'attentional spotlight' (Lewis, 2023a) that is able (metaphorically) to focus on different scenes of actors in a play, leading Daniel Dennett to refer to conscious awareness in this approach as 'fame in the brain' (Lewis, 2023a). GWTs thus recognise that a great deal of 'intelligent' cognitive processing takes place without conscious awareness of those processes, but that being conscious of certain stimuli may enable additional and useful cognitive processes to occur (Baars, 2017).

Identifying the defining features and mechanisms of consciousness using this approach can be achieved through a process called contrastive analysis. Experiments test for differences in participants' experiential self-reports and their neural activity when performing tasks that involve conscious awareness compared with tasks that do not, such as attended versus unattended events, masked versus overtly presented sensory stimuli, waking states versus other states such as sleep, and also clinical conditions such as neglect and blindsight (the ability to respond to visual stimuli without consciously perceiving them). GWTs give an account of why some cognitive processes are conscious while others are unconscious. Conscious cognition is closely associated with aspects of brain activity that have limited capacity, such as memory and attention, whereas unconscious operations are completed using the seemingly vast capacity of neuronal connections across most of the brain. However, GWTs have been unable to provide an explanation for the felt differences between distinct kinds of experiences, such as between the taste of sugar and the sound of a bell (Seth & Bayne, 2022).

Re-entry and predictive processing (PP) theories emphasise the role of top-down processing in shaping and enabling conscious perception. 'Top-down' processing refers to the use of existing knowledge and expectations to affect the way in which new sensory information is interpreted and processed. Within this approach the brain works as a kind of prediction machine that tests 'best guesses' about the nature and content of the outside world against incoming data, refining the model accordingly (Seth & Bayne, 2022). It is the interaction between feed-forward (prediction) and feed-back (sensory input) mechanisms that produces consciousness (although some theorists do not make this claim, suggesting rather that these processes are merely involved in consciousness rather than being its source). The

constructive nature of perceptual experience is illustrated by visual phenomena such as binocular rivalry in which competing ways of making sense of incoming sense data can lead to flip-flopping between perceptions as preferred top-down interpretations alternate, or errors in depth perception due to misinterpretation of cues found in visual illusions. Thus, current neuroscience research (e.g., Seth, 2019) focuses on demonstrating how our consciousness plays an active and creative role in forming impressions of what we perceive, so that we are less the objective neutral observers of reality than we might like to think. PP theories do not deal explicitly with global states of consciousness, but may be able to distinguish between different states in terms of the integrity of predictive processes (Seth & Bayne, 2022). Like GWTs, they identify a key role for attention generally and the prefrontal and parietal regions in particular in determining which sensory signals achieve conscious awareness (Lamme, 2010).

Integrated information theory (IIT) is fundamentally different from the theories of consciousness that have been discussed thus far in that it begins with the view that each phenomenal experience is intrinsically real, with an internal structure and a specific form that is distinct from any other experience, and that each experience exists as an irreducible and unified whole (Tononi, 2017). Any physical substrate of consciousness, such as a human brain, needs to be able to accommodate these properties. The same experience can be supported by different substrates so long as they specify the same conceptual structure. IIT proposes that the amount of information generated by the system as a whole can be calculated as a value (phi), at least in theory, and this can be used to infer the degree to which that system is conscious. If the information that a whole system can generate exceeds the information that can be generated by its individual parts then the system can be deemed as having consciousness.

IIT can in principle detect a system's loss and recovery of consciousness since this will be accompanied by the breakdown and re-emergence of conceptual structures with high values of phi. IIT also allows for different degrees of consciousness in different systems, depending on their capacity to generate integrated information. IIT distinguishes between global states of consciousness (such as wakefulness, dreaming, deep sleep, and psychedelic states), which are associated with arousal, locus of attention and responsiveness, and are measured by phi, and local states of consciousness that reflect distinct individual experiences (qualia), such as the smell of coffee or the sound of a skylark, which are 'conceptual structures' within the whole system (Seth & Bayne, 2022, pp. 447-8). The main proponent of this approach, Tononi (2017, p. 251), concedes that "it is currently not possible to calculate the conceptual structure specified by a human brain in a particular state"; however, the principle of associating loss of consciousness with a breakdown in the brain's capacity for information integration seems to have been established (e.g., Oizumi, Albantakis & Tononi, 2014). IIT makes a number of testable predictions and also addresses the question of what types of entity have the capacity to be conscious. IIT does not restrict attributions of consciousness to organic and brain-like systems: any system capable of creating a sufficient conceptual structure using integrated information could in principle be regarded as conscious. Regarding brains in particular, IIT links consciousness primarily with posterior cortical areas, including parietal, temporal and occipital regions, because the properties of these areas are believed to be suitable for generating high levels of integrated information (Seth & Bayne, 2022; Tononi, Boly, Massimini & Koch, 2016).

2.2 Innovations in Theory Development

Alongside the development of individual neurobiological physicalist theories, there have been two notable innovations that aim to support progress in this field. The first is the establishment of a

database to collate the details of experiments performed in relation to the physicalist approaches to consciousness discussed in this section. This is known as the Consciousness Theories Studies (ConTraSt) database (*ConTraSt Database*, n.d.). The website hosting this data includes functionality to interrogate and compare the details of experimental findings, interpretations of these findings, methodological choices made, the initial viewpoint of experimenters, and other variables. At time of writing, the database incorporates 485 separate experiments examining a variety of aspects of the brain thought to be involved in consciousness such as specific brain regions, interactions between brain regions, brain waves, and neural correlates. Its aim is to provide an "unbiased, theory-neutral, quantitative and systematic review of empirical findings around leading theories of consciousness, providing a bird's eye view of the field and looking for potential biases in interpreting empirical findings" (Yaron et al., 2022, p. 594).

Interestingly, Yaron et al. note that most of the studies in their database interpret findings post hoc rather than presenting a priori tests of particular theories. Only 7% of the experiments directly compared two or more theories' predictions, and there is a general tendency towards confirmation bias in interpreting findings. Del Pin et al. (2021) found that comparisons between theories were "often verbal and non-systematic" (p. 1), so that, despite an enormous number of empirical studies that are claimed to provide support for one or other of these approaches, concerns remain about the lack of rigour in how findings are related to theories. Additionally, the overwhelming focus is on descriptions of the content of consciousness ('access consciousness') rather than accounting for phenomenal aspects of experience, which we have identified as core properties to be explained (section 1.1).

These shortcomings may be addressed by the second innovation, which concerns the recent shift towards an adversarial public forum where theories can compete over contrasting predictions to see which of these turn out to be verified. Researchers using different approaches can collaborate on the design and construction of studies to identify and test predictions that distinguish competing theories (Del Pin et al., 2021). Researchers from each 'opposing' team agree at the outset exactly what specific results will mean for their respective theories. Each experimental finding is designed to confirm one theory's prediction but to contradict the other. A project that pitted one of the global workspace theories against integrated information theory took place in June 2023 (Finkel, 2023). Whilst results were not conclusive because some findings favoured one theory and some the other, the objectives of such a model are to apply a more rigorous and public application of the scientific method in a forum that incorporates both collaboration and competition.

2.3 Discussion

We have seen that physicalist approaches to the study of consciousness have produced a number of theories that broadly fall into the four categories we have just described. Empirical work that has been designed to test the adequacy of these theories has been somewhat compromised by post hoc interpretation that potentially suffers from confirmation bias, with too few attempts to set one theory against another. They also disagree on which features of consciousness require explanation, leading Doerig et al. (2021) to describe the field as a "conceptual quagmire" (p. 42) that lacks stringent criteria guiding how to address consciousness empirically. This is apparent if we consider how well the four types of theory account for the characteristic features of consciousness that we identified in section 1.1. Some of these features are acknowledged. For example, HOT and PP theories attempt to explain the sense of ownership of subjective experiences as a function of perceptions-of-perceptions and top-down processing respectively. HOT, PP and GWT theories emphasise the functional significance of processes that are said to cause conscious awareness, so that it is not possible to conceive of zombies

who are functionally equivalent but without consciousness. They also suggest criteria for distinguishing between entities that are meaningfully conscious and entities that are not. For example, GWT denies that 'intelligent' processing by neural subsystems is sufficient to be regarded as conscious, and IIT provides a computational approach that differentiates degrees of consciousness. IIT treats as axiomatic that conscious experience is unitary, and GWT's spotlight characterisation of consciousness also affords an explanation for how features of experiences are bound together.

Of most concern, however, is the inability of any of the theories to offer any account for the subjective experience of consciousness (qualia). Hoffman (2024) is particularly damning when he states, "as of now, no physicalist theory can explain a single specific conscious experience … We have these [physicalist] theories of conscious experiences that cannot explain *any* conscious experiences". Theories have been preoccupied with neuro-computational aspects and this has been at the expense of addressing the core properties as experienced by a conscious entity. Kastrup (2023) states (with respect to IIT):

> No amount of information integration could explain the magical step of a fundamentally unconscious system suddenly becoming conscious ... it does not explain how an otherwise unconscious substrate can light up with consciousness just because re-entrant loops of information integration form in neuronal activity.

Currently, then, physicalist theories of consciousness may be able to offer a succinct description of sets of observations but they cannot claim to offer a comprehensive description of consciousness. They may in principle make falsifiable predictions but we have seen that in practice there has been a tendency to interpret empirical findings post hoc in ways that are susceptible to confirmatory bias, and this is exacerbated by an antipathy towards identifying areas of difference between theories and seeking to discriminate between them, though recent developments are encouraging.

Our final point is that the architecture of consciousness described in HOT and GWT, and possibly PP too, is closely tied to the mammalian brain, with an apparent bias towards a human expression of consciousness, although IIT, at least in principle, is substrate-neutral. This largely anthropocentric perspective is in keeping with a long history of Western thought, still implicitly held by many, that maintains that consciousness is "primarily an innate endowment of humans, which other animals may or may not share in virtue of being sufficiently like us" (Allen & Trestman, 2024, para. 2). However, a number of recent studies have highlighted apparent animal consciousness, such as crows being trained to report what they see (Nieder et al., 2020), cuttlefish remembering and recalling specific details of past events (Billard et al., 2020), and bees being observed engaging in play activities (Galpayage Dona et al., 2022). Such observations led to the Cambridge Declaration on Consciousness, which asserted that, "the weight of evidence indicates that humans are not unique in possessing the neurological substrates that generate consciousness" (Low, 2012), and the more recent New York Declaration on Animal Consciousness (Andrews et al., 2024). It has even been suggested that plants too may have consciousness, based on observations of their engaging in, for example, communication, kin recognition, decision-making, and learning and memory (Segundo-Ortin & Calvo, 2022). With this in mind, it may be unnecessarily limiting to base any comprehensive theory of consciousness largely on the workings of the human brain.

3 Theories of Non-local Consciousness

Theories of non-local consciousness reject a physicalist approach with its assertion that consciousness can be solely explained in terms of neuronal activity, which in turn is constrained by purely physical processes in a causally closed system. Theories of non-local consciousness propose instead that consciousness extends beyond the body and the brain and need not be restricted by our usual notions of time and space.

Our review of theories of non-local consciousness comprises a selection of eleven prominent proposals. It is not therefore an exhaustive review, but rather is intended to illustrate the main approaches that have been taken. For those who are interested, Robert Kuhn (2024) provides a more comprehensive review covering in excess of 200 theories of consciousness. The purpose of our review is to assess these theories using the same criteria we applied to physicalist theories to test their capacity to account for basic properties of consciousness and to meet the criteria we identified for a 'good' theory. Theories of non-local consciousness are also better placed to incorporate phenomena that seem fundamentally incompatible with physicalist theories because they violate basic limiting principles that apply to spacetime phenomena (section 4). However, theories of non-local consciousness also need to account for "the obvious correlation between felt experience and brain function; [which] no serious scientist or philosopher would deny" (Kastrup, 2023).

We have structured our review by locating each theory in one of five categories. These are where consciousness is described as being quantum, hyperdimensional, associated with fields, everywhere, and 'all there is'.

3.1 Consciousness is Quantum

A number of authors have suggested that modern physical theories involving quantum mechanics (QM) might play an integral role in understanding consciousness. As background to our presentation of theories of consciousness that are based on QM, we present a short summary of its main features. QM is our most fundamental theory of physics and was first proposed and developed from around 1925 by physicists including Erwin Schrödinger, Werner Heisenberg, Max Planck, Albert Einstein, Niels Bohr, and Louis de Broglie. QM contradicts what has become known as the classical view of the world that held sway until the early 20th century where each effect has a cause and that everything is in principle determined and predictable, and many of its features seem to suggest an inherently non-local universe, at least regarding the realm of the very small. QM makes surprising and seemingly counterintuitive predictions that have nevertheless been experimentally confirmed to enormous levels of precision. The key features of QM (after Zwiebach, 2016) that are most salient to our discussion of consciousness in this section are:

1. Non-determinism: it is impossible to predict exactly the behaviour of any subatomic particle such as an electron or a photon. A particle's properties, for example in terms of its position and momentum, can never be fully determined except in terms of their likelihood or probability. Subatomic events are fundamentally uncertain until they are measured or observed, a situation known as the collapse of a spread out, indeterminate, and probabilistic wave function into a definite point-like particle.

2. Superposition: until a measurement takes place, a subatomic particle can be in multiple different places or have multiple different velocities at once, despite this being seemingly impossible in common sense terms. This has been compared to a coin that is simultaneously

both heads up and tails up. One physicist writes that superposition is "a ghostly, eerie state, [one with particles] doing incompatible things simultaneously" (Zwiebach, 2016, p. 12).

3. Entanglement: two particles can appear to be inextricably connected despite being physically separated even across immense distances, a situation known as entanglement. If one of two entangled but separate subatomic particles is measured to have a certain characteristic then its entangled partner will instantaneously take on this same characteristic without any information passing between the two. This happens no matter how far apart the particles may be. Even if they are at opposite ends of the galaxy these separated particles remain inextricably entwined as if they were somehow part of the same system. This is non-locality in that it is seemingly not restricted to apparent constraints of space and time.

For many decades, it was assumed that these quantum mechanical effects could only take place at very small scales and so were not relevant to the human-sized world in which we live. It seemed safe to assume that all objects and processes in our everyday world — including the brain — operated along entirely classical and deterministic lines, and therefore none of the strange features of QM outlined above was relevant to how consciousness works. This assumption has underpinned most physicalist theories of consciousness. However, there is now an increasing body of evidence to support the idea that quantum effects do in fact take place in brains and might be important to everyday physiological processes such as the sense of smell (see Kauffman & Radin, 2021, p. 2). With this in mind, some theorists have suggested that QM may provide the key to understanding consciousness.

Whilst the fundamental mathematics and features of QM are not in dispute, there are many differing interpretations of how the effects outlined above might occur. These include the Copenhagen interpretation, named after the city where many of the key features of QM were first agreed in the early 20th century, which, among other things, assumes an important role for an observer or measurement to cause an indeterminate wave function to 'collapse' into a definite point-like particle with measurable properties (Faye, 2024). At time of writing, Wikipedia lists 13 influential interpretations (Wikipedia, n.d.). Many physicists take the view that it might be best to ignore these various interpretations since they could be viewed as distracting from the core work of physics in developing mathematical theories, an attitude summed up in what has become a cliché of QM – 'shut up and calculate!' (Baggott, 2024). However, interpretations of QM are central to some theories of non-local consciousness.

3.1.1 Stapp – The World is Quantum with an Aspect of Consciousness

Henry Stapp (1999, p. 4) contends that any attempt to explain consciousness in terms of principles drawn from classical physics is destined to fail:

> It is now well known that the precepts of classical physical theory are fundamentally incorrect. Classical physical theory has been superseded by quantum theory, which reproduces all of the empirical successes of classical physical theory, and succeeds also in every known case where the predictions of classical physical theory fail. Yet even though quantum theory yields all the correct predictions of classical physical theory, its representation of the physical aspects of nature is profoundly different from that of classical physical theory. And the most essential difference concerns precisely the connection between physical states and consciousness.

In particular, he focuses on the well-established effects (at least according to some interpretations of QM) upon quantum systems of attention and intention on the part of an observer. He draws on the physicist John von Neumann's interpretation of QM, but argues against any arbitrary boundary between the effects of consciousness upon a 'small' quantum world and putative effects on a 'big'

classical world. Instead, the physical world is entirely quantum, including – importantly - our brains. Thus,

> in this theory, each conscious event has as its physical image not a reduction of the state of some small physical system that is external to the body/brain of the person to whom the experience belongs, as specified by the Copenhagen approach. Rather, the reduction is in that part of the state of the universe that constitutes the state of the body/brain of the person to whom the experience belongs: the reduction actualizes the pattern of activity that is sometimes called the 'neural correlate' of that conscious experience. (Stapp, 1999, p. 16)

Stapp suggests that the reason that brain states appear to behave in a classical manner is because they approximate the collective of quantum brain states. If we look more closely at the brain, we will see that each tiny portion is in a quantum mechanical state. He argues that these quantum states allow the brain to respond to the intentional choices of consciousness. These choices are initiated by a separate non-physical mental aspect — what von Neumann calls the 'abstract ego' — by causing the collapse of the quantum wave function from its multiple potentialities into a single brain-based physical actuality.

At the stage of a conscious decision, the correspondence between classical and quantum models of the brain disappears with a quantum collapse. There is a symmetrical correspondence between physical (neural) states and mental states, meaning not only that changes in the mental give rise to changes in the physical but also that changes to the physical will give rise to changes in the mental, all of which are achieved through quantum effects. This accounts for the close correspondence between subjective states and patterns of neural activity as evidenced by imaging studies and clinical observations.

Although Stapp's account is focused on human experience, he is clear that this could apply to other species (and proto-human ancestors) who have sufficiently developed brains.

> One cannot expect our species to play such a special role in nature. So this human-based pragmatic version must be understood, from the ontological standpoint, as merely the first stage in the development of a better ontological theory: one that accommodates the evolutionary precursors to the human knowings [sic] that the pragmatic theory is based upon. (Stapp, 1999, p. 30)

3.1.2 Faggin – Consciousness is Quantum Information

Federico Faggin (2023) asserts that consciousness and free will are inherent properties of quantum systems in pure quantum states. He denies that the universe is a deterministic system, and instead proposes a central role for 'creative agents', which possess the capacity to imagine different possibilities as an essential step towards development and actualisation. A creative agent is a special quantum system with three defining properties: it has consciousness and maintains the continuity of its consciousness; it has identity, that is, it is conscious of being conscious and recognises its experience is its own; and it has agency, the capacity to act with free will. Creative agents constitute the quantum vacuum out of which the universe emerged. Faggin's model is founded on quantum information in which classical physics supervenes on quantum physics, which in turn supervenes on quantum information, which supervenes on consciousness (D'Ariano & Faggin, 2022).

Within this schema, the quantum vacuum is itself conscious, and is both an indivisible whole and also the source of individual creative agents. Consciousness is motivated by a fundamental 'desire' to experience itself and the wider reality of which it is part, and this is achieved by the creation of discrete

creative agents (also known as consciousness units [CUs]) that can interact with other CUs and with wider creation, what Faggin refers to as 'One' (Faggin, 2021, p. 294):

> Each CU must then be a wholeness, share all the properties of One, and have a unique identity that distinguishes it from the other CUs. Thus, each CU is a part-whole of One. Like One, a CU cannot be the same from instant to instant (dynamism), it can never be separated from One and from the other CUs (holism), and it also must continue to deepen its own self-knowing and the knowing of the other CUs.

In this way, Faggin seeks to account for the general perception of separation and privacy that is characteristic of consciousness, while also acknowledging the kinds of mystical experience that suggest deeper interconnection. Many of his ideas about this concept stem not from abstract theorising but from his experiencing a short period of profound awakening in which he 'directly knew' that everything is unified, everything is love, and that he was the source of this unity and love. He suggests that during this experience his fundamental self was located in both the physical and quantum worlds, as simultaneously both physical 'particle' and quantum 'wave'. He writes,

> I was simultaneously the world and the observer of the world. I was the world observing itself! And I was concurrently knowing that the world is made of a substance that feels like love. And that I am that substance! (Faggin, 2021, p. 285)

At the same time, Faggin allows for separate consciousness units, A and B, to be sufficiently harmonised that a 'combined self', AB, emerges that has its own sense of unity and identity. A and B continue to have independent existences, presumably oblivious to the creation of AB. In this way it is possible to conceive of a hierarchy of juxtaposed consciousness units that would allow, for example, a set of neurons to be sufficient to constitute a consciousness unit while simultaneously contributing to the activity of a whole brain, which constitutes its own consciousness unit, and in turn that brain could contribute to a larger coherent whole such as a community or an ecosystem that also would constitute a consciousness unit.

Creative agents are meaning- and purpose-oriented, and features of experience are fundamentally private and qualitative in a way that cannot be effectively represented symbolically. Classical information from the environment is acquired through the senses and is ultimately converted into quantum information that is experienced as qualia, which provide the impetus for the exercise of free will. Creative agents are able to act on the physical world "via a quantum to classical transformation within the quantum machinery of a neuron, for example, rather than with a classical symbol originating from another part of the brain" (Faggin, 2023, pp. 70-71), although how this is enacted is not specified.

Creative agents have a "short-term buffer of experience" (D'Ariano & Faggin, 2022, p. 146) so are dependent on classical processes for information storage and retrieval. As such, long term memory is considered a classical process, so that memorisation and recall involve quantum-to-classical and classical-to-quantum processes respectively.

3.1.3 Kauffman & Radin – Conscious Observers Create Reality

Kauffman and Radin (2023) also suggest that consciousness plays a pivotal role in bringing about physical reality. In a similar approach to that proposed by Stapp (section 3.1.1), their argument stems from an interpretation of QM proposed by Werner Heisenberg, one of the founders of QM, in which the role of active measurement of quantum effects is central. They illustrate this using the double-slit experiment that is often described in accounts of QM. This experiment involves a light source that fires photons at a screen with a barrier between the two. The barrier has two openings in the form of

parallel vertical slits (see Figure 1). In the first of two experimental set-ups, photons of light pass through one or other of the slits without being observed. This produces a pattern on the screen with multiple lines of shadow and light that suggest wavelengths of light passing through the slits are interfering with one another. In the second set-up, a detector is placed at the barrier so that an observation or measurement is made as to which slit each individual photon passes through on its way to the screen. Now the experimenter finds that the screen shows just two vertical lines with no interference pattern.[2]

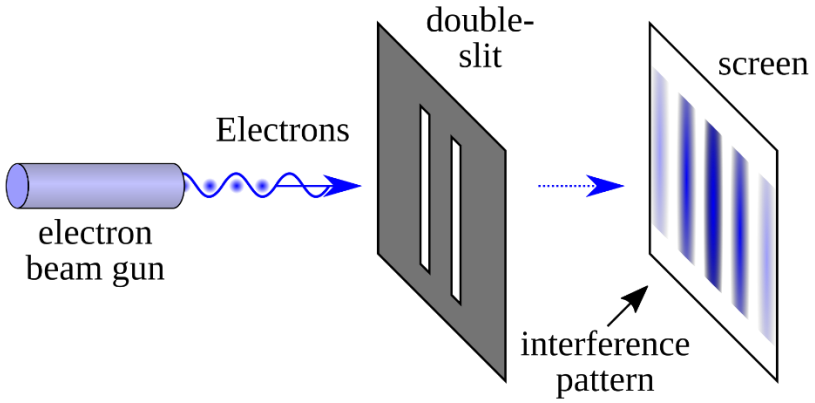

Figure 1: An illustration of the double-slit experiment with no observation/measurement at the barrier [From Wikimedia Commons, the free media repository, file: Double-slit.svg]

According to the Copenhagen interpretation, this indicates that the act of observing the photon has caused the wave function to collapse into an individual particle at the barrier rather than at the screen as in the first set-up. In Kauffman and Radin's theory, this is evidence of consciousness acting on the physical world through quantum effects. Prior to measurement or observation of a particle in spacetime, there is only a realm of possibilities associated with that particle in the form of the wave function. They suggest that this means that the particle therefore does not yet exist within spacetime (the physical world). When an observation occurs, the wave function collapses and becomes an actual particle that now does exist within spacetime. Kauffman and Radin suggest that this process is where "measurement converts Possibles into Actuals" (Kauffman & Radin, 2023, p. 4) and quote Heisenberg, who said that wave-like quantum states represent potentials which can be thought of as "ghost-like, between an idea and a reality" (quoted on p. 2).

Working with other colleagues, Radin has designed a modification of the double-slit experiment to test whether the act of observation can cause effects without the use of a physical detector. When participants were asked to direct attention and intention to the slits in the barrier, but were not able directly to observe the apparatus, this still appeared to affect the interference pattern to a significant degree (Radin et al., 2012, 2021). Interestingly, the effect is more pronounced with practised meditators, who are more adept at focusing their attention. Radin and his co-authors concluded that this was consistent with a "consciousness-related interpretation" (p. 170) of QM where measurement is key to collapsing the wave function. (We describe and discuss this experiment in more depth in section 6.1.2.)

Kauffman and Radin (2023) argue that this provides a means of resolving the principal objection to dualism as espoused by René Descartes in 1664. If it is admitted that reality consists of two distinct

[2] For a more extended explanation of this experiment we recommend this source: https://plus.maths.org/content/physics-minute-double-slit-experiment-0

substances, 'matter' and 'mind', then how is it possible for them to interact with one another? Findings from Radin et al.'s (2012) adapted double slit experiment suggest that 'mind' may be able to interact with 'matter' through the collapse of the wave function.

Co-opting QM also challenges conventional physicalist thinking that the world is essentially deterministic and classical in nature, in which case 'free will' is not possible. By ascribing to consciousness, a key role in physical reality, Kauffman and Radin show that the universe is not completely deterministic and causally closed, and this site of interaction could provide a point at which free will could be exercised. It should be noted that whilst the Copenhagen interpretation of QM was most popular amongst physicists in one survey (Sivasundaram & Nielsen, 2016), that such implications apparently contradict physicalist theories of consciousness is today rarely discussed or acknowledged by most scientists, despite being a feature of early discussions of QM by its founders (Marin, 2009).

3.1.4 Hameroff & Penrose – Microtubule Quantum Wave Function Collapse

Stuart Hameroff and Roger Penrose (Hameroff & Penrose, 2014) propose that consciousness equates with an orchestrated collapse of the quantum wave function within the microtubules that can be found within neurons. They offer three main reasons for rejecting an exclusively physicalist approach to consciousness with its emphasis on brain structures. Firstly, they assert that consciousness, particularly as it relates to moments of understanding, cannot be computational, and therefore cannot be accounted for by physical structures of the brain that are restricted to computational processes. Secondly, they argue that the roots of consciousness must lie within individual cells because even single cell organisms seem to show signs of consciousness exhibited through complex behaviours such as finding food, accessing memories, and being able to escape from mazes in laboratory experiments. Having only one cell, such organisms, of course, do not possess the brain structures and resultant processes that are proposed to underpin consciousness by most physicalist theories. Thirdly, Hameroff argues that free will necessitates a non-classical and non-deterministic approach, such as that provided by QM (Hameroff, 2012).

Hameroff and Penrose argue that wave function collapse is a prime candidate for a non-computable process that could give rise to consciousness. They identify microtubules that exist within neurons as the most likely site for such quantum processes to take place, because they have a crystal-like lattice structure with a hollow core and are known to have quantum-level sub-unit states. Penrose has said that the structure of a microtubule "reeks of something quantum mechanical" in that its tubular shape may help to shield a delicate wave function superposition from the noise of its neuronal surroundings and so prevent premature collapse (Paulson, 2017).

Microtubules are found within virtually all animal and plant cells where they provide structure and shape, facilitate the movement of cell components, and play a key role in cell division (Paulson, 2017). However, they also appear to have a potentially consciousness-related function. They are much more common within neurons, where they are believed also to facilitate synaptic connections, which implicates them in cognitive processes. Indeed, the cognitive deficits found in conditions such as Alzheimer's disease seem to involve abnormalities and reductions in the number of microtubules (Sferra et al., 2020), loss of consciousness resulting from surgical anaesthesia has been linked to disruption in the formation and maintenance of microtubules (e.g., Craddock et al., 2015; Kelz & Mashour, 2019), and the introduction of microtubule stabilisers has been shown to reduce the effects of anaesthetics in rats (Khan et al., 2024).

Hameroff and Penrose suggest that there is a collapse of the quantum wave function within microtubules that transitions a probabilistic spread of potential states into a specific state, and that this is equivalent to conscious experience. The quantum wave collapse in microtubules is said to be

'orchestrated', that is, it is organised and associated with cognitive processes, and is also clearly demarcated from non-organised and random quantum processes that might be nearby. In a sense, the wave function collapse is the brain engaging in quantum computation through moving from a superposition of states into a single definite state, albeit without recourse to a binary system of ones and zeroes such as is the case in human-made quantum computers. Hameroff and Penrose also argue that the orchestration of whole or regional brain states may be taking place through quantum entanglement between microtubules in different parts of the brain. Ontologically, Hameroff and Penrose are claiming that the orchestration of quantum processes is in some way responsible for consciousness itself, which comes close to 'lifting oneself up by one's own bootstraps', which is of course logically impossible.

Because wave function collapses occur everywhere throughout the universe, and not just in cells, neurons and brains, Hameroff and Penrose speculate that this might mean that primitive types of conscious experiences (proto-consciousness) may likewise be ubiquitous. Hence, perhaps such primitive experiences might have a "physical role as important to basic physics as those of mass, spin or charge" (Hameroff & Penrose, 2014, p. 65). However, these instances of proto-consciousness do not encompass "information or meaning" (p. 65) because they lack orchestration, such as occurs in more complex structures like cells and brains. This could mean that consciousness has evolved through natural selection because it is possible to envisage situations where there is a selective advantage for orchestrated consciousness that can encompass useful information about the environment, even when this is very basic. Such a process of evolution may have eventually led to organisms such as humans that are capable of exhibiting features such as understanding and self-reflection.

3.1.5 Discussion

Explaining the mystery of consciousness by invoking the mystery of quantum processes is appealing and popular (Roe, 2009). The theories we have included here go further than is usually the case in specifying the nature of that association.

Stapp, and Kauffman and Radin favour assigning a central role for consciousness in the collapse of the wave function, suggesting that this offers a means by which 'mind' can produce tangible effects in the physical world. The work of Radin and colleagues is particularly important in this respect in evidencing that it is the act of intention (a property of mind) that is instrumental rather than the act of observation per se. Even though Stapp claims that all physical processes are fundamentally quantum, so that such a mechanism might apply more generally, he does not explain how consciousness is instantiated or how such an interaction would produce predictable correlations between brain states and consciousness states or cognitive functions.

Hameroff and Penrose suggest a site for quantum processes that could plausibly explain how wave function collapse translates into patterns of neural activity. Interestingly, there are lines of evidence that seem to show that inhibiting the action of microtubules leads to disruptions in conscious states. Just a few decades ago it was thought impossible that quantum effects such as those proposed by Hameroff and Penrose could manifest in large and warm structures like the brain because these conditions would not allow for superpositions to be maintained for any useful duration of time. However, there is now increasing evidence that QM may indeed play a key role in certain areas of cognition such as vision, smell, and the navigation of birds (Moazed, 2023), and one recent study suggests that quantum entanglement of photons may underpin the coordination and synchronisation of neuronal activity across the brain (Liu et al., 2024). However, more needs to be done to elucidate the characteristics of orchestrated quantum collapse to show how this might map onto the patterns of neuronal activity that are characteristic of conscious states. For example, Hameroff and Penrose

(2014) suggest that microtubules communicate and cooperate with each other in a manner that could store memories, which could fruitfully be developed to show how it could account for well-documented features of memory encoding and recall (see Gauld, 2007).

Faggin is most explicit in asserting that quantum physics supervenes on quantum information, which supervenes on consciousness, although the implications of this are unclear in terms of tangible predictions regarding the nature of these relationships or their consequences. Disappointingly, with the exception of Hameroff and Penrose's theory, there is nothing in these theories that sufficiently addresses any of the defining qualities of consciousness that we outlined in our introduction (section 1.1). It is not clear how any minor modifications to these theories might account for qualia, or for the unitariness and sense of ownership of lived experience, beyond perhaps claiming that these are fundamental properties of the universe that are no more amenable to analysis than mass or charge.

3.2 Consciousness is Hyperdimensional

This section incorporates another theory of consciousness that, like those of the previous section, is also based on modern physical theories, in this case, on suggestions that the universe consists of multiple 'higher' dimensions.

3.2.1 Carr – Consciousness is Hyperspatial and Hypertemporal

The physicist Bernard Carr (2010a, 2010b, 2015, 2021) suggests that consciousness might be found in higher dimensions of space and time. In our everyday lives, physical reality appears to consist of just three spatial dimensions – left and right, backwards and forwards, and up and down. We also live in an additional dimension of time, albeit one in which we seem only to move forwards. This notion of a four-dimensional 'spacetime' is reflected in Einstein's theory of special relativity, which he developed in the early 20th century (Gardner, 2003).

Subsequently, Kaluza and Klein proposed that a fifth dimension could allow for the unification of the fundamental forces of gravity and electromagnetism. By the 1980s, a number of theories were able to offer accurate descriptions of elementary particles, but only by involving ten dimensions. These theories are known as string theories because they suggest that reality at its deepest level is formed from minuscule strings vibrating at different frequencies to manifest as fundamental particles and forces, in contrast to the more conventional approach in which they are modelled as zero-dimensional point particles. In the 1990s, physicists were able to combine a number of competing string theories into one overarching theory which they called M-theory. What the 'M' in its name is said to stand for is somewhat contested, but may refer to 'membrane' – what the tiny tubular strings would look like if stretched out – but may also mean 'mother' or 'mystery' (Cosmology, n.d.). M-theory is not yet a comprehensive theory but is probably the closest we have to a single set of mathematical equations to describe reality, a so-called 'Theory of Everything'. If M-theory is correct, then we live in a universe that consists of 11 dimensions.

Whilst the extra dimensions of M-theory are required for the mathematics describing fundamental forces and particles to work, this appears to be at odds with our everyday experience. Why is it that we seem not to experience this multitude of extra dimensions? The reason usually suggested is that the spatial dimensions in M-theory, beyond the three with which we are most familiar, are wrapped-up so small (on the Planck scale) that they are not obvious to our normal human senses nor can they be probed by instruments, which can only operate in our physical four-dimensional spacetime (Sutter, 2020). However, Carr's suggestion is that we do in fact routinely access hyperspace and hypertime

when we engage in any type of mental activity, and that these 'extra' higher dimensions are where consciousness is to be found.

Carr's argument stems from the observation that many mental activities appear to take place in environments that could be thought of as mental equivalents to physical spaces. For example, we can visualise in our mind's eye a mental space with objects that have positions relative to each other, such as picturing a bedroom with walls and a ceiling that enclose a mental space into which we might imagine a bed, a lamp, and so on, all of which take up different locations in the space. Dreams too seem to take place in mental spaces in which we move from one place to another and interact with other beings who may be close or distant, large or small, all of which are properties of spaces, albeit these spaces seem more elastic and less permanent. More exotic states of consciousness, such as the out-of-body experience, also seem to occur in a space-like environment, one that is reported to have close similarities with our waking world in which experiencers suggest they can move around, view objects from different perspectives, and travel from one mental location to another (Peterson, 1997).[3] Many reports of near-death experiences have space-like properties, for example in reports of travelling through a tunnel towards a light (Kadagian et al., 2022).

Carr suggests that the consciousness within multiple dimensions might be viewed as an informational space, with each ascending physical dimension corresponding to an increasing dimension of information. In this model, there needs to be some way for information to be shared between different dimensions. For example, our three-dimensional brains and mouths are clearly necessary for telling others about a dream or an out-of-body experience that we might have had in a higher dimension of reality. Hence there is a need for information to pass between the different dimensions involved. To accommodate this, Carr has proposed 'transcendental field theory', so-called because "firstly, … all the interactions are assumed to proceed via fields and, secondly, … the fields involved are more extensive than the usual physical ones in that they do not only involve space and time" (Carr, 2015, The Universal Structure…, para. 11). Carr suggests that such interactions between dimensions might be geometric in form.

Carr proposes that a hierarchy of physical dimensions might correspond to a hierarchy of mental spaces. In Carr's tentative schema, the mental spaces that are uncontroversial to mainstream science — such as those involved in our perceptions of physical space, our memories, and our dreams — occupy a relatively low dimensional space, perhaps with five space and time dimensions. However, certain aspects of phenomena that seem to challenge our normal notions of spatial or temporal relationships such as telepathy, remote viewing, or precognition might be explained in terms of higher dimensions of space or time, which could allow for apparent violations of rules that seem otherwise to be sacrosanct to our familiar physical world.

How higher dimensions could explain aspects of anomalous phenomena such as these might be illuminated through metaphors first suggested by the Victorian author Edwin A. Abbot. In his 1884 novella, Abbot describes a character – A. Square – who lives in Flatland, a two-dimensional fictional world where everything exists on a plane (Abbott, 1884). People in this world are two-dimensional shapes and can only move across the plane in combinations of right-left and backwards-forwards

[3] Our description of Carr's theory refers to 'exotic' states of consciousness such as out-of-body experiences, the possible survival of consciousness after bodily death, and other phenomena such as telepathy (mind-to-mind communication), clairvoyance/remote viewing (accessing information about distant times or places in non-physical manner), and precognition ('seeing' the future). Whilst this might seem pre-emptive since we address such 'disturbing' phenomena and how theories of non-local consciousness address them in section 4, they are intrinsic to Carr's theory and, as such, some of this discussion is included here.

movements. The walls of buildings in Flatland are like lines on a sheet of paper. The only way for A. Square to enter or leave his two-dimensional house is if there is a gap in one of these lines, such as for his doorway. However, there is another way to get into the building when the doors are locked and without breaking a wall, and this is by invoking a third dimension. A. Square is visited by a character who lives in three dimensions — A. Sphere — who looks like a circle to two-dimensional A. Square. A. Sphere can easily move into and out of an enclosed building in Flatland by using the dimension of up-down, a feat impossible using only two dimensions. Relatedly, things that seem spatially separate in Flatland may appear unitary from the perspective of a third dimension; for example, a set of three circles that seem mysteriously co-ordinated in Flatland might appear as the legs of a tripod when perceived in three dimensions.

By extension, if mental activities take place in dimensions beyond the three we appear to live in, this might allow for information transfer that would seem impossible when considering only three dimensions, where they would be described in terms of mysterious processes like telepathy and clairvoyance. A multidimensional model in which consciousness is not located in spacetime but is capable of exchanging information with spacetime objects might explain certain 'survival' phenomena, since it allows for a disembodied consciousness to live independently of a physical body to which it was attached, and potentially exchange information with physical bodies, as in mediumship or reincarnation. It could explain apparently strange behaviour exhibited by apparitions that seem able to defy three-dimensional physical rules. Mystical experiences, which are often reported to involve feelings of unity or 'oneness', might be tapping into what Carr calls a 'Universal Structure' that encompasses all physical dimensions. (Carr, 2010b, 2015) Higher dimensional spaces might also be communal: "consciousness may be fragmented at one level but unitary at a higher level" (Carr, 2010b, p. 7).

As well as spatial dimensions and transcendental fields, time is also integral to Carr's model. He suggests that physical time, which can be measured using a physical clock, might be distinct from 'mental time' that we subjectively experience as individuals. This would accord with how we can have an experience of time that doesn't always match the regularity of a timepiece, with an hour passing quickly when we are enjoying ourselves but feeling like an eternity when waiting for some important event (but see, e.g., Wittman, 2022). As such, this mental time is an important component of our individuality. Carr proposes that for each 'plane of actuality', such as the dimensions in which we dream or experience out-of-body experiences, there is a separate expression, or 'projection', of time – "it is as though consciousness perceives the world through a number of windows, each with its own clock" (Carr, 2015, para. 5, The Universal Structure…).

In particular, Carr notes that our subjective experience of the present is not confined to a momentary instant but extends over a longer period such that sequential stimuli (such as flashing lights or musical notes) are actually perceived as simultaneous. This has been termed the 'specious present' (Clay, 1882), and can be thought of as a unit of subjective time, a granularity or a pixelation of our experience of time. The specious present in normal states of consciousness has been suggested to be between around 0.03 seconds (which relates to the speed of oscillations in our brain) to around 0.1 seconds (which is the minimum timeframe our senses need to observe an event). Carr notes that the specious present may change substantially in unusual circumstances and during paranormal or spiritual experiences. He proposes a hierarchy of increasingly long specious presents corresponding with our consciousness occupying higher spatial dimensions. This may explain why those involved in a traumatic event, such as a car crash, report things happening in slow-motion, why some of those who have had near-death experiences report re-experiencing their whole lives in an instant, and why mystical states are sometimes associated with a feeling of timelessness.

3.2.2 Discussion

Carr's theory is appealing in the sense that it draws on respectable views from contemporary physics. Since extra dimensions have been proposed in order to account for the properties of elementary particles and waves, it does not seem unreasonable to look to these extra dimensions as a way to accommodate the properties of consciousness.

However, standard string theories have been criticised as unscientific by some physicists because it may not be possible, even in theory, to subject them to direct experimentation because the extra dimensions are too small to be accessible to physical instruments (Ritson & Camilleri, 2015). Extending an arguably already unfalsifiable theory into the realm of consciousness may suffer from the same fundamental weakness. Indeed, it is difficult to see how Carr's theory might be translated into particular hypotheses about the nature or capacities of consciousness that might be subjected to empirical tests. Even for phenomena that seem to be a good fit for the theory, such as survival phenomena, the correspondence is somewhat vague. We would need to know much more about the nature of information transfer between a disembodied consciousness and agents in spacetime in order to identify the implications of the theory, for example in relation to the persistence of particular memories versus the survival of a coherent recognisable individual.

Similarly, Carr's theory lacks detail regarding both the relationship between the extra dimensions of space and mental time, and the nature of the transcendental field theory proposed to explain the transfer of information between dimensions. As such, the theory is highly speculative and rests almost entirely on the apparently similar spatial experience of both three-dimensional life and mental experiences. It might be argued that just because there are apparently space-like features in mental activities, it is not clear why these necessarily align with higher dimensional physical spaces. As Carr himself concedes, his ideas are still "very preliminary, providing more questions than answers" (Carr, 2015, para. 1, Some General Considerations).

3.3 Consciousness is Fields

We now turn to examine theories that suggest that in some sense consciousness is associated with fields.

3.3.1 Hennacy – Electromagnetism and Biofields

Diane Hennacy (2024a; 2015) proposes that, rather than generating consciousness as physicalist theories maintain, the brain is instead our primary means for interfacing with and navigating a non-local consciousness, similar to how computers interact with information on the internet. Hennacy suggests that examining the anatomy and functioning of the brain could provide clues as to how it might interface with a potentially electromagnetic and holographic non-local consciousness.[4]

Hennacy (2024a) makes the case for the importance of electromagnetic fields from several perspectives. For example, our eyes and skin make use of electromagnetism in perceiving the external world. Electrical brain waves are also used to indicate different states of consciousness, such as stages of sleep and meditative states, and these can be detected using EEG. In terms of brain matter itself, many non-neuronal gap junctions associated with glial cells (which make up 50% of brain matter) make

[4] The main source upon which we base this description of Hennacy's theory contains a number of neuroscientific claims presented as factual without citation. Although, unlike Hennacy, we do not have a neuroscientific background, we have not been able to verify several of these from independent sources and, in some cases, we have found literature that appears to contradict her descriptions.

use of electrical waves because "this enables significantly faster speeds of processing than neuron to neuron [chemically-based] transmission" (Hennacy, 2024a, Glial Cells…, para. 4). Glia have been proposed as the site of 'higher thought processes' and potentially "present a much better candidate for quantum processing than neurons" (para. 4, but see section 3.1.4). Hence, Hennacy suggests, these cells may be pivotal for consciousness.

Whilst electromagnetism has been proposed as potentially underlying consciousness by a number of authors writing from a physicalist perspective (Jones & Hunt, 2023), Hennacy argues that electromagnetic fields may be important within a model of consciousness that is non-local. In particular, she proposes a role for Extremely Low Frequency (ELF) waves. ELF waves have frequencies between 3 and 30Hz with corresponding wavelengths of 100,000 to 10,000km, and as such can pass through most physical structures and be transmitted over an extremely wide area. Hennacy notes that the brain waves most associated with dreaming and deep relaxation are theta waves, which have frequencies of 6 to 10Hz; in other words, they are ELF. There is also some evidence that animals might be able to detect ELF waves, for example to support long-distance migratory behaviour making use of the Earth's magnetic field, perhaps with a role for the magnetite that is found in birds' beaks, which may operate as a compass. Hennacy writes that whilst magnetite is present in humans' brains and spinal cord, it is also found lining our skull bones, which suggests this may play a similar role to birds' magnetite in terms of helping with directionality and perhaps to act like an antenna for ELF waves.

There are a number of other elements of the brain that Hennacy suggests might be important in relation to electromagnetic effects and therefore to consciousness. These include neuromelanin, microtubules, mitochondria, and the pineal gland.

Neuromelanin is found only in neurons, and its resulting colouration is what gives rise to the term 'grey matter'. Melanin absorbs a wide range of wavelengths of light and can also respond to sound waves. Hennacy suggests that this may mean it can act as a "biological semiconductor with physiological responses to photic, acoustic, and electrical stimuli" (Hennacy, 2024a, Neuromelanin…, para. 4). Hennacy speculates that the presence of neuromelanin may therefore offer the potential to develop technology to affect states of consciousness through the application of light and sound waves.

Hennacy suggests that the pineal gland, which is encased in more electrolyte fluid (an electromagnetically-conductive material) than any other part of the brain, might be involved in information processing due to its central position, which enables signals it may emit rapidly to reach all parts of the brain. The pineal gland is highly sensitive to light and other electromagnetic fields and produces melatonin, which is important in sleep regulation, and has also been suggested by some to be involved in psychic phenomena (Roney-Dougal, 1989).

Hennacy notes that microtubules have been implicated in consciousness. However, rather than being host to quantum processes as Hameroff and Penrose suggest (section 3.1.4), she proposes that microtubules may be particularly susceptible to electromagnetic fields and act as superconductors. Mitochondria are found close to the brain's microtubules and Hennacy suggests that they "appear too numerous to be merely satisfying energy requirements of synaptic functioning and might be a source of biological light" (Hennacy, 2024a, Microtubules, para. 3). This light has come to be known as biophotons (Popp et al., 1984) and whilst most is used for physiological processes, some escapes the body meaning that we "literally glow, albeit 1,000 times below what can be detected by the naked eye" (Hennacy, 2024a, We Aren't…, para. 1). Hennacy cites research by the physicist Claude Swanson who suggests that holographic biophoton fields are created through a torsion field that occurs when biophotons are emitted by DNA (Swanson, 2008). Hennacy suggests that these biophotons form a holographic field through torsion waves within and beyond the body, and it is this that perhaps equates

to a person's 'aura' or 'subtle body'. Because this purported field is said to be holographic, Hennacy suggests that this means that our bodies can access non-local information, including through electromagnetic effects, albeit by means that are not clear from her description. As she writes, "instead of generating consciousness, our brains could be what detects it" (Hennacy, 2024a, Conclusion, para. 1).

3.3.2 Sheldrake – Morphic Fields and Consciousness

In common with other theories of non-local consciousness, Sheldrake (1995, 2011) maintains that consciousness cannot be found within or emerging from the brain as is proposed by physicalist theories. Instead, he suggests that there are non-local fields of consciousness beyond the body with which we resonate. Just as a radio does not contain the source of its broadcasts and instead is able to tune in and transmit radio signals that exist as electromagnetic fields, so our brains are able to tune into and access non-local fields of consciousness that are beyond our body. Others have suggested similar concepts, most notably Upton Sinclair with his book *Mental Radio* (Sinclair, 1930).

Sheldrake first proposed morphic fields in order to explain how organisms are able during development to form physical structures with precise and distinct shapes and compositions, for example how our cells are able to organise into a heart, or skin, or an arm, or a nose. This process of formation cannot be explained using genetics, he argues, because each cell in the body shares the same genetic code and so it is hard to envisage how the same genes in cells with different functions could determine such behaviour. Instead, Sheldrake hypothesises that there are morphic fields that act as a blueprint for the physical shape and structure of organisms and their component parts. Cells use these fields to guide the relative positioning and particular composition of every part of the body. Each specific entity within the body – whether a tissue, organ, limb, or the whole organism itself – has its own morphic field associated with its formation that has evolved and strengthened as previous organisms of the same species have both accessed and contributed to these fields, strengthening and refining them. This is similar to how water flowing down a hill will eventually erode a channel. This channel becomes more established over time as the water is both guided by the channel but also makes it more pronounced through further erosion so making it more likely that future flows of water will follow the same channel.

Sheldrake's proposal is that morphic fields apply well beyond biological development to encompass every aspect of the universe. Sheldrake suggests that these morphic fields can also account for the so-called 'laws' of nature, which are better thought of as entrenched habits rather than universal principles. For example, gravity has become established as an extremely engrained habit of nature. On the other hand, a morphic field associated with a new behaviour, for example that might exist for a novel crystalline compound made in the lab, is initially erratic such that the compound is at first difficult to make, but as the behaviour is repeated over time and the associated morphic field becomes more established, so the process becomes easier and more consistent.

Morphic fields can account for attributes of consciousness such as memory and behaviour. Sheldrake states, "the resonance of a brain with its own past states also helps to explain the memories of individual animals and humans. There is no need for all memories to be 'stored' inside the brain" (Sheldrake, n.d.). For example, spiders do not learn how to build complex webs in any conventional sense from other spiders (Reed et al., 1970), but neither do they rely on genetically inherited instinct. Rather, morphic fields explain how a spider is able to weave the intricate web design that is unique to its species (Hendry, n.d.), in terms of its behaviour being constrained by a tendency to conform to a pattern established in its morphic field that has been created by innumerable generations of the same species.

Sheldrake notes that some spontaneous but adaptive animal behaviours that have been observed to occur have been adopted by other species members even in circumstances where conventional learning methods like observation and modelling are not possible. For example, he describes (Sheldrake, 1988) how blue tits in Southampton discovered how to peck at the foil caps on milk bottles that had been delivered to doorsteps so they could drink some of the contents. This novel behaviour spread rapidly throughout the UK with some instances being recorded farther away in Holland, Sweden and Denmark, despite these birds having very restricted territories that would seem to preclude transmission by imitation. Sheldrake explained this in terms of a critical number of blue tits having discovered and repeated this novel but rewarding behaviour so that it reinforced particular motor fields for pecking when presented with this stimulus, increasing the likelihood that others would express the same behaviour by morphic resonance. He describes laboratory experiments showing how the rate of learning by groups of rats increased significantly over a 50-year period even though the rats involved were not descended from trained rats and populations were physically separated across three different continents. Regarding human behaviour, morphic resonance may explain why scores for IQ tests appear to have risen over the decades, and how children can learn new languages so quickly (Sheldrake, 2006). The theory predicts that it should be easier to complete a crossword puzzle after a period of time when more people have generated the answers and the overall solution has associated with it a stronger morphic field.

Sheldrake suggests that organisms are in resonance with fields of consciousness. This resonance is strongest when there is high similarity with the individual or group of individuals whose behaviour and decision making has contributed to the morphic field. This creates not only species- or family-specific resonances, but potentially provides a mechanism for the encoding and storage of personal memories. An individual person would be readily able to access a specific memory, or repeat a learned behaviour, because they are most in resonance with parts of the morphic field to which they contributed. Fields of consciousness are also present for groups such as families, sports teams, nations, and species which have their own hierarchical fields of consciousness with which members of these groups will most strongly resonate and so influence how members of these groups behave. Sheldrake (1988) claims that his theory bears some similarity to Carl Jung's notion of the collective unconscious, which is a realm of consciousness shared by all of humanity that is also said to have a hierarchical nature in that it expresses itself more strongly through the similarities of families and cultural groups. Jung wrote that,

> the collective unconscious comprises in itself the psychic life of our ancestors right back to the earliest beginnings. It is the matrix of all conscious psychic occurrences, and hence it exerts an influence that compromises the freedom of [individual] consciousness in the highest degree, since it is continually striving to lead all conscious processes back into the old paths. (Jung, 1929, para. 70)

3.3.3 Discussion

The suggestion that consciousness may be related to fields is considered respectable within a physicalist model. For example, Jones and Hunt (2023) review a number of theories of qualia based on electromagnetic fields. Sheldrake (2021) has even extended such ideas to pose the question of whether our sun may possess a form of consciousness exercised through its electromagnetic fields. Therefore, Hennacy's and Sheldrake's theories of consciousness may potentially be seen as an adaptation of an ongoing mainstream approach. Where they differ, of course, is that both propose a form of non-local consciousness, in Hennacy's case, related to the influence of electromagnetism on biofields, and in Sheldrake's case, in the presence of hypothesised morphic consciousness fields.

Hennacy's theory of consciousness is based heavily on the suggestion that the importance of electromagnetism has been somewhat overlooked in neuroscience, and she refers to a number of anatomical features of the brain to highlight their apparent relationship with electromagnetism and electromagnetic effects. The brain, she suggests, may interface with a non-local consciousness through holographic biofields that extend beyond the body and are created by the actions of biophotons through torsion waves. However, the theory appears somewhat vague and highly speculative. A number of brain features are implicated as possibly sensitive to electromagnetic information, but as yet these are only vaguely specified and it is not clear if they can be combined meaningfully to provide a unified mechanism or process. There is scope to refine and develop these suggestions so that they outline a more precise mechanism for the suggested links and to identify lines of research that might test them. It is also the case that, whilst Hennacy has a background in neuroscience research (Hennacy, 2024b), a number of key points she makes regarding this area, for example, the suggestion that magnetite exists in the lining of the skull, are unreferenced in the main source on which we based our account (Hennacy, 2024a), and we have found it difficult to substantiate some of these claims in peer-reviewed sources.

Part of the appeal of Sheldrake's theory is its adoption of the established concept of fields, which allow for non-local representations that have been shown to affect behaviour in other contexts (such as gravity and electromagnetism). However, a significant weakness of Sheldrake's theory is that he does not provide specifics regarding the nature of morphic fields, in particular, how or in what form they might exist, and in what medium they are instantiated. Similarly, the concept of resonance needs to be elucidated in order to provide more precision regarding when and how entities (of different sorts) might resonate with their associated fields. Superficially at least, morphic fields, especially in relation to consciousness, appear conceptually very different from physical fields that are well-established in science, such as gravitational or electromagnetic fields. It also remains an unanswered question how particular fields might be associated with particular processes across a vast range of different types of entities, including those not normally regarded as conscious, for example the behaviour of matter for the laws of nature, molecules in reaction, and cells in the formation of organisms, as well as for those that are conscious such as memory in animals, instinctive species-level behaviour, and so on. Whilst Sheldrake suggests that fields are related to physical entities due to resonance that is stronger when there are similarities between entities, in practice this seems rather imprecise.

3.4 Consciousness is Everywhere

Our next category encompasses theories proposing that consciousness is everywhere. These theories put forward the view that the substance of the universe inherently incorporates an aspect of consciousness and that this consciousness is universal.

3.4.1 Goff – The Cosmos is a Field of Consciousness

Philip Goff (2024) suggests that consciousness constitutes a single unified and all-pervasive field. He proposes that individual particles and other apparently separate entities are local expressions or 'excitations' of this universal field. Everything is conscious including the most rudimentary elements of the universe such as quarks, though the form of that consciousness may vary in relation to the complexity of the entity so that 'quark consciousness' is very rudimentary indeed. Larger more complex entities are made up of those smaller elements. The challenge to a theory such as this where everything is supposedly conscious is the so-called 'combination problem' (see, e.g., Heikkinen, 2021), that is, how does the combination of rudimentary consciousnesses give rise to a more complex, refined or sophisticated form, such as we see in humans? If we allow consciousness to those sub-elements do

we end up with a version of the zombie problem in which it would be possible to imagine a functional zombie who possesses micro-consciousness in the elements but does not have a supervening coherent and unitary consciousness?

One explanation Goff (2017) offers is a explanation based on 'grounding'. He uses the example of the dancing and drinking of a group of teenagers as the grounds for the existence of a party. The product – the party – is nothing more than the elements in combination – the teenagers and their dancing and drinking. Having teenagers drinking and dancing entails the party in the same way that the activities of the components of human consciousness would entail that consciousness. It is not possible to conceive of one occurring without the other. Thus, even if sub-elements have their own (more rudimentary) consciousness, their combination necessarily entails a more sophisticated consciousness that is not a property of its contributing factors. This analogy also hints at more than mere combination. Teenagers drinking and dancing in isolation from one another would not be regarded as a party – at least not a very successful one. Similarly, the combination of micro consciousnesses give rise to a macro consciousness whose properties seem likely to be a function of their interaction rather than merely their combination per se.

This suggestion could also help with the question of how we have a singular integrated and coherent experience if it is made up of smaller elements (the 'phenomenal bonding problem'), which is analogous to the question of how diverse neural activity might combine to create a cohesive experience in physicalist theories (the 'neural binding problem'). Just as the latter is suggested to resolve (to a degree) by synchronisation or resonance, so the former might be resolved by the interaction and meaningful synchronisation of those basic consciousnesses.

More recently Goff (2024) has argued for there being a form of universal consciousness on the grounds that this avoids some of the problems of taking micro-level conscious entities and combining them to account for macro-level ones. Instead, "there is just one fundamental entity: the universe as a whole. All facts are grounded in facts about the universe" (p. 13). And hence "very complex forms of consciousness are the essential nature of the universe-wide fields born by the cosmos". However, this results in the zombie problem, but in reverse – if the universe as a whole is capable of mind-bogglingly complex but nevertheless subjective, unitary and coherent experience, then why do we need to posit discrete consciousness in any parts of that universe? Additionally, we need to explain why those part-consciousnesses have the character of privacy and separation from one another. Goff (2024, p. 16) explains this as follows:

> New conscious subjects – new phenomenal property bearers – emerge from the universe. But these strongly emergent subjects do not appear with their own phenomenal property instances; rather they 'inherit' phenomenal property instances which previously belonged to the universe. … [As a conscious subject] persists through time, it continues to possess a small 'bubble' of the phenomenal properties of the fundamental fields, constantly gaining some from/losing some back to the universe around the edges. At the moment [the subject] ceases to be a conscious entity in its own right – perhaps at the death of the organism – it relinquishes its phenomenal properties back to the universe.

Goff's theory sees qualia as a fundamental property of the universe but allows for them to be transferred to new individual conscious ('local') subjects according to certain laws. These include the 'localisation' principle that suggests that local subjects emerge when certain precise conditions obtain. He does not specify what those conditions would be, but they would be empirically determined and reflect the observed physical correlates of consciousness, so could, for example, include possessing a brain. He also proposes the thinning principle, which describes how the form of experience had by

local subjects is constrained (or 'thinned out') by virtue of occupying a particular spatial region, and by virtue of their limited perceptual systems and processing capacities (for which he invokes the principle of IIT's computation of phi). In this way there can be different kinds of local subjects (say humans and cockroaches) whose thinned out experiences are substantially different, but are always partial and selective. This seems to imply that what is available to the awareness of one local subject is not necessarily simultaneously available to a second local subject or to the cosmic consciousness from which they emerged.

Whilst Goff proposes that universal consciousness is a unified whole, this does not necessarily mean that the universe in itself has any recognisable intelligence or purpose in the way that local subjects do, although Goff does state that "I believe that there is overwhelming evidence for the existence of cosmic purpose. Whether it is of the kind that would add great meaning to our lives [however] is a further question" (Goff, 2023, Chapter 1, para. 14). The evidence Goff finds convincing largely rests on the observation that the nature of the universe is finely-tuned to allow for life in that there are several important mathematical constants we see in nature, such as the value of the charge of an electron or the gravitational constant, that, if they were only very slightly different, would have meant that life, or indeed many of the structures of the universe in general, such as complex elements, could not exist (Smith et al., 2018).

3.4.2 Velmans – Consciousness is a Witness to Itself

Velmans argues for what he terms 'reflexive monism'. This means that consciousness is reflexive in the sense that the purpose of consciousness is to witness itself, and it is monist in the sense that a single consciousness encompasses three-dimensional phenomenal space rather than existing beyond three-dimensional space or being contained within a very tiny part of it (e.g., for humans, within the skull). Thus, if we prick our finger with a pin, the resultant pain is experienced not in the brain, but in the finger itself. Velmans (2021) acknowledges that there are neural correlates of pain that do indeed exist in the brain, but that it would be a mistake to believe that these neural correlates are the experience of pain itself. He suggests that anyone "in doubt on this issue might like to try it" (p. 181).

The existence of neuronal activity related to subjective experience means that there is an objective and physical aspect to any experience. Viewed from the inside, the mind is conscious experience but viewed from the outside, for example by someone performing brain imaging, the mind is the brain. Velmans therefore suggests that consciousness is 'psychophysical' because physical matter and consciousness are intimately related. Alterations to the physical structure of the brain result in specific mental experiences. The psychophysical mind has both conscious and material aspects in a similar way to how electricity and magnetism are both aspects of the single force of electromagnetism. Hence, "the nature of mind is not *either* physical *or* conscious experience (as normally understood); it is at once physical and conscious experience" (Velmans, 2021, p. 193, emphasis original).

Velmans (2021) identifies similarities between his model and Hindu philosophy. For example, in the Vendanta tradition the ultimate nature of reality is said to be 'pure consciousness', with the mental and physical features that we experience being lower-order manifestations of that consciousness. In order to address the problem of how (and why) this universal consciousness might give rise to micro consciousnesses, along the lines discussed when we considered Goff's theory, Velmans suggests that physical entities emerge spontaneously from local excitations of the quantum vacuum, and proposes that local, integrated and individualised conscious subjects might be differentiated from the oceanic consciousness in a similar fashion. Whereas in Goff's approach, local subjects remain distinct from cosmic consciousness until the subject 'dies' and is reassimilated, Velmans allows for the possibility (primarily through spiritual practices that involve introspection) that conscious subjects can have an

inkling of the experience of the cosmic mind from which they emerged. Ordinarily, Velmans also sees the properties of that local consciousness being constrained by its concomitant physical properties: "It is through the material world that consciousness is given form" (p. 210), most obviously according to the gross structure and activation potentials of the brain. (This aspect has consequences for which particular entities might be credited with recognisable local consciousness and which will not, although this is not explored in the sources we consulted.)

An important component in Velmans' theory is that he suggests that the purpose of individual consciousness is to observe the universe so that consciousness can become real to itself. Velmans suggests that this theory is consistent with the ancient Hindu Vedanta tradition, in which "consciousness acts as a witness, and that—and that alone—is its function" (Velmans, 2021, p. 199). In this respect it also bears some similarity to kabbalistic understandings of the purpose of consciousness (see Lancaster, 2004). Consciousness has co-evolved with matter so that just as matter has become more complex and differentiated, so consciousness has also become more complex and differentiated. Because the mental and physical worlds are two aspects of the same cosmic consciousness, there is no separation between our own conscious experience and the physical world.

3.4.3 Discussion

Theories that propose that consciousness is everywhere have the advantage that they do not have to account for certain features of consciousness, in particular, qualia. Consciousness simply exists as an inherent property of the universe and such properties are fundamental in the same way as mass and charge and so cannot be further analysed or thought of as having underlying causes. However, this raises the question, if consciousness is a co-occurring aspect of the physical world in which all material features are amenable to scientific study, for example through physics, chemistry and biology, then what does it add to imbue all matter with an aspect of consciousness? It is also reasonable to ask why we experience the physical features of the world in the way that we do. Individual entities such as ourselves are explained as temporary localised bundles of experiences, but why should that entail having bodies along with the sensory systems and brains to process their input? Goff alludes to this by describing how the experience of local consciousnesses may be 'thinned out' as a consequence of limitations in their perceptual and processing capabilities.

Both theories considered in this section propose that consciousness is at once both fundamental and universal. However, whilst Goff suggests that the nature of consciousness is as a field, Velmans suggests that it is informational. It could be argued that these two viewpoints are expressing similar ideas given that fields are informational in that they relate to properties associated with particular points, usually in a spatial context (Encyclopaedia Britannica, 2022).

There are a number of particular difficulties with Velmans' theory. Some of these are related to seemingly unevidenced assertions, for example the suggestion that experiences occur where they are rather than in the brain. Perhaps the reason for the persistence of the physicalist model is that it is not unreasonable to suggest that experiences of the outside world could well be located in the brain, and that the brain has manufactured a useful working model of the world where feelings appear to exist beyond the immediate boundaries of the skull. Another issue is Velmans' assertion that consciousness has a purpose or a will, although evidence for this viewpoint may be found in Goff's noting the seeming unlikely coincidences where many of nature's constants appear ideally suited to the emergence of life.

3.5 Consciousness is All There Is

Our final category involves theories proposing that consciousness is not only fundamental to reality but that consciousness is all that exists. These theories put forward the view that the substance of the universe is exclusively consciousness and the physical world exists only as an emergent property of this consciousness.

3.5.1 Kastrup – Individual Dissociation within Cosmic Consciousness

Bernardo Kastrup (Kastrup, 2014b, 2018) proposes that the universe is made solely of cosmic consciousness. All natural physical phenomena including objects, energy, and fields arise from this cosmic consciousness. Individual organisms and their experiences of consciousness are distinct localised patterns within this cosmic consciousness, similar to how a wave exists as something in its own right but remains a part of the ocean as a whole.

Central to Kastrup's theory is his explanation of how, despite our selves being a part of cosmic consciousness, we normally experience life as separate and discrete individuals without awareness of the wider reality of cosmic consciousness. Kastrup suggests that our everyday experience does not normally consist of an all-knowing oneness immersed in cosmic consciousness because the thoughts, feelings, and memories that constitute our individual selves are integrated in a cohesive whole and are detached from everyone else's thoughts, feelings, and memories. He describes this detachment and individuation as a 'dissociation', or a separation, within cosmic consciousness. Dissociation is a widely-accepted psychological phenomenon. For example, there are instances where several distinct personalities appear to reside within a single person's body, a condition known as Dissociative Identity Disorder (Braude, 1995). Such cases are characterised by a number of apparently separate and discrete personalities (identities) occupying a single body each of which display the range and depth of traits normally associated with a single person. Kastrup suggests that a similar dissociation is at work with respect to universal consciousness and it is this that accounts for what appears in the world to be a multitude of separate organisms each with their own unique individuality and perspective. Kastrup argues that a human's personality and subjective sense of self arises from a dissociation in cosmic consciousness and hence we experience our self as distinct from everyone else's selves.

But why would such dissociations occur? Kastrup suggests that this is due to the emergence of perception, which entails a separation of subject and object. Before there were dissociated individuals, Kastrup suggests that there were no perceptions in cosmic consciousness. There could not have been perceptions if everything was unified, if there were no 'others' to perceive. (In this respect, Kastrup's theory bears comparison with Velmans' Vedanta-inspired conceptualisation.) The only content of cosmic consciousness in this state was thoughts. When subtle dissociations occurred in the cosmic consciousness, this led to individual experiences of consciousness, boundaries to emerge, perceptions to arise, and ultimately to what we sense as the 'real' physical world. This is how Kastrup's theory allows for the idea of the emergence and then the evolution of living beings. As he puts it, if an individual's boundary is its sense organs, then "even if the outside stimulation is very faint and subtle, evolution has had billions of years to optimize the sensitivity of our sense organs … to pick up on these faint signals" (Kastrup, 2018, p. 148).

In order to live and survive and reproduce as an organism in a harsh external environment, an individual must encode a representation within itself of this external world through its sensory systems. This necessarily incomplete encoding in animal brains explains why neural activity and particular experiences match, thereby showing the 'neural correlates' that are favoured by physicalist theories. Kastrup points out that our perception of the outside world is not perfect. Indeed, he suggests that if it was perfect then the information or thoughts within us and outside of us would be

the same. This would lead to the information within us being subject to the same entropy (or progress towards disorder) as the states outside of us and therefore we "would dissolve into an entropic soup" (p. 149). He suggests that this does not happen because our bodies and brains buck the trend towards entropy. He argues that this must be retained if we are to survive as individuals and hence why we perceive only representations of reality rather than reality itself.

Kastrup draws a distinction between inanimate objects and living beings. Whilst dissociated individuation holds true for living beings, this is not the case for physical objects in our environment. The boundaries of physical objects are often arbitrary, such as "whether we distinguish the handle from the mug, [or] the hood from the jacket" (Kastrup, 2018, p. 144). Physical objects are expressions of consciousness and can be manipulated in many different ways, such as making a table from pieces of wood. Whether we call a table 'pieces of wood glued together' or a 'table' is just a matter of perspective. Inanimate objects such as these are 'excitations of consciousness', just as a ripple on a lake is an excitation of water. Living beings are also expressions of consciousness. However, unlike an inanimate object, a living being is a 'self-localisation' of consciousness in a similar way to how a whirlpool on lake is a 'self-localisation' of the lake water. Both ripples on a lake (physical objects) and whirlpools (living beings) are still essentially water (consciousness); however, ripples do not have a discrete identity consistent over time as whirlpools do. This is why living beings are viewed as objects from the outside, but only living beings have the internal, self-contained, and individual expression of consciousness that is lacking in physical objects (Kastrup, 2014a).

Our existence as separate unique individuals appears to be the normal experience of living beings. Our body marks the boundary of our individual perception. For example, for humans, our skin contains nerve cells to experience touch, our eyes receive photons for sight, our eardrums receive sound waves for hearing, and our tongue receives molecules so we can experience the tastes of food. All of these sense organs are at the boundary between our bodies and what we perceive to be the outside world. Living beings are self-sustaining, they take food and other physical necessities from the environment, and excrete waste materials. Again, this is similar to how the water in a whirlpool will renew itself over time taking in water from the lake and releasing water to the lake all the while retaining its discrete identify.

3.5.2 Hoffman – Conscious Agents and Perception as Interface to Reality

Donald Hoffman (2020) has developed a model of reality that does not start with spacetime, but instead takes consciousness as fundamental and attempts to show how spacetime arises from that. This is achieved by positing entities called 'conscious agents' that give rise to fundamental physical entities and their interactions. In this respect, Hoffman's approach has some similarity to D'Ariano and Faggin (2022) in suggesting that physical reality is shaped by mind because the elements of quantum physics supervene on consciousness. Hoffman (2024) explains that,

> we're trying to have a science of consciousness where consciousness is first – but it's not a hand wave – we're going to explain where the speed of light comes from, and we're going to try to explain where exactly momentum distributions and so forth in spacetime [come from]. If we can do this, then maybe scientists will take seriously the idea that consciousness might be fundamental.

The physical world thus emerges from a fundamental consciousness that consists of networks of conscious agents operating outside of spacetime. These conscious agents have experiences, perceive other conscious agents, make decisions, and perform actions. Conscious agents are not only the basis for our individual consciousness and the consciousness of other animals, but also give rise to inanimate objects such as rocks, molecules, atoms, and so-called fundamental particles. Hoffman aims to develop

in detail the logical and mathematical principles underpinning fundamental consciousness beginning with just two basic assumptions related to the operations of conscious agents – their experiences and their actions. He suggests that these two assumptions can ultimately lead to an explanation for the entirety of spacetime, including physical laws, life, and the wealth of human experience (Hoffman, 2024; Hoffman et al., 2023). Hoffman (2024) reported recently that he has already made progress towards this goal. He described how two assumptions used by Einstein for his theory of relativity related to the speed of light – that massless objects always travel at the speed of light and that every observer always sees the same maximum speed of light – can be derived directly from the first principles of his theory of conscious agents.

Central to Hoffman's approach is the assertion that what we perceive as real with our senses is not the world as it is but is instead merely a useful representation of reality. Through simulation work Hoffman and colleagues have developed a theorem, known as Fitness-Beats-Truth (FBT) (Prakash et al., 2021), showing that organisms perceiving 'fitness' will drive organisms perceiving 'truth' to extinction. In other words, organisms that are able to perceive what helps them best to survive in the environment will be much more likely to survive and produce offspring than a similar organism that is tuned instead to perceive the true nature of reality. He concluded that,

> mathematically it turns out that the probability is zero that any sensory system has ever been shaped by natural selection to see any true structure of objective reality … Evolution didn't shape us to see the truth; evolution shaped us to have a user interface that helped us to stay alive. (Hoffman, 2024)

So, what is it that we perceive with our senses if not the real world? Rather than actual reality, Hoffman suggests that we interact with a wholly virtual reality similar to our experience of working on a computer desktop interface. The files and icons and text that make up such a desktop interface are not actually the underlying computer; instead they are useful representations of its electronic circuitry. If we had to interact directly with these inner workings, then our productivity would shudder to a halt and we would find ourselves unable to do anything useful such as write an email or watch a video. In the same way, objects in the world that we appear to see and hear and feel do not actually exist in any objective sense but instead are merely useful representations of an underlying objective reality. "Ignorance of reality can aid command of reality. This claim, out of context, is counterintuitive. But for an interface it's obvious" (Hoffman, 2020a, p. 76). Hoffman et al. (2015) call this the Interface Theory of Perception.

Hoffman goes beyond claiming that just our perceptions of reality are wrong. He maintains that the very objects we see in our world, and even the fabric of spacetime itself, do not exist. Our best theories of physics show us that our direct experience of reality is illusory. For example, Einstein's theory of spacetime breaks down below the thresholds of 10^{-33}cm in distance and 10^{-43} seconds in time (Hoffman, 2024). One leading physicist, Nathan Seiberg of the Institute for Advanced Study at Princeton, says, "I am almost certain that space and time are illusions. These are primitive notions that will be replaced by something more sophisticated" (Hoffman, 2020, quoted on p. 116).

3.5.3 Discussion

One of the strengths of Kastrup's and Hoffman's theories is their suggestion that ultimately the whole of reality consists only of consciousness. This approach means there is no necessity to provide any explanation of how it is that two different substances of mind and matter might interface and interact with each other. There is also no need to explain the 'hard problem' faced by physicalist theories of how consciousness emerges from matter, because consciousness is all there is. However, there is an

issue in these theories of what might be viewed as its mirror problem, the need to explain the emergence of the physical world from fundamental consciousness.

Kastrup's response to this is to suggest that the physical world *is* consciousness. There is no need to explain the laws of the physical world because these are just ways in which objects interact with each other within consciousness. However, Hoffman's view is that there are conscious agents outside of spacetime from which the physical world emerges. The current focus of Hoffman's and his colleagues' work is in deriving the physical and phenomenal characteristics of the universe from a mathematical formulation of just two of the features of these agents – experiences and actions. In other words, a complete theoretical description of how the world in all its material and conscious complexity emerges from consciousness outside of spacetime. Needless to say, this is hugely ambitious in its scope.

Another distinction between Kastrup's and Hoffman's theories is in how they account for individuation within cosmic and universal consciousness. Kastrup accounts for this through dissociations of consciousness, which initially arose from very basic levels of perception where one part of consciousness perceived another part of consciousness. Through an extended process of evolution, this eventually led to the sophisticated dissociated consciousnesses – living organisms — we see around us. However, the exact mechanisms for dissociation emerging remain ultimately a gap in Kastrup's theory, albeit one he is currently aiming to address through the application of integrated information theory (Kastrup, 2023). In Hoffman's case, the existence of separate and individual conscious agents is a starting assumption. In other words, he does not account for why universal consciousness consists of multiple agents rather than manifesting as a uniform and undivided whole. His justification for this is that every theory must have assumptions that it does not attempt to explain. In his theory, the starting assumptions that have no explanation are the experiences and actions of conscious agents.

Kastrup and Hoffman's theories attempt a level of precision that is not found in most of the other theories of non-local consciousness considered in this essay. In Hoffman's case, this extends to precise mathematical formulations for conscious agents manipulated in such a way as to simulate various behaviours and interactions between them. As discussed, this has already led to a claimed derivation of the properties of light used by Einstein as a starting point for his theory of relativity. His subsequent aim is to build on recent findings of mathematicians and physicists who are working on static geometrical constructs that they suggest may exist outside of spacetime and may be the underlying source of what we now think of as fundamental particles (UNIVERSE+, 2024). His theoretical constructs for consciousness – conscious agents – may in turn be the underlying dynamic source of these fundamental precursors of the physical world. He said that behind the geometrical constructs, "there's actually the dynamics of consciousness going on. … the nice thing is that once we get to that, then the physicists are doing the hard work of getting from the positive geometries into spacetime" (Hoffman, 2024).

4 'Disturbing' Phenomena

We have argued that theories of consciousness should be as comprehensive as possible in accounting for the full range of first-person subjective experiences. All theories of consciousness must in some way account, at least in principle, for experiences derived from sensory input, or for the relationship between states of consciousness and features of subjective experience, along with other 'mundane' experiences. However, there are additional classes of experience that are not generally accepted by mainstream science, but relate to phenomena that are widely reported by the general public, and are

supported by a substantial and robust base of experimental evidence, which we argue should also be subject to explanation within any satisfactory theory of consciousness.

We call these phenomena 'disturbing' after Alan Turing's reference to them in his proposal for the 'imitation game', a test to gauge whether computers can exhibit intelligent behaviour equivalent to, or indistinguishable from, that of a human (Turing, 1950). Turing considered one objection to the test to be that human protagonists might use extrasensory perception (ESP) in order to pass the test whereas an intelligent computer could not. He exclaims, "These disturbing phenomena seem to deny all our usual scientific ideas. How we would like to discredit them! Unfortunately, the statistical evidence, at least for telepathy, is overwhelming" (p. 453), a position with which we concur. We also note that the definition of 'disturb' is to interfere or upset the normal arrangement of something, so its adoption here reflects a general perception that if these phenomena were to be widely accepted then they would require significant disturbances to or restructuring of the prevailing physicalist worldview and perhaps the acceptance of a non-local alternative. Given the nature of theories of non-local consciousness, we would expect them to show more awareness of such disturbing phenomena and to have made greater efforts to accommodate them.

Cardeña (2018) lists many of the kinds of anomalous experiences that would need to be included in a comprehensive account of consciousness, including: synaesthesia, hallucinations, lucid dreaming, spirit possession, alien abduction, past-life experiences, psychic experiences, near-death experiences, and mystical experiences. This is rather a hodgepodge of potentially unrelated phenomena and there is not the space in our essay to consider them all. Rather, we restrict our focus to the following types of phenomena, which are intended to be illustrative rather than exhaustive. This is based in part on the 'white crow' principle expressed by William James (1896) as "a universal proposition can be made untrue by a particular instance. If you wish to upset the law that all crows are black, you mustn't seek to show that no crows are; it is enough if you prove one single crow to be white":

- *Phenomena that suggest that consciousness is not dependent on brain activity,* including near-death experiences, terminal lucidity and coma, and cases of severe brain impairment.
- *Phenomena that suggest consciousness can exist in a disembodied form,* such as supposed communications from the deceased, which may be direct, as in apparitional experiences or reincarnation cases, or mediated by third parties, as in mediumship.
- *Phenomena that suggest consciousness is not constrained by conventional notions of space or time, since information can be acquired from distant points in space or time in a way that cannot be mediated by the conventional senses,* such as extrasensory perception (ESP) phenomena associated with clairvoyance or remote viewing and precognition.
- *Phenomena that suggest consciousness, via focused attention and intention, can potentially influence aspects of the physical world at a distance*, such as psychokinetic effects and noncontact healing.

4.1 Phenomena Suggesting Consciousness is Not Dependent on Brain Activity

4.1.1 Near-Death Experiences

When they are near death — or believe themselves to be — some people have found that the dying process is experienced not in terms of a painful and fearful catastrophic loss of functionality, but rather as a serene, even blissful, experience that includes coherent and meaningful elements suggesting that some aspect of their self may continue to exist and have experiences after the brain ceases to function

(Roe, 2024b). Such *near-death experiences* (NDEs) are now part of popular culture, and include the experiencer witnessing resuscitation attempts from a perspective outside their body, travelling along a tunnel towards a light, and entering a transcendental realm where they may meet deceased relatives or religious figures.

It has been estimated that about 4% of the general public have experienced an NDE (van Lommel, 2023). Prospective studies in clinical settings suggest that between 9 and 18% of people report an NDE following resuscitation (Parnia et al., 2014; van Lommel et al., 2001). Attempts have been made to account in physicalist terms for the various phenomenological elements of the NDE, such as the brain being deprived of oxygen, the release of endorphins in response to trauma, or as a psychological reaction to seemingly impending death (e.g., Augustine, 2014; French, 2005). While these explanations might have merit in some cases, they are unable to account for the strongest cases (e.g., Greyson, 2007; Roe, in press). In particular, they struggle to offer a meaningful explanation for instances in which events that were perceived during the NDE were later corroborated. Cook, Greyson and Stevenson (1998) present 14 such cases, including the following where the person involved reported seeing parts of the hospital ward that should not have been visible using their ordinary senses from their location:

> I was in the hospital having had an operation for peritonitis; I developed pneumonia and was very ill. The ward was L-shaped so that anyone in bed at one part of the ward could not see around the corner. One morning I felt myself floating upwards, and found I was looking down on the rest of the patients. I could see myself propped up against pillows, very white and ill. I saw the Sister and nurse rush to my bed with oxygen. Then everything went blank.
>
> The next I remember was opening my eyes to see the Sister bending over me. I told her what had happened but at first she thought I was rambling. Then I said, "There is a big woman sitting up in bed with her head wrapped in bandages and she is knitting something with blue wool. She has a very red face." This certainly shook her as apparently the lady concerned had a mastoid operation and was just as I described. She was not allowed out of bed and of course I hadn't been up at all. After [providing] several other details such as the time by the clock on the wall (which had broken down) I convinced her that at least something strange had happened to me. (pp. 385-386)

Cases such as these that are difficult to explain from a physicalist perspective are not uncommon; Holden (2007) reported that 37% of the published cases of accurate out-of-body perception in NDEs were corroborated by independent, objective sources. Such evidential reports along with the very possibility of being able to sustain a vivid, complex and coherent experience at times when brain functioning is severely compromised such as during general anaesthesia or cardiac arrest poses a formidable challenge to brain-based theories of consciousness.

4.1.2 Terminal Lucidity and Coma

NDEs often involve an abrupt deterioration in a person's ability to maintain a coherent conscious experience, but there are a number of degenerative brain conditions that produce a more gradual decline, including meningitis, brain abscesses, brain tumours, strokes, neurodegenerative dementias, as well as psychiatric disorders such as chronic schizophrenia. These conditions produce longer term severe brain damage and dysfunction that are normally considered to be irreversible (Roehrs et al., 2024). Patients are typically drowsy, forgetful, and unresponsive to their surroundings or even their own biological needs. However, when close to death some experience a sudden marked and medically surprising improvement in their condition that includes enhanced mental clarity, and interest in the people and things around them. They seem to recover access to lost memories so that they are able to recognise friends and family, and regain enough awareness of their circumstances to be able to say

goodbye and put their affairs in order. The lucid episode is often short-lived, lasting from a few minutes to a few days before the patient reverts to their former cognitively compromised condition, frequently deteriorating further and dying within a day or two. These episodes are known as 'terminal lucidity' (Nahm et al., 2012). The following brief case cited by Nahm et al. (2012, pp. 139 140) is fairly typical:

> Bedridden, blind in one eye, incontinent, and increasingly incoherent in his speech and bizarre in his behaviour. He appeared to be unable to make sense of his surroundings, and when his family touched him, he would slap as if at an insect. He eventually stopped sleeping, talking deliriously through the night. After several weeks of that, he suddenly one night appeared calm and started speaking coherently, and then slept peacefully. The following morning, he remained coherent and conversed with his wife, discussing his imminent death with her for the first time. However, he stopped speaking later that day, and lay immobile in his bed, not eating or drinking for two more weeks, after which he expired.

Terminal lucidity has been witnessed in young children, who are less likely to have absorbed cultural expectations regarding death and dying, or even to have a sense of what death means existentially. Roehrs et al. (2024) describe the case of a three-year-old girl with a rare immune disorder who failed to respond to treatment, leading to extreme inflammation in many organs and tissues. Her parents agreed to change her status to 'do not resuscitate' as the focus shifted to palliative care. However,

> that evening, the patient awoke and asked for her usual comfort items (i.e., Lion King movie, parents, toys) and food. She showed no indication of mental impairment and regained the ability to sit up in bed and participate in coloring and other simple age-appropriate tasks. She spoke using logical, organized full sentences, and had multiple conversations with her parents that evening, which they and the bedside nurse described as "like a miracle." During the conversations with her parents, she reviewed all the important people in her life and prayed for them. She indicated awareness of transitioning to death and reassured loved ones of the need not to be concerned about her. She also seemed to be communicating with people who were not visible to others. After several hours, she asked to "go to bed" and returned to her comatose state.

Following this episode, she became and remained unconscious during the next two days before dying peacefully of cardiac arrest in her parents' arms. Such health conditions are complex and it is not yet clear to what extent the occurrence and phenomenology of terminal lucidity cases is related to factors such as the progression of their underlying condition, co-morbidities, or the effects of medical treatment, although this is a focus of ongoing research (e.g., Roe, 2024c). Reliable data regarding the prevalence of such cases are not yet available (Nahm et al., 2012), although reports from palliative care workers suggest that it is not an uncommon experience (Brayne et al., 2008). Theories of consciousness would need to be able to account for the recovery of lucid awareness despite apparent irreversible brain damage that had caused significant dysfunction and degradation to core cognitive processes.

Some of those who have experienced NDEs have a period following their close brush with death in a coma, during which time they may have further lucid episodes. van Lommel (2023, p. 25) defines this state as follows:

> While in a coma a patient is unresponsive and cannot wake up, even when stimulated. Coma is a state of apparent unconsciousness due to severe brain injury, such as a cerebral haemorrhage or a cerebral infarction, due to a complicated CPR, a cerebral trauma (traffic

> accident), a cerebral infection, or intoxication. According to current science conscious experiences should not be possible.

Some coma patients who subsequently recover consciousness do not report NDEs but may still describe periods of lucidity. For example, van Lommel recounts the following case:

> While she was thought to be in a deep coma without any apparent brain activity, her specialist and husband were having a conversation by her bedside. The neurologist predicted that his patient would be a "vegetable" for the rest of her life and asked the husband to consider taking her off the equipment (oxygen, medication) that was keeping her alive. The husband was still hopeful of a recovery, so she was kept on the ventilator. Several months later the woman woke up, despite the sombre prognosis. It emerged that she had been able to hear throughout most of her coma and had overheard the conversation between her doctor and husband about passive euthanasia! She said how awful this had been and that while she had been trying to shout that she was still there, that she wanted to live, be with her husband and children, they were discussing her possible demise.

Similarly, Nahm (2023) cites the following case:

> In a book introducing his work with developing modes of communication with nonresponsive patients in vegetative states, neuropsychologist Adrian Owen described what happened to one of his patients, Juan. In order to gain detailed insights into the activity of the brain in nonresponsive patients, including its deeper layers, Owen used fMRI scanners. These highly sophisticated apparatuses enable physicians to evaluate whether there might be a conscious individual inside a nonresponsive body. In Juan's case, repeated scans showed practically no sign of conscious awareness. The characteristic patterns of activity in brain regions signalling awareness in response to applied stimuli were almost completely absent although his eyes were open. Consequently, he was regarded entirely unconscious. Weeks later, however, Juan awoke from his coma. To the amazement of Owen, Juan had a full recall of his two visits to Owen's laboratory. He was able to describe everything that happened correctly and remembered the physicians involved. [42]

We are aware of just one additional case, involving Gil Avni, who was diagnosed with a cerebral oedema and suffered severe anoxic brain damage and was put in an induced coma. Although he was not expected to recover, he regained consciousness after 44 hours and reported that he had been fully conscious throughout. During his lucid coma period, Avni sought to memorise his experiences so that he was able to give a rich and quite detailed recollection of his experiences on waking. This is currently being investigated (Nahm, 2024) and has resulted in a documentary film (Gross & Shamir, 2023).

Cases of lucidity during coma seem to be extremely rare. This is perhaps in part because the prognosis for recovery is very poor. A patient who presents after twenty-four hours of care with a Glasgow Coma Scale score of 3 or 4 (with 3 being a person in a coma and 15 being a normal-appearing person) has an 87% likelihood of dying or remaining in a vegetative state, and only a 7% likelihood of moderate disability or good recovery (Igou, 2024). Nevertheless, the cases that have been reported warrant serious scrutiny because such occurrences question whether a functional brain is a necessary condition for conscious experience.

4.1.3 Severe Brain Impairment

There are many well-documented cases where people who have apparently severe brain impairments nevertheless exhibit normal functioning, which appears difficult to explain within a physicalist model of consciousness. One clinical condition concerns hydrocephalus. In such cases, the circulation of fluid in the ventricles of the brain is blocked or there is increased pressure in the spinal area forcing fluid into the ventricles. As the volume of fluid within brain ventricles increases during childhood it presses brain tissue against the cranium, restricting its growth as well as stretching and destroying neural connections. In severe cases, the liquid-filled cavity can occupy 95% of the skull. Paediatrician John Lorber found that, whilst many of these people showed substantial intellectual and physical disabilities as might be expected with such reduced brain matter, about 10% were found to have above average IQs (Lewin, 1980). Lorber referred to one exceptional patient,

> who has an IQ of 126, has gained a first-class honors degree in mathematics, and is socially completely normal [yet] … instead of the normal 4.5-centimeter thickness of brain tissue between the ventricles and the cortical surface, there was just a thin layer of mantle measuring a millimeter or so. His cranium is filled mainly with cerebrospinal fluid. (cited in Lewin, 1980, p. 1232).

Van Lommel (2023, p. 17) comments on this case and suggests that,

> the weight of his remaining brain was estimated at one hundred grams (compared to a normal weight of 1,500 grams), and yet his mental function was unimpaired. It seems scarcely possible to reconcile this exceptional case with our current belief that memories and consciousness are produced and stored in the brain.

Lorber's work has not been taken seriously by many mainstream scientists, but a more recent case has supported his observations. Feuillet, Dufour and Pelletier (2007) describe the clinical case of a patient who had suffered a massive enlargement of the ventricles, and consequently had a very thin lining of brain matter. Psychological testing revealed that although he scored below average on intelligence (his verbal IQ was 84 and his performance IQ 70) he showed no sign of any disability beyond a mild left leg weakness that had led to the consultation in the first place, and, as a married father of two who worked as a civil servant, was socially functional. Hydrocephalus has a much greater effect on white matter than on grey matter, and this might help explain the remarkable retention of many normal functions in severely affected individuals. Additionally, these remarkable cases have only been documented in patients with chronic hydrocephalus during which ventricular expansion may be gradual and the patient has had an opportunity to adapt or compensate (Oliveira et al., 2019).

Savantism is a phenomenon whereby a person is suddenly able to express a prodigious talent in which they have had little or no former experience or training, such as music, art, mathematics, or languages. Sometimes these abilities emerge as a result of intense spiritual practice and sometimes they have no obvious trigger. However, illness or trauma to the brain is a common feature. For example, Kim Peek, upon whom the 1988 film 'Rain Man' was based, was found from brain imaging to have a large cavity in his brain caused by hydrocephalus. Among many astounding talents was that, by the time of his death, Peek had memorised word for word over 10,000 books and could recite each with exact precision backwards as well as forwards (Hennacy, 2024b). As Kelly (2007, p. 86) suggests, this phenomenon "looks hard to explain in terms of brain processes".

In terms of other brain impairments, Majorek (2012) cites the case of a female patient who at the age of three underwent a hemispherectomy in which the dominant left hemisphere of her brain was surgically removed in order to control severe epilepsy that had led to paralysis in the right side of her

body and a significant impairment of language skills. By the age of seven, despite no obvious regeneration in that hemisphere, she had recovered to such an extent that she was fully bilingual in Turkish and Dutch, and her paralysis was only noticeable as a slight spasticity of her left arm and leg. Otherwise, she led a normal life. Battro (2000) reports on a remarkably similar case involving a male child who was also aged three and also had a hemispherectomy to control intractable epilepsy, this time of the right hemisphere. He recovered quickly and, notwithstanding some difficulties with left-sided vision and motor control, showed little evidence of disability. These are not isolated cases: Majorek cites a follow-up study of 33 children and adolescents who underwent hemispherectomies at Great Ormond Street Hospital, London, among whom no significant cognitive deterioration or loss of language occurred despite the removal of a whole hemisphere.

Such cases involving severe hydrocephalus or the removal of half of the brain and yet retaining reasonably high cognitive skills represent a significant challenge to the physicalist perspective that the mind is wholly equivalent to, or arises from, the brain.

4.2 Phenomena Suggesting Consciousness Can Exist in a Disembodied Form

4.2.1 Spontaneous After-Death Communications

A spontaneous after-death communication (ADC) occurs when a person unexpectedly perceives a deceased person through sight, hearing, smell, or touch, or simply experiences a sense of their presence. The deceased person is perceived in a manner interpreted as meaning they continue to survive in some form. The following is a fairly typical example of an ADC (Roe, et al., 2023, p. 98):

> I was awakening around 6 a.m. I saw someone walking on my front porch through my bedroom window. I thought “who would be here this early”? I got dressed and went to the front door. I opened the door and saw a woman with her back to me on my left, crying. I asked if she was ok? She turned around and it was my [deceased] grandmother from my father’s side of the family. I was in shock to see her. She spoke and asked me for forgiveness and apologized for no longer talking to me after my father had passed away. I told her it was ok and I forgave her. She walked towards me and we hugged. I felt her frail body hug me and I hugged her back. I felt her clothes, her smell and she thanked me as we hugged. I felt this most intense feeling of love. I started to cry. She then started to turn into this bright white light. I had to close my eyes due to it being so bright. I could see the light fading away through my eyelids. The feeling of her started to slowly leave. I opened my eyes and she was gone. I was standing there with my arms still looking like I was hugging someone. I was in shock. I went back into the house and lay on my bed and my wife woke up. I told her what happened. For two days I felt light headed/dizzy... My grandmother had been dead for about 7 years and I was so in shock from the experience. (E197)

ADCs have been documented and investigated for centuries, originally as haunting type phenomena (e.g., Carrington, 1920) and more recently by clinicians who have introduced the alternative term Sensory Experiences of the Deceased (SEDs; e.g., Kamp et al., 2020). There is no indication that they are indicative of pathology or of psychological difficulties with bereavement (Elsaesser et al., 2021). Indeed, they seem to play an important role in enabling people to come to terms with their loss (e.g., Penberthy et al., 2023). Surveys indicate that they are reasonably common, with a third of people surveyed having experienced an ADC (Streit-Horn et al., 2022), and a higher proportion in samples who have experienced the death of a loved one.

Although the vast majority of people are convinced of the authenticity of their experience, ADCs are intrinsically subjective and therefore susceptible to being explained as a psychological response to a deep emotional need. People profoundly affected by the death of a family member or friend might imagine having experienced these perceptions, or may be susceptible to misinterpret phenomena if they occur under poor sensory conditions, such as in darkness or semi-darkness, or at times when they are drowsy or inattentive. There are, however, some types of ADCs that are more resistant to such explanations and therefore have more bearing on the claim that consciousness might be possible in a disembodied form. For example, surveys have shown that many cases of ADCs occur when the experiencer is not in mourning or even thinking of the deceased, and take place in well-lit spaces or whilst clearly awake and alert (e.g., Elsaesser et al., in press). Some cases involve multiple witnesses (e.g., Roe et al., 2023). Perhaps most evidential are cases in which the ADC conveys information that was previously unknown to the experiencer. This may be the fact of the person's death itself, as in this example (Gurney et al., 1886):

> On February 26th, 1850, I was awake, for I was to go to my sister-in-law, and visiting was then an event for me. About two o'clock in the morning my brother walked into our room (my sister's) and stood beside my bed. I called to her, "Here is ---." He was at the time quartered at Paisley, and a mail-car from Belfast passed about that hour not more than a mile from our village… He looked down on us most lovingly, and kindly, and waved his hand, and he was gone! I recollect it all as if it were only last night it occurred, and my feeling of astonishment, not at his coming into the room at all, but where he could have gone. At that very hour he died.

In other cases, it seems to reflect information that would only have been known to the deceased. The following case is taken from our own survey collection (Elsaesser et al., 2021):

> One night I woke up and saw my biological father. He greeted me and said that he had come to tell me that he was leaving and that he had left me a small legacy. He added that he had met my children and that I had a beautiful family. He bid me a fond farewell and left. I never had any contact with him and I never met him in person. I learned of his existence at the age of 9 when I discovered that the father I grew up with and whose surname I have was not my biological father. However, I never sought to meet him, and neither did he. So, we only met personally after his death. Two days after this experience, his family contacted me to inform me of his death and his wish that I receive a legacy he had left me. This confirmed that my experience was real and accurate.

4.2.2 Mediumship

Mediumship provides another means by which deceased persons are believed to communicate with the living. This evidence is usually in the form of physical phenomena (such as raps or bangs, movements of objects) that are thought to be caused by discarnate spirits, or in the form of mental phenomena such as messages that contain information known only to the deceased person or is characteristic of them when they were alive. Investigations of physical mediumship were popular at the beginning of the 20th century but interest waned following discoveries of claimant fraud in high profile investigations (Beloff, 1993; Gauld, 1968). Modern investigations are rare and have had very mixed success (Keen, Ellison & Fontana, 1999; Nahm, 2016).

Demonstrations of mental mediumship are typically dismissed as being due to cold reading, which Hyman (1977, p. 20) defines as "a procedure by which a 'reader' is able to persuade a client whom he has never met before that he knows all about the client's personality and problems". Cold reading comprises a set of diverse psychological techniques that are effective under different conditions (see

Roe & Roxburgh, 2013a, 2013b). These make it difficult to evaluate real-world demonstrations of mediumship. However, it is a relatively straightforward matter to control for them in experimental tests, and these have been carried out since the late 19th century.

For example, the mediums Mrs Piper and Mrs Leonard were repeatedly tested over a period of more than 60 years and many hundreds of sittings, during which time they produced material under controlled conditions that was regarded as compelling evidence for survival. Neither was ever seriously suspected of cheating in any way (Gauld, 1968). One of Mrs Piper's communicators was 'G.P.', who had been an acquaintance of the investigators but had died in an accident. G.P. acted as spirit control for 150 experimental sittings in which the client was introduced anonymously and was previously unknown to Piper. Of these, 30 had been known to G.P. in life and he recognised all but one of them (the other being a young woman whom he had only known when she was a little girl). He recognised none of those that the living G.P. had not known. One of the (formerly sceptical) investigators, Hodgson, commented:

> I may say generally that out of a large number of sitters who went as strangers to Mrs. Piper, the communicating G.P. has picked out the friends of G.P. living, precisely as the G.P. living might have been expected to do, and has exhibited memories in connection with these and other friends which are such as would naturally be associated as part of the G.P. personality... and which are accompanied by the emotional relations which were connected with such friends in the mind of G.P. living. (cited in Salter, 1950)

An experiment by Beischel and colleagues (2015) illustrates how contemporary research is designed. This team works with a group of mediums who are each allocated a researcher who has no contact at all with those who will be receiving readings (known as 'sitters'), and so cannot unwittingly convey any information about them. A second researcher interacts with the sitters who are each asked to provide the first name of someone who has died from whom they wish to receive a message. That name is passed on to one of the mediums who attempts to contact that person and produces a reading based on the communication. Each participant receives two readings: one that was intended for them, and a decoy reading that is intended for one of the other participants. Without knowing which is which, they evaluate the accuracy of each of these readings both holistically and in terms of the percentage of correct statements. Analysis of the 96 readings showed that the intended readings were rated as significantly more applicable than readings intended for other sitters. Whilst not all such experiments give statistically significant results, 18 similar experiments were included in a meta-analysis reported by Sarraf et al. (2020). The cumulative effect size was .18, which suggests only a small effect size. However, this outcome is statistically significant, and the authors conclude that "the results of this meta-analysis support the hypothesis that some mediums can retrieve information about deceased persons through unknown means" (p. 1).

4.2.3 Reincarnation

Reincarnation may be defined as the return of a non-material essence of a person to another physical body after death (Matlock, 2019). Although recollections of a past life can occur at any age, particularly with the intervention of psychedelics or hypnotic regression methods, it is most commonly associated with young children as they begin to have sufficient command of their native language to be able to express themselves. The child may declare that they do not belong here, that they have a different name and different family members, sometimes including a spouse and children of their own. In some circumstances, members of the child's family claim to have found someone who died before the child was born who closely matches the descriptions given. Ian Stevenson (e.g., Stevenson, 2001) introduced the systematic investigation of such cases, in which he took care to document the child's

recollections before any details were verified so as to avoid the accounts altering after the fact, and to monitor contacts between the current and previous families in order to rule out information passing between them and subsequent confirmatory biases when evaluating potential correspondences. This methodology was adopted particularly by Stevenson's successor Jim Tucker (2015, 2016). Stevenson and associates have amassed a database of over 2,500 cases of apparent reincarnation, which includes some impressive matches. The case of Gopal Gupta (summarised by McLuhan & Matlock, 2015) is typical:

> When Gupta was two years old, an incident occurred when he lost his temper at being asked to perform a task. He had no need to work, he said, as he had lived in a large house with many servants to do housework. This was in Mathura (160 kilometres distant), he went on, where he had another father and two brothers; one of the brothers had shot him to death. Among other details he said he had quarrelled with his wife and owned a company, named Suk Shancharak, that had to do with medicines. Some years later when Gupta was eight, enquiries were made in Mathura, where it was found that his statements closely corresponded to the life and death of Shaktipal Sharma, a well-known businessman, whose younger brother had shot and killed him after a quarrel in 1948. When the two families met, Gopal recognized Sharma family members and correctly identified individuals in photographs. He found his way unaided to Shaktipal's house and to the pharmaceutical manufacturing plant that Shaktipal had jointly inherited from his father.

Many recalled past-lives involve a premature, unexpected or violent death. In some cases, birthmarks, skin pigmentation and various birth-defects of the person recalling a past life seem to relate to the manner in which injuries were sustained during the former life, or to relate to the mode of death. For example, Haraldsson (2000) reported on the case of Purnima Ekanayake, the daughter of teachers in Bakamuna in northern Sri Lanka. In 1990, when she was three years old, she began to speak about a past life as a manufacturer of incense sticks. She did not give the name of her previous personality nor describe the mode of death, but gave sufficient details to identify Jinadasa Perera as the previous personality. When she met the family, she recognised individuals known to Perera, and noticed changes to manufacturing practices since Perera's death. Haraldsson acquired a copy of the autopsy for Perera. He had been run over by a bus which had driven diagonally across his chest, breaking his ribs on the left side and puncturing his lungs. Remarkably, Ekanayake had a cluster of birthmarks diagonally across her chest that matched this pattern. Stevenson (1997) gave extended consideration to birthmark cases, which he felt were particularly evidential of reincarnation.

4.3 Phenomena Suggesting Consciousness is Not Constrained Within Spacetime

A tenet of brain-based physicalist theories of consciousness is that information about the outside world can be acquired only via the known sensory systems of vision, hearing, touch, taste and smell. There is little scope within these theories to entertain the idea that, at least under certain circumstances, people may be able to acquire information from far away, or from the future or past without recourse to their normal senses or logical inference from available facts. However, reports suggest that ESP is very common across all communities around the world. For example, a representative sample survey of the United Kingdom (Roe, 2023) found that 30% believed that telepathy (mind to mind communication) is possible, and 31% that precognition (knowledge about the future) is possible. Personal experience is an important driver of belief, and 9% reported having experienced telepathy, while 13% had experienced precognition. Although this indicates that these experiences are not ubiquitous, these figures represent about 4.6 and 7 million people within the UK

as having experienced telepathy and precognition respectively. These belief levels are comparable with other surveys in the UK (Castro et al., 2014), US (Moore, 2005; Newport & Strausberg, 2001), and across Europe (Haraldsson & Houtkooper, 1991).

Analysis of people's accounts of their experiences has provided valuable insight into the situational and personal circumstances that seem to facilitate ESP in people who would not regard themselves as especially 'psychic'. Interestingly, this suggests that ESP may be facilitated by states of consciousness other than the waking state, such as when dreaming, experiencing hypnagogia/hypnopompia (the states between sleep and waking), while meditating, and so on (Rhine, 1962a, 1962b; Schouten, 1981). This pattern could have important implications for theories of consciousness that seek to accommodate ESP.

Of course, subjective reports of spontaneous psychic experiences could reflect selective reporting, misperception, miscognition, or even fraud in some cases, so it is difficult to be confident that the experiences occurred exactly as described. Therefore, experimental work is important to test whether phenomena persist even under conditions that control for factors that might indicate a normal explanation for a supposedly paranormal effect. This careful approach is evident in the early card guessing experiments of J.B. Rhine and colleagues, which produced highly statistically significant above-chance scoring (Beloff, 1993; Mauskopf & McVaugh, 1980; Rhine Feather & Ensrud, 2018).

More recently, researchers have focused on experimental methods that encourage participants to enter mild altered states of consciousness such as dreaming, and use of the 'ganzfeld', a technique that aims to shift attention internally and facilitates mental imagery (Roe, 2009). Comprehensive reviews of experimental research under these conditions show that it is possible to produce convincing evidence for ESP even under strict experimental controls (Storm et al., 2017; Storm & Tressoldi, 2020).

The success of this paradigm begs the question, what is it about these altered states of consciousness that is conducive for ESP? One suggestion is that it allows more ready access to material that is ordinarily unconscious. In evolutionary terms, such material may have beneficial effects for an organism without having to reach conscious awareness, for example by subtly nudging behaviour or decision-making, or causing material of which we are conscious to be associated with positive or negative emotional states. Support for this notion comes from experimental tests of unconscious psychic effects. This research takes two broad forms: direct measurement of physiological responses of which we might be unaware, and use of implicit psychic tasks that focus on subtle choices or behaviours.

The first of these has been investigated with a precognition experimental design in which participants are presented with randomly selected emotional images. These elicit a distinct emotional reaction that differentiates between arousing pictures (such as a threatening or erotic image) and neutral pictures. These experiments find that there are similar differences in physiological arousal in the period prior to the experiment software making a random selection of what type of image it will show next that is suggestive of precognition. These 'presentiment' effects are much smaller than the post-exposure reactions, but are still highly statistically significant, and have been replicated across over 50 experiments measuring a range of physiological responses (Duggan & Tressoldi, 2018; Mossbridge et al., 2012).

Information that is processed unconsciously can still affect a participant's behaviour or decision-making in subtle ways (e.g., Damasio, 2006; Dijksterhuis et al., 2006; but see also Newell & Shanks, 2014). This could extend to information that is only available by ESP, if that too is processed without conscious awareness. Researchers have tested for this by seeing whether performance at a task can

be facilitated or inhibited by information that is only available unconsciously, via ESP. The most well-known series of such experiments was initiated by Daryl Bem (2011). For example, a participant may complete a task in which they have to decide whether a presented image is emotionally positive or negative, registering their decision by pressing a left or right button. The time to respond to the image can be affected by presenting participants with a stimulus in such a way that it is not registered consciously (for example by presenting it very briefly or in degraded form). Where the prime is consistent with the appropriate choice (e.g., the word 'beautiful' before a positive picture) reaction times are faster than normal; where the prime is inconsistent (e.g., the word 'disgusting') reaction times are slower. Bem modified this standard psychology experiment into a test of precognition by presenting the prime word *after* the participant had seen and responded to the image. Nevertheless, consistent primes produced faster reaction times than inconsistent primes. A recent review of 90 similar studies suggests that, just as with those investigating presentiment, participants' behaviours are affected by psychic-mediated information acting at an unconscious level (Bem et al., 2016).

Taken as a whole, the findings from these and other areas of experimental parapsychology have been summarised by Cardeña (2018, p. 663), who concluded that,

> the evidence provides cumulative support for the reality of [psychic phenomena], which cannot be readily explained away by the quality of the studies, fraud, selective reporting, experimental or analytical incompetence, or other frequent criticisms. The evidence … is comparable to that for established phenomena in psychology and other disciplines.

It is difficult to conceive of how psychic phenomena such as those described above might be accommodated within physicalist theories with their suggestion that consciousness is confined to the skull, but perhaps this is more straightforward for theories that suggest consciousness is non-local in nature.

4.4 Phenomena Suggesting Consciousness Can Influence Aspects of the Physical World at a Distance

Experiments to test whether consciousness can directly influence the physical world (termed psychokinesis) have typically focused on whether our minds are able to influence matter in subtle ways, such as affecting the roll of dice, or a computer programmed to generate random streams of ones and zeroes. Most experiments are designed in this way rather than examining more large-scale mind-over-matter effects like moving objects or bending spoons because of the difficulty of ruling out non-psychic influences or fraud (although some have suggested that there is a great deal of evidence that large-scale psychokinesis can and does happen, for example in poltergeist cases and physical mediumship [Braude, 2015]).

In dice-rolling studies participants aim to have the dice land such that a favoured number, like six, appears face up. On different runs the favoured face will change, say, to a one, so that any inherent bias in the dice is controlled for. Mechanical devices have often been used to avoid the possibility that someone's throwing action might favour their chosen number. More recently, experiments have used computerised electronic random number generators (RNGs) because the random process is more protected from sources of bias, and it is possible to produce more engaging tasks for participants by connecting the RNG to a computer interface. RNGs continuously generate ones and zeroes in a manner that is analogous to flipping a coin to generate heads and tails. Researchers ask participants to try to cause the computer to generate more ones than zeroes, or vice versa. A review of 73 studies of psychokinesis that used dice (Radin & Ferrari, 1991) and a review of 380 studies that used random

number generators (Radin & Nelson, 2003) found that although the effect sizes are much smaller than those observed for the ESP phenomena discussed in the last section, outcomes were still statistically significant, suggesting that people can indeed mentally affect aspects of the physical world, at least in subtle ways.

Another way in which mental attention and intention might produce tangible effects in the physical world is via non-contact healing, where therapy is administered without the use of any physical mechanism, such as drugs or physiological manipulation (Krippner & Achterberg, 2014). Any effects from non-contact healing need to go beyond the trivial in terms of placebo or expectancy effects on the part of the client or patient. Clinical trials control for these explanations by randomising participants to healing or placebo treatment conditions and by adopting a double-blind methodology in which the patients themselves and those who interact with them do not know to which condition they have been allocated. For placebo conditions to be effective they must mimic the healing condition in all respects except for the treatment; for example, if the healing treatment involves the therapist making hand passes around the body of the patient then these movements need to be simulated in the placebo condition. Many different modes of healing are practised and have been tested for in clinical trials, including Reiki, Johrei, Therapeutic Touch, and the efficacy of prayer. The overall outcome from such studies gives a significantly better wellbeing outcome for participants in the healing condition than in the placebo condition, although the effect sizes are rather small (Roe, Sonnex & Roxburgh, 2015). A number of healing interventions have met evidence thresholds sufficient to be included in the UK's National Institute for Clinical Excellence (NICE) guidelines for treating a wide range of conditions (Ernst, 2010), and there is growing interest in biofield understandings of wellness (see Rubik et al., 2015, for a review).

Experiments have also taken place that focus on animals, plants, biological tissue and cell cultures, which rule out the effect of expectations among participants. These studies also show evidence of a significant improvement in the healing condition (Roe, Sonnex & Roxburgh, 2015).

4.5 Explanations of Disturbing Phenomena from Theories of Consciousness

Physicalist theories of consciousness depend on a functioning neural (or equivalent) system to give rise to subjective experience. From this perspective, it is difficult to see how reports of lucid and coherent consciousness could occur when that neural system is compromised (as in NDEs, terminal lucidity, or hydrocephalus), and so instead attempts are often made to challenge the degree to which the brain is actually compromised at the time of the reported experience. For reports of disembodied consciousness, as in mediumship or reincarnation cases, this is not a viable response and so instead doubts must be cast concerning whether the evidence for survival meets reasonable standards. Because of the weight of evidence for each of these phenomena, the onus is on proponents of physicalist theories to offer plausible (and empirically testable) counter explanations, although sadly these theorists have rarely engaged in this manner to date. There is also no obvious way in which claims for ESP and psychokinesis might be accounted for in a physicalist theory of consciousness, which may explain the general tendency to neglect reports of these kinds, despite their widespread occurrence and the existence of a robust scientific evidence base that suggests such phenomena can manifest under controlled conditions.

In theories of non-local consciousness, however, consciousness is not limited to the body. Whilst these theories accept that the brain and other organs are necessary to the normal functioning of consciousness whilst a person is alive, they suggest that this consciousness might be able to exist without the body in the moments just prior to death in NDEs or persist post-mortem to inhabit another

body as in cases of reincarnation. Such theories may also provide the means to explain how at times consciousness seems to transcend the usual limitations of a body/brain system in being able to acquire information not ordinarily available to the senses, or to bring about changes to the environment without the use of conventional motor systems.

The following sections provide an overview of how certain of the theorists of non-local consciousness we have included in our essay have tried to account for particular types of disturbing phenomena.

4.5.1 Consciousness is Quantum

A quantum mechanical approach to understanding consciousness such as proposed by the four such theories we consider in this essay (section 3.1) may provide the key to apparently non-local aspects of consciousness and help to move beyond the constraints of conventional thinking that still dominates most of mainstream science, namely that the world is essentially deterministic and classical in nature. That quantum mechanics (QM) is in some way directly related to consciousness, and that this consciousness is non-local in some respects, was anticipated by many of the founders of QM, including figures such as Niels Bohr, Werner Heisenberg, and Albert Einstein. Two influential psi researchers, Robert Jahn and Brenda Dunne (2012, p. 157), have pointed out that these implications were "certainly evident to those who first hammered out its physical and mathematical formalisms". Max Planck wrote that the "ideal clear-sightedness of the spiritual eye, in seeing behind the various processes of physical nature, is due exclusively to the fact that the nature of the physical world … is fashioned by the mind of the observer himself" (quoted by Jahn & Dunne, 2012, p. 159), and Wolfgang Pauli noted the 'conceptual coincidence' of ideas in QM and in consciousness that "appear independently both in physics and the unconscious" (quoted on pp. 188-189) as well as commenting on the seeming connections between QM and parapsychology.

In what ways can these quantum-based theories of consciousness account for disturbing phenomena? Stapp (section 3.1.1) argues that an individual's consciousness, or its 'abstract ego', is 'ontologically different' from the physical world and the physical body (Stapp, 2015). He suggests that a person's mind interacts with the physical world via the brain, with which it is 'specially tuned'. Given the distinction between mind and brain, he is willing to conceive that the mind might survive the death of the brain and "continue to have a stream of conscious experiences of some sort" (para. 2), such as is suggested by NDEs and mediumship. Regarding reincarnation, Stapp speculates that, after the death of its former body, an individual consciousness might be able to attach itself to another brain through its 'probing actions'. Stapp thus suggests that such survival of consciousness is possible within the "full mathematical machinery of orthodox quantum mechanics" (para. 5), invoking von Neumann's interpretation of QM:

> This freeing of the ego from its attachment to a unique brain is made logically possible … [because the] ego's dynamical connection to the physical is not bottom-up, with the physical controlling the mental, but is rather top-down, with the ontologically separate ego probing, and through nature's response influencing, the physical world. (para. 6)

In order to account for both spatially- and matter-related psychic phenomena (sections 4.3 & 4.4), Stapp proposes that, given certain psychological states, an individual's consciousness might be able to reach beyond the body, which is its normal sphere of influence, and cause a collapse of the quantum wave function in the wider physical world. In this way, the 'abstract ego' can access, or 'probe', distant information, and so exhibit telepathy or clairvoyance, or can directly affect distant physical matter, and so exhibit psychokinesis. Whilst he concedes that for his theory fully to account for psychic phenomena "many details would need to be developed in order to make a serious proposal" (para. 10), he states that,

> if the ego is indeed able to probe properties of physical systems other than its own nervous system, then [quantum effects] would allow various properties of such systems to be manipulated not only in the imagination of the probing agent, but, by virtue of … physical effects, … also in the external, physically described world itself. (Stapp, 2015, Clairvoyance and Macro-PK, para 9).

Faggin (section 3.1.2) argues that when someone is alive their associated consciousness unit must focus wholly on their body and physical environment in order to survive. This would explain the everyday experience of feeling encapsulated within a physical body and being limited to its capacities, while allowing for moments when consciousness seems more widely and deeply interconnected, reflecting its origin as part of universal quantum consciousness. After physical death, an individual's consciousness is no longer overwhelmed with physical information that arrives via the body and so can become more fully aware of universal quantum consciousness. This might account for features of the NDE such as the life-review, and could be consistent with approaches to cultivating ESP experiences that focus on reducing sensory and cognitive noise (e.g., Honorton, 1977). A useful development would be to attempt to specify when or how a consciousness unit might meet conditions that especially tune individual consciousnesses to particular brains, and this tuning can be disrupted in ways that might facilitate more expansive experiences.

Hameroff and Penrose (section 3.1.4) suggest, albeit tentatively, that the results of presentiment experiments might be related to the fact that quantum entanglements – a key part of their theory of the orchestration of consciousness – do not always follow conventional time ordering. Certain effects associated with their theory of quantum-mediated consciousness might therefore propagate into the past as well as into the future. In this sense conscious experiences could be "*temporally non-local* with backward time effects" (emphasis original, p. 64). Hence consciousness may "not … follow the normal rules of sequential time progression, so long as this does not lead to contradictions with external causality" (Hameroff & Penrose, 2014, p. 63). This shares some features with Bierman's (2010) Consciousness-Induced Restoration of Time-Symmetry theory, and a more systematic comparison of the two could be fruitful (cf. Escola-Gascón, 2024).

4.5.2 Consciousness is Hyperdimensional

We have already noted that disturbing phenomena is an intrinsic element of Bernard Carr's hyperdimensional theory (section 3.2.1). He regards much of the evidence for these to be compelling, and so part of his approach is to use the nature of these phenomena to clarify aspects of how a non-local consciousness might be constituted. By locating consciousness outside of spacetime he can treat some apparently non-local phenomena as a matter of perspective, much like the misleading perception of a three-dimensional object experienced in two-dimensional space. For example, in Carr's theory, the higher spatial dimensions in which conscious experiences take place may be shared to some extent, suggesting an explanation for telepathy. Arising from the fact of clairvoyance, he suggests that mental space might contain within it some form of our three-dimensional world, which would thereby enable people to access remotely information about the physical through mental higher-dimensional spaces (Carr, 2010b).

He also suggests that this higher dimensional physical space could accommodate an individual's consciousness when it no longer has a physical form. He terms this as a 'survival space', the travel to which through a dark tunnel is sometimes experienced by those who have had NDEs, and in which souls may be located between physical incarnations. This space would be equivalent to the 'bardo' or 'intermediate state' described in Buddhist traditions and which is sometimes described in accounts of reincarnation (Sharma & Tucker, 2004). In particular, Carr suggests that his theory may actually imply

survival after death because consciousness requires mental spaces that go beyond the confines of the physical body and occupy higher spatial dimensions, each with their own specious present. Hence, the "mind is 'larger' than the body and so may persist outside it and endure longer than it" (Carr, 2015, Survival, para. 1).

Carr's explanation of time-related psychic experiences makes particular use of the concept of the specious present. His argument is that because the specious present can be thought of as a granular unit of subjective time, there is no past or future at timescales below its duration. Hence the length of the normal specious present for humans between 0.03 to 0.1 seconds may be enough to accommodate a presentiment effect (although actual presentiment effects may show a response up to a second before the trigger event, e.g., Radin, 1997). This is because, from someone with a subjective perspective occupying the specious present, there is no time ordering in the experiment between the autonomic effect in question (such as pupil dilation) and the computer's selection of the image (Carr, 2015). Although Carr himself does not do so, it is possible to broaden this concept and speculate that precognition over much longer periods of time might be possible through significant extensions of the specious present, for example when in a dream-like state or other altered state of consciousness (Storm & Tressoldi, 2020).

4.5.3 Consciousness is Fields

Hennacy (2015; 2024a) suggests that her theory of non-local consciousness (section 3.3.1) may provide an explanation for two forms of disturbing phenomena – savantism and telepathy. As described in section 4.1.3, phenomena like savantism, where people demonstrate remarkable skills, is often associated with brain trauma. Hennacy notes that the bones in the savant Kim Peek's skull (where, according to her, there is a lining of magnetite) were found to be slightly separated because of his hydrocephalus. She suggests that this,

> would have created a disruption of his magnetic arrays. Perhaps this disruption could partially explain why some people with severe hydrocephalus have superior cognition; it could theoretically give them a greater access to memory stored in holographic informational fields. (Hennacy, 2024a, Navigation…, para. 9)

Hennacy's (2015) own research has identified certain autistic children who she claims are capable of performing telepathic tasks with those with whom they are emotionally bonded with very high levels of accuracy. In one test using multiple cameras and dividers deployed to counter accusations of fraud, Hennacy reports that one autistic child ('Hayley') was able to 'read the mind' of their therapist with an accuracy of 100% who was attempting mentally to transfer to her randomly-selected words and numbers with 12 digits.[5] Hennacy suggests that the autism condition itself may be responsible for such seemingly high psychic functioning. Autism is associated with brain functioning that also appears to equate with a reduction of mental noise, for example with impairments in the left hemisphere and less active frontal lobes (Hennacy, 2015), which could be consistent with findings in parapsychology that suggest that 'noise reduction' can facilitate psychic experiences (Storm & Tressoldi, 2020).

Hennacy also suggests a role for electromagnetism regarding telepathy. Most parapsychologists have dismissed this as a means for psychic information transfer because successful ESP experiments have been performed with participants in Faraday cages and at large distances, which effectively rules out

[5] It is clear given the unique needs of each autistic child that it is difficult to impose standardised tests, and, whilst the data have not yet, to our knowledge, been published in a peer reviewed journal, they are sufficiently intriguing to deserve further attention. However, given this seeming lack of peer review, some caution might be advisable regarding these striking findings.

most electromagnetic frequencies. However, these restrictions do not apply to Extremely Low Frequency (ELF) waves, which can pass through most physical structures and be transmitted over a very wide area. Hennacy speculates that the magnetite she suggests lines the skull (section 3.3.1) acts like an antenna that detects ELF waves. She writes,

> if we have an antenna capable of detecting ELF waves in the same frequency range as human brainwaves, the possibility of telepathy does not seem to be as big of a stretch. Nonetheless, if telepathy is real, why wouldn't more of us experience it? Perhaps, the magnetite lining our skulls can also serve as a shield to protect the privacy of our thoughts and limit potentially undesirable outside influences. (Hennacy, 2024a, Navigation…, para. 9)

Whilst superficially this sounds compelling, the issue with ELF waves is that they are very low resolution and have a low bandwidth for communicating information. Although ELF waves are used for communication with submarines, this requires extremely large transmission sites and they are typically only used for simple messages, such as signalling a need for the vessel to surface to receive more detailed communications by other means (Baker, 2013). These limitations may mitigate against the potential for them to be the host for psychic information such as might be conveyed using telepathy or clairvoyance/remote viewing.

Sheldrake proposes a different form of field as a basis to explain telepathy. He proposes that morphic fields are created because our consciousness fields exist outside of our bodies and so, in the right circumstances, the thoughts and feelings of one person might be accessible by another person (perhaps through morphic resonance). He argues that his theory suggests that telepathy should be more common among people and animals who have close emotional bonds, which would be anticipated through resonance of similarities in the morphic field. This theory has provided the basis of experiments he has performed on dogs that apparently know when their owners are coming home without recourse to any known physical cues (Sheldrake, 1999), and telephone telepathy, when people seem to be able to know who out of several close friends or relatives may be phoning them (Sheldrake & Smart, 2003). Sheldrake suggests that telepathy experiments among people or animals who know each other well are more likely to show higher effect sizes than experiments among people who are strangers because there is more resonance between those with close ties. He also proposes perceptual fields that extend outwards from brains that may explain why people seem to be able to 'feel' when someone is staring at them without recourse to normal senses (Sheldrake, 2003).

4.5.4 Consciousness is Everywhere

Velmans argues that his theory (section 3.4.2), in common with other similar theories, such as Goff's (section 3.4.1), implies the survival of consciousness beyond bodily death. This is because consciousness is said to be a fundamental aspect of the universe and, 'like energy', is always conserved, and cannot be created or destroyed. All individual manifestations of consciousness therefore must ultimately return to the unified consciousness from which they emerge "just as the waves of the ocean revert to the primal sea" (Velmans, 2021, p. 216). However, this does not necessarily imply the survival of a distinct individual personality, such as appears to persist in NDEs, reincarnation, and other supposed manifestations of deceased individuals. Velmans suggests that such a survival of individualised consciousness would,

> require primal forms of psychophysical differentiation within the ultimate ground of being [universal consciousness] that are both sufficiently well encapsulated to count as individuals and, internally, sufficiently well informationally integrated to operate as distinct subjects with individualized perspectives. (pp. 216-217)

4.5.5 Consciousness is All There Is

Bernardo Kastrup (section 3.5.1) also suggests that consciousness is not destroyed on physical death. Because consciousness is all there is, this consciousness cannot disappear just because the physical body with which a part of it identified is no more. However, Kastrup argues, in common with Velmans, that this does not necessarily entail the survival of an individualised personality. In fact, if an individual life is defined as a dissociation of consciousness as Kastrup maintains, then its dissolution on death implies that all of the accumulated memories, preferences, and dispositions of a person's lived experience are subsumed back into universal consciousness at that point. In other words, the individual personality dies when the physical body dies.

Instead, Kastrup (2021) suggests that what remains after bodily death is a continuation of a 'felt self'. He describes this as "what remains of a person's subjectivity when the person's particular mental contents are disregarded. It is pure I-ness, which feels exactly the same in each and every person (arguably even every living creature)" (p. 276). It is this felt self that is a constant during life and will remain constant during a person's dying and beyond. Our felt self is ultimately that of universal consciousness, which, according to Kastrup is all there is. He suggests that we "survive our bodily death in the only way that, in my view, really matters: our felt I-ness persists and probably witnesses the whole process of death" (p. 276).

Kastrup acknowledges that, superficially at least, this may not accord with the evidence for survival after death, which does seem to allow for the persistence of some aspects of an individual's personality, such as those seen in mediumship and reincarnation cases. Kastrup offers four potential resolutions to this question. Firstly, it is possible that a biological organism represents only the physical part of a dissociation and another 'hidden' part of a dissociated individual exists that can survive the death of its physical body, although Kastrup questions whether there is sufficient evidence for this possibility. Secondly, Kastrup points out that the nature of time is an as-yet unresolved question in modern physics, and "once the objective existence of irreducible linear time is called into question, all bets are off" (p. 277). This means that the idea of anything existing *after* death might have little meaning within a more enhanced and expansive understanding of time. Thirdly, because the intellectual aspects of our personality – such as what we have learned, our memories, and our preferences – are released into collective consciousness when our body dies, it is therefore possible that it is these that are being accessed by children 'remembering' past lives, or that are being detected in ADCs, or that are being accessed by trance mediums, and so on, and not the actual surviving individual personality associated with them, although this raises a number of problems associated with such a hypothesis (which is known as 'super psi', see Braude, 2003). Fourthly, it is possible that we misinterpret accounts of NDEs and other evidence of survival after death as pointing to the persistence of an individual personality when really this just shows the persistence of the 'felt self'.

With respect to other disturbing phenomena, Kastrup argues that since the universe is ultimately composed only of consciousness then people experience consciousness as individual and separated because they are a manifestation of dissociated consciousness. Hence, spatially-related psychic experiences or savantism may be explainable through an increase in the porosity of a person's individual boundaries, a softening of their dissociation, that enables access to elements of wider consciousness. For example, whilst our thoughts are normally private because we experience life as dissociated beings, if our mental boundaries become more permeable, then it may be possible for our thoughts to be shared between individuals. Kastrup notes that,

> many preliterate cultures have initiatory rituals whereby individuals are meant to discover great secrets and achieve great insight precisely by undergoing extreme physiological stress,

> such as exhaustive physical activity, fasting, poisoning, dehydration, overheating, or panic-inducing ceremonies. … It is conceivable that such rituals, by disrupting a person's normal physiology, weaken the dissociative boundary and thereby enable transcendent insight. (Kastrup, 2021, p. 274)

Kastrup suggests that if his theory related to spatially-related psychic experiences is correct, then a more thorough investigation of the neurophysiological bases for dissociation and its causes may lead to discovering reliable and controllable methods for purposefully inducing psychic experiences such as telepathy and clairvoyance.

Hoffman (section 3.5.2) is agnostic about the potential for survival after death, although he does suggest that it might be conceivable when considering his interface theory of perception, in the sense of a conscious agent (an individual) disengaging from that interface when the body dies. He compares life to playing a virtual reality game of beach volleyball where a player might remove his,

> headset and body suit. His avatar collapses onto the sand, inert and unresponsive. But he's fine. He just stepped out of the virtual-reality interface. When we die, do we simply slip out of the spacetime interface of homo sapiens? I don't know. (Hoffman, 2020b, p. 201)

4.6 Discussion

We have identified four classes of phenomena that seem to indicate that consciousness, at least under some circumstances, has non-local properties. Respectively, they suggest that consciousness is not dependent on brain activity, can exist in a disembodied form, is not constrained by conventional notions of space or time, and can influence aspects of the physical world at a distance without the mediation of motor systems. Theories that posit that consciousness is inherently non-local, or at least has non-local features, seem better placed to be able to accommodate these phenomena in their characterisations of the capacities of mind.

Examples of the disturbing phenomena we offer are rather a hodgepodge collection and the theories we have considered range from those that explicitly formulate accommodations for some – but by no means all – of the categories of phenomena, through to those that show little awareness of their occurrence or relevance. With just a few exceptions (Hameroff and Penrose, Carr, and Kastrup), explanations from theorists tend to be speculative and preliminary, having the quality of metaphysical statements rather than the explicitness of a scientific theory. Work is clearly needed in order to articulate the theories in more refined detail so as to identify their implications for the manifestation of disturbing phenomena; for example, in terms of the necessary or sufficient conditions for their occurrence, and their defining features and natural limits.

In some respects, the current position of consciousness research is reminiscent of the position of physics in 1900, when Lord Kelvin gave a lecture at the famous Royal Institution in London in which he presented two major anomalies in what was then the current understanding of physics. He termed these as 'clouds' on the horizon that could not be explained by existing theories of heat and light (Passon, 2021). These problems were eventually resolved through the development of special relativity and quantum mechanics, two frameworks that during the 20th century completely overturned the foundations of classical physics that had been established by Isaac Newton over 250 years previously. Together they revolutionised what we now know about how the world works.

In the 21st century there is mounting evidence of significant anomalies related to consciousness in the form of what we have termed disturbing phenomena. These might also be thought of as clouds on the

horizon for our understanding of consciousness. Physicalist theories seem unable to explain (or even seriously to entertain) these phenomena and seemingly have no option but to ignore them lest they undermine their fundamental premise. However, these clouds keep building and will only be dispersed by a radical change in perspective to a post-physicalist perspective (Walach, 2019) and the adoption of theories that allow for a non-local consciousness.

5 Comparative Analysis of Theories of Consciousness

We have now presented a review of physicalist theories (section 2), a review of theories of non-local consciousness (section 3), and considered how some of these theories address disturbing phenomena (section 4). In this section, we offer a comparative analysis of all 15 theories regarding three aspects: firstly, into which philosophical category they might be located; secondly, how well each addresses defining properties of consciousness; and thirdly, which features of a good scientific theory they embody. Our aim with the first of these aspects is to provide continuity with historical philosophical classifications of theories of consciousness. Our aim with the last two is to offer generalised conclusions about the state of play within and between physicalist and non-local consciousness theories based on these criteria, and so provide the context for the next section of our essay where we make suggestions for improving the rigour of theories of non-local consciousness.

Grading theories in table format is an approach that offers a brief, even terse, perspective of their relative merits. We fully acknowledge that others, perhaps especially the authors of the theories themselves, may disagree with some or all of our gradings and classifications. This may be as a result of honest disagreement or perhaps due to our own limited understandings of the theory in question. However, we present the material in this section to provide our overall view and summation of the state of consciousness research in general.

5.1 Philosophical Classifications

In traditional academic philosophy, theories of consciousness are usually considered as occupying five broad categories: physicalism, dualism, dual-aspect monism (sometimes known as panpsychism), idealism, and mysterianism (Mørch, 2023). Each of these has an extended lineage with famous philosophical and scientific figures among their advocates. Definitions of each of these categories are as follows:

- Physicalism: as we have described, this assumes that the physical world is all there is and that everything in the world, including consciousness, is ultimately subject to observation and measurement through the use of our senses and physical instruments.
- Dualism: this is the suggestion that there are two fundamentals to the universe – physical and mental. This viewpoint suggests either that there are two different types of substances, an idea most famously defended by the 17th century philosopher Rene Descartes, or two different physical and mental properties of a single fundamental substance of the universe.
- Dual-aspect monism: this proposes that the universe is fundamentally only one type of substance but that this substance has both physical and mental aspects. Dual-aspect monism is also known as ‘panpsychism’ where ‘pan’ means everything and ‘psychism’ means consciousness. In other words, consciousness, or at least some nascent form of consciousness, is everywhere and in everything.

- Idealism: this is the view that consciousness is all there is and that the physical world only exists as a manifestation of consciousness. The physical world can be thought of either as an illusion or as something that emerges from consciousness.
- Mysterianism: this viewpoint rejects all of these possibilities and suggests that it is not possible to explain consciousness because humans lack the capability to do so, perhaps because any explanation of consciousness ultimately comes from within consciousness itself meaning that it is ultimately inexplicable and therefore mysterious. For obvious reasons, this category is not included in our table.

Table 1 represents our view of the category (or categories) into which the theories of consciousness we have reviewed in this essay might be located.

Table 1.
Philosophical Classifications

Category	Theory of Consciousness	Physicalism	Dualism	Panpsychism	Idealism
Physicalist	2.1 Higher order theories	✓			
	2.1 Global workspace theories	✓			
	2.1 Re-entry/Predictive processing theories	✓			
	2.1 Integrated information theory	✓		✓	
Quantum	3.1.1 Stapp			✓	
	3.1.2 Faggin			✓	
	3.1.3 Kauffman & Radin		✓		
	3.1.4 Hameroff & Penrose			✓	
Hyperdimensional	3.2.1 Carr			✓	
Fields	3.3.1 Hennacy			✓	
	3.3.2 Sheldrake			✓	
Everywhere	3.4.1 Goff			✓	
	3.4.2 Velmans			✓	
All There Is	3.5.1 Kastrup				✓
	3.5.2 Hoffman				✓

5.2 Defining Properties of Consciousness

In section 1.1 we presented several defining properties or features of consciousness about which any effective theory of consciousness should provide either an adequate explanation or persuasive reasons for discounting. These properties are that,

- consciousness is experienced as private, personal, and unitary;
- consciousness includes subjective phenomenal features that seem to resist description in physical terms (i.e., qualia);
- consciousness incorporates distinct states of consciousness;

- consciousness likely offers an evolutionary selective advantage over functionally equivalent 'zombies' which do not have consciousness;
- we appear to exercise freedom of will in making meaningful conscious decisions in the world; and
- there is a differentiation between conscious entities and non-conscious entities.

In addition, in section 4 we presented,

- robust evidence for disturbing phenomena suggesting that consciousness does not depend on the brain, can exist in disembodied form, is not constrained by space or time, and can directly influence the physical world at a distance.

Table 2 represents our view on whether the theories of consciousness we have reviewed in this essay effectively address each of these properties of consciousness. Perhaps the most surprising observation is that there are significant omissions across all theories in attempting to account for the full range of features of consciousness. Given the importance of these features, it seems clear that there is a pressing need to significantly widen the scope of these theories if they are to have any claims to descriptive power or utility.

5.2.1 Physicalist Theories

None of the physicalist theories offers a convincing attempt to explain qualia. Yet out of all the essential features of consciousness we consider, the fact that we have subjective phenomenal experiences is widely regarded as the key question. Whilst this is the 'hard problem of consciousness' (Chalmers, 1995), it could be seen as nevertheless somewhat missing the point for this question to be sidelined by theories with a physicalist perspective. It is also the case that these theories struggle with the zombie problem, which questions why consciousness should exist at all if it is simply (at best) an epiphenomenon of the brain? Physicalist theories address this issue by effectively denying that it this is an issue that requires explanation. Regarding free will, most physicalist theories are content to argue that it simply cannot exist, despite wide commitment to the belief, primarily based on lived experience. A positive note for physicalist theories is their focus identifying criteria that could differentiate conscious from non-conscious entities. Finally, for physicalist theories, we note that as a group they cannot account for disturbing phenomena; indeed, the very nature of a physicalist theory precludes them, despite the overwhelming evidence for their existence, as we discussed in section 4.

5.2.2 Theories of Non-Local Consciousness

In general, theories of non-local consciousness perform much better than physicalist theories in accounting for disturbing phenomena, as expected. However, whilst some of these theories (e.g., Stapp) do not preclude disturbing phenomena, they do not necessarily actively incorporate them into their theory. In contrast, disturbing phenomena are an integral part of some of these theories of non-local consciousness (e.g., Carr, Hennacy, and Sheldrake). At the same time, however, these theories generally seem unable to account for the occurrence of distinct states of conscious, despite the importance that these have had for theory development in parapsychology. Theories of non-local consciousness also fare worse than physicalist theories in accounting for the differentiation between conscious and non-conscious entities, particularly where consciousness is a fundamental property of reality, and so there is a danger of homogenising consciousness in a way that obscures rather than clarifies the phenomenon.

5.2.2.1 Consciousness is Quantum

Quantum consciousness theories appear to be generally lacking in how they might account for the seeming unitariness of consciousness, and, as with the physicalist theories, they fail sufficiently to address the issue of qualia. However, the zombie problem and the nature of free will do seem to be accounted for by this approach, by rejecting the assumption that the neurophysiological system is causally and functionally closed. There seems an assumption from Stapp, and Kauffman and Radin that non-local consciousness supervenes on the physical world. Faggin's suggestion of autonomous and individual consciousness units has a similar effect. It is less certain how Hameroff and Penrose's theory might accommodate free will, although Hameroff (2012) does argue that involving quantum effects in an explanation for consciousness at least allows for its possibility.

5.2.2.2 Consciousness is Hyperdimensional

The strength of Carr's theory of consciousness is in the centrality given to disturbing phenomena. By proposing multiple dimensions he provides a means of explaining some of the anomalies that we experience from the perspective of four-dimensional spacetime, and suggests a solution to the problem of survival of consciousness after bodily death. This is incorporated into a more general theory of consciousness, which, while novel and intriguing, suffers from having little to say about other features of consciousness.

5.2.2.3 Consciousness is Fields

Whilst the strength of Hennacy's and Sheldrake's theories is their central focus on the accommodation of disturbing phenomena, neither appear to address sufficiently most of the other defining features of consciousness. Indeed, there is little attention given in either framework to any of the other key questions that we would expect to be addressed by an effective theory of consciousness.

5.2.2.4 Consciousness is Everywhere

Goff's and Velmans's theories are more comprehensive in their addressing the range of features of consciousness, although it is difficult to see how either might account for differentiations between states of consciousness. However, accounting for the zombie problem by virtue of consciousness being primary is a strength of these theories, which is perhaps not surprising given that their starting point, similar to those theories suggesting that consciousness is all there is, is that consciousness is a fundamental and ubiquitous aspect of the universe.

5.2.2.5 Consciousness is All There Is

For Kastrup and Hoffman, qualia is a fundamental property of consciousness, which is itself fundamental to the universe, and so this feature is straightforwardly accounted for by their theories. Indeed, for Hoffman, experiences (which might be equated with qualia), along with decisions (free will) form the basic starting principles for his theory. The consciousness-is-all-there-is perspective also essentially negates the zombie problem in a similar manner to Goff and Velmans' theories. However, it is more challenging for these theories to account for the differentiation of conscious states, and neither of them effectively address the full range of disturbing phenomena (although Kastrup's theory is more accommodating in this respect particularly with regard to telepathy and clairvoyance as a porosity in dissociative boundaries).

Table 2.
Defining Properties of Consciousness

Category	Theory of Consciousness	Private & Personal / Unitariness	Qualia	Differentiate Conscious States	Zombie Problem	Free Will	Differentiate Conscious Entities	Disturbing Phenomena
Physicalist	2.1 Higher order theories	✓		?			✓	
	2.1 Global workspace theories	✓		✓			✓	
	2.1 Re-entry/Predictive processing theories	?		?			✓	
	2.1 Integrated information theory	✓		✓	?	✓	✓	
Quantum	3.1.1 Stapp				✓	✓	?	?
	3.1.2 Faggin	?			✓	✓		?
	3.1.3 Kauffman & Radin				✓	✓		?
	3.1.4 Hameroff & Penrose		?	✓	?	?	✓	?
Hyperdimensional	3.2.1 Carr	?	?		?	?		✓
Fields	3.3.1 Hennacy	?			?			✓
	3.3.2 Sheldrake	?			?			✓
Everywhere	3.4.1 Goff	✓	?		✓	?	✓	
	3.4.2 Velmans	✓	?		✓	?	?	?
All There Is	3.5.1 Kastrup	✓	✓		✓	✓	✓	?
	3.5.2 Hoffman		✓		✓	✓	?	

Note. A tick (or check) indicates that the theory in question addresses this property, either to account for it, or to discount it. ? = unclear whether property is accounted for (or discounted) or explanation not plausible. Neither of these means that the theory does not address this feature.

5.3 Features of a Good Scientific Theory

In section 1.2 we suggested that a good scientific theory should meet the following characteristics in providing,

- parsimony: it can reduce a large set of diverse observations to a more manageable and coherent set of principles as efficiently and succinctly as possible;
- comprehensiveness: it can explain observations across as wide a range as possible;
- falsifiability: it can make predictions that might not be confirmed;
- unexpectedness: it should draw attention to neglected or unanticipated properties; and
- directiveness: it should be amenable to a programme of research.

Table 2 represents our view on whether the theories of consciousness we have reviewed in this essay effectively address each of these features of a good scientific theory.

It is immediately clear that physicalist theories satisfy more of these criteria. This is perhaps unsurprising given that these theories have emerged from within the scientific community with the

express intention of explaining a range of experimental and clinical data. It seems clear that they offer alternative ways of summarising more succinctly a range of observations, so meet the criterion for parsimony. They clearly have been able to make testable predictions that can sustain a programme of research, as evidenced by the extensive ConTraSt database (section 2.2), so are credited with being falsifiable and directive. However, we note that there has been a strong tendency towards confirmatory bias in the research design and analysis of that work so it is less clear whether the theories have been falsifiable in practice. We are hopeful that recent initiatives will help remedy this. It is debatable whether any of the physicalist theories is truly surprising, except in a narrow technical sense, and we have classified all physicalist theories as failing the comprehensive test on the grounds that they neglect defining features of consciousness such as qualia, and of course make no attempt to accommodate the disturbing phenomena that we have referred to in this essay.

Table 3.
Features of a Good Scientific Theory

Category	Theory of Consciousness	Parsimonious	Comprehensive	Falsifiability	Unexpectedness	Directive
Physicalist	2.1 Higher order theories	✓		✓	?	✓
	2.1 Global workspace theories	✓		✓	?	✓
	2.1 Re-entry/Predictive processing theories	✓		✓	?	✓
	2.1 Integrated information theory	✓		✓	?	✓
Quantum	3.1.1 Stapp	?				
	3.1.2 Faggin	?				
	3.1.3 Kauffman & Radin	?		?	?	?
	3.1.4 Hameroff & Penrose	?		✓	✓	✓
Hyperdimensional	3.2.1 Carr				?	?
Fields	3.3.1 Hennacy			✓	✓	✓
	3.3.2 Sheldrake	?		✓	✓	✓
Everywhere	3.4.1 Goff					
	3.4.2 Velmans					
All There Is	3.5.1 Kastrup	?		?		?
	3.5.2 Hoffman	✓	?	?	✓	✓

Note. A tick (or check) indicates that the theory in question has this property. ? = unclear whether theory has this property. Neither of these means that the theory does not have this feature.

Theories of non-local consciousness present a very different profile. None can be considered comprehensive in that they are very selective with respect to which features of consciousness they seek to explain, and neither can they be thought of as parsimonious since rather elaborate descriptions of theory accommodate very few observations of consciousness as experienced. It has been difficult to conceive of ways in which the descriptive statements about consciousness might be subject to any form of empirical test (either experimental or experiential), although we have given them the benefit of the doubt in suspecting that with further elucidation and refinement it might be possible to construct useful empirical statements. We are particularly encouraged by the ambitious aims of

Hoffman and colleagues. Their ambitious aims have not yet been achieved but initial findings have been encouraging and we look forward to further developments. Generally, it has been difficult to classify theories of non-local consciousness in terms of their falsifiability, in part because core concepts remain uncomfortably vague, but also because descriptions inhabit an abstract philosophical space rather than being operationalised in tangible real-world ways. However, a number of these theories do contain real innovation in the way they seek to describe consciousness, and there is some potential to develop these ideas in ways that could sustain programmes of empirical work. We make some suggestions of this sort in the next section.

6 Developing a Programme for Theories of Non-Local Consciousness

We have suggested that many theories of non-local consciousness lack the essential elements of a good scientific theory (section 5.3). In this section, we propose two avenues for strengthening theories of non-local consciousness through increasing their rigour (section 6.1) and in developing a more inclusive and integrative approach (section 6.2). We first argue that theorists should increase their focus on developing falsifiable predictions along with associated experimental tests. We have argued that disturbing phenomena (section 4) provide important clues regarding the nature of consciousness and so many such tests will likely be parapsychological in nature. The second avenue is to propose an integration or 'cross-fertilisation' between theories of consciousness (including both physicalist and non-local consciousness perspectives), and to build on approaches increasingly adopted by the community of physicalist theorists in how they are beginning to address the need for increased scientific rigour.

We stress that our proposals in this section are necessarily preliminary and are far from exhaustive. However, we hope that these suggestions might serve as a template and starting point for more sustained efforts by theorists of non-local consciousness to develop the robustness of their theories, ideally working in collaboration with others both within the field and perhaps also with theorists who may not agree that consciousness is non-local (if indeed such individuals are willing to engage).

6.1 Developing Theoretical Experiments

A significant proportion of the books, papers, and articles written by theorists of non-local consciousness is devoted to making the general case against physicalism. This often appears to be at the expense of presenting evidence in relation to their own theory alongside clear and falsifiable predictions. Whilst it is understandable that many non-local consciousness theorists focus on refuting the physicalist paradigm in the round given the dominance of physicalist views of consciousness, we suggest that in many cases this appears to be at the cost of these authors building theories with maximal explanatory and predictive power about specific aspects of their alternative models. In other words, in such theories meeting the demands of a good scientific theory (section 5.3).

Despite this apparent paucity of testable hypotheses amongst theories of non-local consciousness, there are some useful historical exemplars that could offer a guide to future work in this area, which we present below (section 6.1.1). We also offer two suggestions of our own (section 6.1.2).

6.1.1 Examples of Historical Experiments

6.1.1.1 Quantum or Universal Mind?

As we discussed in section 4, there is a significant body of evidence suggesting that, in some circumstances, it is possible to foresee aspects of the future that have yet to occur without recourse to the normal senses or by deduction. When this happens unconsciously, for example through pupil dilation or a change in heart rate, it is known as presentiment; when consciously, for example in a dream, it is known as precognition. Radin and Kauffman have proposed a theory that consciousness is fundamentally quantum in nature (section 3.1.3), in which case, they suggest,

> by virtue of [quantum mechanics'] spatial and temporal non-locality, experiences that reflect these effects [such as presentiment and precognition] may be viewed as not only plausible, but as expected to occur if the mind/brain relationship is also – even to a miniscule degree – quantum. (Kauffman & Radin, 2023, p. 4)

Radin (2023b) has hypothesised that the quantum feature of entanglement may be involved in presentiment and precognition phenomena. His suggestion is that such cases may occur through the mind becoming entangled with a future instantiation of itself through quantum effects, and it is this that is the root explanation of 'seeing the future'. However, this implies that the mind must experience this future in order for the quantum entanglement to be present. If Radin's hypothesis is correct, then it should not be possible for the mind to gain access to future information to which it is never exposed.

This hypothesis led Radin to include a hidden feature within a long-running public online psychic testing website, known as 'Got Psi?' (Institute of Noetic Sciences, n.d.). The hidden feature was that in some tests of precognition, the participant was provided with feedback of their target, and in other tests, they were not. Radin's expectation was that the participants who were given feedback about the target should perform better than those who were not because their minds would be accessing future information through quantum entanglement between their brain in the present with their brain in the future.

Since its inception in the mid-2000s, the 'Got Psi?' website has hosted 85 million trials involving 250,000 people (Radin, 2023b). This extremely large dataset allows for the detection of very subtle effects. Contrary to Radin's expectations, his results appear to show that feedback is not required for participants to demonstrate precognition, although the study is yet to be formally published and peer reviewed. Nevertheless, this appears to provide evidence for some other factors being involved in precognition other than, or in addition to, quantum entanglement effects. Radin's preliminary conclusion is that his findings may point to a model of mind that is universal or holographic rather than wholly quantum.

This experiment is an excellent example of an experiment with clear constraints and a falsifiable consciousness-related hypothesis (indeed, the hypothesis was falsified). We would suggest that more work is needed to clarify and confirm Radin's conclusions, perhaps using designs of precognition experiments with more in-depth approaches that offer larger effect sizes than the type of experiment deployed here (Cardeña, 2018).

Such future experiments might also usefully address the so-called 'intervention paradox' that is a feature of many precognitive experiences. This occurs when the person who is having such an experience "intervenes so as to prevent that foreseen event from happening, [and] the future event will no longer have been there to have caused the original precognitive experience of it" (Steinkamp, 1997, p. 411). Possible experiments to examine the effect of participants receiving feedback that

involve an element of participant choice regarding an intervention to alter the future may potentially also shed light on the nature of free will (section 1.1), as well as that of precognition.

6.1.1.2 Consciousness Collapses the Quantum Wave Function?

Another set of experiments testing consciousness-related quantum effects has been performed by Radin and colleagues. These experiments were designed to examine the role of the observer, sometimes suggested to collapse the quantum wave function in the Copenhagen interpretation. A similar role for consciousness is the basis for both Stapp's, and Kauffman and Radin's theories (sections 3.1.1 & 3.1.3). The series of experiments involved a modification of the double-slit experiment. (We referred to these studies briefly in section 3.1.3.) The participants were asked to direct their attention to the double-slit apparatus and attempt to influence the path of particles through mental intention alone. Six experiments testing a consciousness-causes-collapse hypothesis led to a combined 4.4-sigma effect in the predicted direction, suggesting this result was very unlikely to have occurred by chance alone (Radin et al., 2012). This effect was due to the involvement of experienced meditators – non-meditating participants did not achieve an effect that differed from chance in the original set of experiments. Eleven out of the 28 similar studies that have been reported to date, including those conducted by three independent groups, have also reported significant outcomes, where just one significant result would be expected by chance (Radin et al., 2019). Radin and his co-authors concluded that, "the results appear to be consistent with a consciousness-related interpretation of the quantum measurement problem" (Radin et al., 2012, p. 157).

The novelty of this set of experiments is in its modification of a standard experiment used to demonstrate quantum effects, which may help to make its findings more appealing to mainstream science. However, whilst the results were indeed consistent with theories suggesting that consciousness collapses the wave function, as the authors suggest, we would argue that they are far from a confirmation of this point. It could be that these results simply provide further evidence of psychokinetic effects, albeit at the level of individual particles. It is conceivable that these results could be explained using other interpretations of quantum mechanics where there is no pivotal role for an observer, for example where consciousness might influence what ultimately becomes physical reality in the transactional interpretation championed by Ruth Kastner (2015), or where consciousness might influence which of many parallel universes to occupy in the many-worlds interpretation (Everett, 1957).

We would suggest that more work is required to develop experiments with clearer and better-demarcated hypotheses if we are to confirm experimentally the purported central role of an observer in collapsing the wave function and thereby provide support for these particular quantum theories of consciousness. However, given the persistence of a large number of interpretations of quantum mechanics, all of which are consistent with over a century of experimental observations, we acknowledge that this is no small task.

6.1.1.3 Non-Physical Mind Influences the Future?

Henry Stapp has also proposed an experiment based on his theory of consciousness (section 3.1.1). In his theory, Stapp suggests that a non-physical mind brings its influence to bear on the physical world by causing a collapse of the indeterminate quantum wave function. This influence normally occurs in the brain and is implicated in the control of normal phenomena such as moving the body in physical activity; however, Stapp also suggests that this influence by the mind may sometimes extend beyond the body so as to cause psychokinetic effects on objects, or on people through non-contact healing.

Regarding precognition, Stapp (2015) argues that most explanations for this phenomenon invoke 'mysterious' actions by suggesting that the mind is somehow accessing information from the future, or that there is a retrocausal (backwards-in-time) effect, for example when showing a shocking image to a participant in a presentiment experiment somehow causes an increased dilation of their pupil in the past. His alternative hypothesis is that precognition arises not from any actual foreknowledge of the future or from retrocausal effects, but from the non-physical mind influencing quantum probabilities to make a future event more likely to happen. This is based on his suggestion that there are no truly random events in nature, despite this being an 'orthodox' interpretation of quantum mechanics.

He suggests that this hypothesis could be tested through an adaptation of a precognition experiment. Many such experiments (e.g., Bem, 2011) have the same general form. Firstly, the participant is offered a choice of actions, say choosing between two images on a screen. Their choice is recorded. Secondly, a computer generates a random number. Thirdly, based on this random number, the computer selects one of the actions. If the action chosen by the participant (step 1) is the same as the action selected by the computer (step 3), then the accumulation of such a result over the course of many trials and participants beyond what might be expected by chance is deemed as providing evidence in favour of a precognitive effect.

Stapp suggests inserting an additional step in this type of experiment for a subset of participants. This step would come after the computer has generated the random number (step 2) but before it has selected one of the actions based on this random number (step 3). It would involve the participant interacting in some way with the random number itself so as to cause a collapse of the quantum wave function at this point independent of the subsequent action taken by the computer. This would, Stapp (2015, The Principle of Sufficient Reason, para. 13) maintains, "eliminate the empirical retrocausal effect" and determine experimentally whether the non-physical mind can bias future quantum probabilities.

As with Radin's experiment related to precognition (section 6.1.1.1), this proposal has the advantages of a clear and testable hypothesis. Whilst it is the case that it would not provide definitive confirmation of an observer collapsing the wave function (as with Radin and colleagues' experiments related to the double-slit experiment [section 6.1.1.2]), the experiment could nevertheless advance our understanding of the exact nature of precognitive effects. However, we note that the exact design of this experiment is not clear from our reading of Stapp's description (Stapp, 2015, The Principle of Sufficient…, para.s 13-15) and so work would be needed in order to clarify a precise procedure.

6.1.1.4 Telepathy and Clairvoyance Use Electromagnetic Waves?

Ever since the late 19th century when 'disturbing' phenomena first began to be subjected to rigorous scientific investigation, there have been suggestions that certain aspects of these phenomena might be related to electromagnetism (Parsons, 2022). In particular, it was suggested that information transmission between people (telepathy) or from remote places (clairvoyance or remote viewing) might take place via the medium of electromagnetic waves, especially after electrical brain waves were successfully measured by the inventor of the EEG, Hans Berger. (Berger's initial interest in the topic of brain waves, incidentally, was prompted by his experiencing a case of apparent spontaneous telepathy with his sister [İnce et al., 2021].) As we have seen with Sheldrake's and Goff's theories (sections 3.3.2 & 3.4.1), some researchers still suggest that consciousness may be related to fields, albeit not necessarily electromagnetic.

Whilst the hypothesis associating psychic information with electromagnetic waves was seemingly disproved, in particular by Soviet researchers in the 1960s conducting successful ESP experiments with participants in Faraday cages and at great distances, both of which measures shield most electromagnetic waves, there remained the possibility that psychic signals might still be conveyed by Extremely Low Frequency (ELF) waves because they can pass through most physical structures and be transmitted over large distances. Diane Hennacy has proposed that ELF waves might be the conduit for psychic signals pointing out, in particular, that theta waves, which have been associated with psychic phenomena, are themselves ELF waves (sections 3.3.1 & 4.5.3).

In order to test the ELF-psychic information hypothesis, in the 1970s, Stephen Schwartz (1979) conducted successful remote viewing tests involving a participant on a submarine at a depth below the sea of 360m and at a distance of 800km. Whilst this was not deep and remote enough definitively to rule out the possibility that psychic information uses ELF waves, which would require a sea depth of at least 2000m, Schwartz nevertheless suggested that results were "highly suggestive, if preliminary" (p. 12). Unfortunately, there appear to have been no confirmatory studies. As Schwartz (2014, p. 31) more recently reflected: "it would be lovely to replicate [this experiment] but it seems unlikely to ever happen, given the scarcity of deep ocean submersibles, and their cost of operation. One thing is certain: no ELF communications expert could ever explain what happened".

Whilst Schwartz appears certain that ELF waves cannot be responsible for psychic information transfer, Hennacy's subsequent theory appears to suggest that more research may be required on this point. As we noted in section 4.5.3, ELF waves are extremely limited in their capacity to carry large amounts of information. Whilst this might suggest that ELF waves cannot be a conduit for psychic information, we are far from understanding the form in which psychic information is conveyed, and therefore it is conceivable that 'psychic formats' might embody highly efficient compression that would enable their transmission using ELF. This is of course highly speculative. Nevertheless, if we were able to replicate Schwartz's experiment at more significant depths of sea water, we would be able conclusively to dismiss or allow this possibility.

6.1.1.5 Morphic Fields Embody a Collective Memory?

Rupert Sheldrake (section 3.3.2) has proposed that hypothesised morphic fields might govern the creation and maintenance of the laws of nature, biological forms, and thoughts, memories, and behaviours. Fields affect individuals who resonate most closely with these fields. The strength of this resonance is related to how close any individual is with those who created or contributed to the morphic field, for example, progressively, the individual themselves, family members, members of an individual's community, their nation, and their species.

Sheldrake has suggested that such fields when related to physiology may be detectable in experiments. For example, people who have lost a limb through an accident often report that they retain the feeling of this limb as a phantom. Whilst they may no longer possess a physical arm or leg, they nevertheless still feel the shape of this limb where it used to be. Sheldrake (2002, p. 145) has proposed a test whereby an amputee would 'touch' with their phantom limb another person who is not able to see whether this phantom touch is taking place, for example because they are blindfolded or are shielded behind a door. If that person is able to feel this phantom touch more than would be expected by chance, this could be evidence for a detectable morphic field for the missing limb. In a small initial set of experiments conducted by Sheldrake, results were positive, although it is difficult to rule out telepathy as an alternative explanation (p. 262).

Sheldrake also suggests that morphic fields may be related to consciousness. Morphic fields may exist, for example, that hold thoughts, memories, and behaviours. Sheldrake suggests that these consciousness fields may be collective and would therefore allow for phenomena such as telepathy. As we have described (section 4.3), the evidence for telepathy and other forms of ESP is overwhelming; however, explanations for how telepathy might work are by no means confined to shared morphic fields.

Sheldrake also hypothesises that consciousness fields exist related to shared cultural or informational artefacts such as languages or the solutions for a daily newspaper's crossword puzzle. Vernon and Roe (2021, p. 130) describe how Sheldrake himself conducted a successful test of this hypothesis in the early 1980s in which he used,

> two pictures containing hidden images. According to Sheldrake, it should be easier for people to identify one of the hidden images once many others had seen it. This was achieved by presenting one of the images on television to approximately two million people in the UK. Subsequently Sheldrake found that the broadcast figure was more readily identified than a control figure when presented to individuals in countries outside of the UK (who presumably were not exposed to the broadcast).

One example of subsequent tests related to morphic fields for consciousness has been a series of experiments that have examined whether Western participants who have not previously encountered the Chinese language can learn genuine Chinese characters more easily than decoy Chinese characters that have been designed to be superficially realistic. This hypothesis is based on the suggestion that genuine Chinese characters that have been in use by large numbers of people for thousands of years should be associated with well-established morphic fields and therefore more easily learnt, whereas decoy Chinese characters created for the experiment should have very much weaker nascent morphic fields, and therefore be more difficult to recall. Findings from initial experiments along these lines appeared to support the morphic resonance hypothesis (Robbins & Roe, 2010), although a subsequent more rigorous design with more realistic decoys failed to repeat these positive results (Hitchman & Roe, 2011), and a still more recent attempt to replicate the experiment likewise failed to establish the predicted effect (Vernon & Roe, 2021).

The strongest examples of experimental designs to test Sheldrake's theory of morphic resonance relate to aspects of the theory where large numbers of individuals contribute to a common morphic field in a way that enables subsequent generations to be disposed towards specific behaviours or have access to collective information forms, such as was tested using Chinese language characters in the examples we describe. However, Sheldrake (2019, pp. 26-27) also proposes that "telepathy can be understood as an interaction between members of social groups within the morphic field of the group as a whole, which interconnects the individual[s]". In this case we would argue that it is much more difficult to see how morphic fields of consciousness could account for specific telepathic impressions or, say, mediumship communications. As we have seen, many other theories might account for such disturbing phenomena, and as such, we would argue that the strong evidence in favour of these phenomena offers no direct support for his theory over numerous other explanations. Therefore, more specific hypotheses are required to test these aspects of Sheldrake's theory.

However, the strength of Sheldrake's approach has often been in the development of clear and testable hypotheses along with precise suggestions for experiments (e.g., Sheldrake, 1994). The examples we offer in this section are indicative of this approach. Whilst the recent studies we cited related to morphic fields for language appear somewhat devastating for the theory, this is a strength of this aspect of his theoretical framework – that it is clearly falsifiable (section 5.3). We therefore

recommend that other theorists adopt a similarly rigorous approach to theory formation and hypothesis development.

6.1.2 Our Proposals for Research

6.1.2.1 Neurological Processes Contribute to Making Consciousness Private?

A challenge for some theories of non-local consciousness is to account for the subjective sense of being a discrete and separate unitary local consciousness when that consciousness is hypothesised to derive from or to be a field (e.g., Hennacy [3.3.1], Sheldrake [section 3.3.2]), or an aspect of a larger cosmic consciousness (e.g., Goff [section 3.4.1], Velmans [section 3.4.2]). For Kastrup (section 3.5.1) this separateness entails a form of dissociation in consciousness, while for Velmans it arises in a similar manner to how separate physical structures emerge. Goff and Velmans are explicit in describing how the individual's subjective experience as a discrete individual is shaped by the physical instantiation of consciousness in the form of neural activity. Effectively, brain functioning serves to maintain the perception of being an encapsulated private self. This is consistent with the notion, popularised by Aldous Huxley, that the brain serves as a 'reducing valve', or filter, for a larger consciousness whose primary function is severely to constrain the information that is available to conscious awareness so as to prioritise material that is immediately biologically useful (Marshall, 2021; Kelly et al., 2006). Certain practices that interfere with this inhibitory action are supposed, then, to allow an expansion of that phenomenal experience, such as spiritual practices or the effects of 'mind-expanding' psychedelic drugs. This theoretical perspective could inform our understanding of the effects of certain psychedelics and their implications for the ontology of reported experiences (see Swanson, 2018), and, we propose here, offer new insights regarding certain theories of non-local consciousness.

How might this hypothesised reducing valve manifest itself in neurological terms? Freedman et al. (2003, 2018) have developed a neurobiological model that focuses on the left medial middle frontal region of the brain that is assumed to play a role in self-awareness (Morin 2011). Freedman et al. (2018, 2024) have performed parapsychological tests on patients with brain lesions in this specific region, and on healthy participants with induced reversible brain lesion in the same region, using an inhibitory repetitive Transcranial Magnetic Stimulation (rTMS), which uses magnetic fields to stimulate nerve cells in the brain. In a psychokinesis task involving participants attempting to influence a random event generator, they found a significant effect both for those with brain injuries and for healthy participants given a reversible brain lesion induced using rTMS. They conclude that the left medial frontal lobe may act as a filter, inhibiting psychic phenomena via activation of the self-awareness mechanism (Freedman et al., 2018, 2024). When it was initially proposed, the reducing valve or filter theory concerned psychic experiences receiving information such as telepathy or clairvoyance, so it is surprising that Freedman and colleagues have so far focused on psychokinesis. An obvious next step would be to test this hypothesis on an ESP task using a protocol such as the ganzfeld and thus explore whether we can extend Freedman's findings to ESP.

The default mode network (DMN) could also be of interest to the reducing valve theory and hence to related theories of consciousness. Reduced blood flow and altered connectivity in the DMN has been shown to occur when individuals experience states of disturbed consciousness, such as through the use of LSD and psilocybin, and people experiencing such states have reported anomalous experiences (Mainieri et al., 2017). People with epilepsy diagnoses have been found to have abnormal DMN activity during seizures but also at other times (Fahoum et al., 2013; Parsons et al., 2020). They also report a range of mystical and parapsychological experiences (Spiers, Roe & Spencer, 2019). This provides a basis for exploring whether rTMS-induced reductions in DMN activity can stimulate such mystical and parapsychological experiences or lead to better performance in psychic tasks.

6.1.2.2 A Research Programme Testing Autistic Virtuosi?

Parapsychology has traditionally engaged with participants who do not claim to be particularly adept in terms of psychic ability. This approach relies on accumulating statistical evidence from large numbers of participants, usually resulting in relatively small aggregate effect sizes, albeit still comparable to effect sizes in other areas of psychology (Roe, 2021). However, there have been instances where the focus has been on what Steven Braude (2002) describes as 'virtuosi', namely those who seemingly have a particular marked psychic propensity. According to Braude (p. 5), "the evidence (as I see it) does in fact show that, on the whole, tests involving subjects selected by screening procedures yield better results than tests with randomly selected subjects".

One such area that appears to yield these (much) better results is in regards to autism. Hennacy has performed tests of autistic children who appear to exhibit exceptionally high levels of telepathic skills (section 4.5.3). As we noted, the reports of these tests of which we are aware from Hennacy (2015) lack certain methodological details and have not been subjected to peer review, and so we remain cautious regarding these apparently startling findings. However, if more rigorous confirmation is forthcoming, this could have major implications for the study of consciousness. Needless to say, there are very few reliable reports of non-autistic children or adults achieving such dramatically high levels of performance. Therefore, the association of autism with telepathy could potentially provide scope for a broad and in-depth programme of research with the aim of uncovering valuable insights into the nature of consciousness not possible with neurotypical participants. Such a programme might also investigate the implications of other claims of remarkable phenomenal features reported by autistic children regarding expanded consciousness (Dickens, 2024).

We suggest that such an approach could yield valuable insights regarding particular theories of consciousness. For example, experiments could be performed with telepathically-gifted autistic children regarding specific hypotheses arising from Hennacy's own theory (section 3.3.1), such as testing for ELF waves and holographic biofields, and a renewed and more parapsychologically-driven focus on the divergent features of autistic versus neuronormative brain functioning. Such a programme of research could also focus on hypotheses derived from theories of consciousness beyond Hennacy's. Particularly pertinent here may be Hameroff and Penrose's theory of microtubular wave function collapse (section 3.1.4), Carr's theory regarding higher spatial and temporal dimensions (section 3.2.1), and Kastrup's proposal regarding dissociation (section 3.5.1).

6.2 Developing an Inclusive Approach

We have suggested that there is a tendency among theorists of non-local consciousness to develop their theories in isolation without reference to wider developments. Hence we argue for a more inclusive approach, both through examining the potential for integrating aspects of other theories of consciousness, and in adopting some of the approaches used within the physicalist theory community.

6.2.1 Integrating Theories of Consciousness

In section 3 we examined perspectives that suggest that the nature of consciousness is quantum, hyperdimensional, field-like, everywhere, and fundamentally all there is. Whilst these approaches are superficially diverse and have different emphases, there may not necessarily be any contradiction between them. Therefore, it could be productive to explore how these models might meaningfully be integrated. A similar approach has been suggested by Michael Nahm (2022), who has argued that there needs to be a 'parapsychological synthesis' that integrates the various theories of psychic experiences into one overarching model with various sub-theories.

Perhaps the most promising starting point for integrating theories of non-local consciousness is with Hameroff and Penrose's theory (section 3.1.4). Although Hameroff and Penrose argue that the mechanism that they have identified is consciousness itself, it can equally be understood as providing a location and mechanism for a non-local consciousness to interact with neural processes, and hence would be a valuable addition to other theories of non-local consciousness. The theories that might most obviously gain from this integration are those that postulate a version of the Copenhagen interpretation, namely Stapp's (section 3.1.1) and Kauffman and Radin's (section 3.1.3) theories, which could conceivably co-opt Hameroff and Penrose's work to provide a neuroscientific mechanism for a wave function collapse caused by a non-local consciousness. Such an integration might also be extended to Carr's theory (3.2.1), which requires an interface for accessing higher (consciousness-containing) dimensions that could be satisfied by quantum processes in microtubules, although this is arguably a larger gap to be bridged than for quantum-based theories of consciousness. We suggest that this line of work may provide the opening for a range of new hypotheses related to these (and perhaps other) theories of non-local consciousness.

We argue that this idea of synthesising elements from different theories of consciousness should not be limited to those that suggest consciousness is non-local, but should also include insights related to the development of proposed physicalist theories of consciousness (section 2). Whilst the premise of theories of non-local consciousness is that consciousness is not produced by, or equivalent to, the brain, few would suggest that the brain is irrelevant to the consciousness of humans and other animals. Therefore, valuable insights arising from the work being conducted by neuroscientists and other researchers on physicalist theories of consciousness related to brain functioning could inform and enhance theories of non-local consciousness. We see this as building on Gertrude Schmeidler's (1986) suggestion of there being two distinct stages to the processing of psychic information. The first stage concerns how psychic information enters the organism, a question that is still very much unresolved but which should be accommodated by good theories of non-local consciousness. The second stage refers to how this information is processed thereafter to produce psychic experiences, and can be addressed using mainstream psychology and neuroscience. It is in this second stage where physicalist theories may be particularly insightful. An important example of such an approach is Jim Carpenter's First Sight model (Carpenter, 2004, 2005), which has led to testable hypotheses (e.g., Carpenter, Simmonds-Moore, Moore, & Carpenter, 2021).

By way of illustration, higher order theories (section 2.1) suggest that the prefrontal cortex might contain higher order representations of experiences. It is possible to hypothesise that these 'higher orders' might describe how the brain organises aspects of a non-local consciousness that is to be found beyond the brain. Similarly, global workspace theories (section 2.1) suggest that an attentional spotlight is equivalent to consciousness. Rather than being consciousness itself, in a non-physicalist model, perhaps this attentional spotlight is instead evidence of the workings of a non-local conscious agent acting upon the brain. As such, both of these physicalist approaches might provide clues as to the particular primary locations where a non-local consciousness may associate itself with the brain. For quantum theories, this could offer pointers related to where to look for quantum consciousness effects, such as the 'mental aspect' in Stapp's, and 'measurement' in Kauffman and Radin's theories (sections 3.1.1 & 3.1.3), quantum information in Faggin's theory (section 3.1.2), or particular instantiations of the wave function collapse or orchestration through entanglement in Hameroff and Penrose's theory (section 3.1.4). (Indeed, these might even be termed the 'quantum correlates of consciousness'.)

Regarding integrated information theory (IIT), Kastrup (2023) (section 3.5.1) has suggested that this approach may provide clues as to how an organism's consciousness dissociates within universal

consciousness. Whilst IIT is used by many physicalists to 'explain' how the brain might produce consciousness, Kastrup points out that those developing IIT use language that is "clearly and deliberately chosen so as to precisely avoid metaphysical commitments" (para. 4). In other words, IIT does not mandate necessarily that the brain is a required substrate for consciousness. Hence, IIT may explain dissociation in terms of "abstracted phi structures of information integration" (para. 14) that might be used not just to provide support for aspects of Kastrup's theory of consciousness, but also to provide a more rigorous account of the concept of dissociation for psychiatry more generally.

IIT might also be used to inform elements of Faggin's theory of consciousness (section 3.1.2) in which he suggests that consciousness combines physical information-experiences in various structures within the non-physical quantum world. One could suggest that these structures might be expressed in terms of information integration (phi). IIT may also help account for Faggin's suggestion that information subsystems lack an individual consciousness. Expressed from the perspective of IIT, it is possible that these subsystems may not have the requisite level of information integration. Hence, perhaps a greater level of precision in Faggin's exposition combined with an exploration of whether or how IIT may inform his theory may offer a greater level of rigour and – potentially – testable predictions specific to this particular theory of non-local consciousness.

Carr's theory (section 3.2.1) might be seen as offering a concrete example of applying a modern physics theory to a theory of non-local consciousness. To provide Carr's theory with more explanatory power, we could hypothesise which locations in the brain might provide an interface with the higher spatial dimensions that are the supposed location of mental spaces in his theory via his purported informational fields. The 2014 Nobel prize in medicine was awarded to researchers who discovered that the hippocampus region of the brain is involved in forming an internal map that is required for navigating both physical and mental spaces (Nobel Prize Outreach AB, 2014). As Hennacy (2024a) notes, it happens that the hippocampus is also the location of functions related to dreaming, meditation, and intuition (Wamsley, 2020). The conjunction of these two disparate functions within the same part of the brain provides intriguing circumstantial evidence that might underpin a neuroscientific perspective on the notion that consciousness exists in higher physical dimensions.

6.2.2 Adopting Innovative Approaches

As we noted in section 2.2, the effort to develop a physicalist theory of consciousness has involved innovations intended to integrate different approaches. This has included the formation of a database (ConTraSt) to compare and contrast experiments performed by different researchers. This database has been useful in providing the evidence for a critique of the current state-of-play within the physicalist field, for example in suggesting that predictions of various theories appear to be confirmed purely from researchers' methodological choices rather than the implicit value of these predictions, and that most findings are interpreted after the related experiments have been completed rather than making clear and falsifiable a priori predictions (Yaron et al., 2022).

There could be great value in establishing a similar database that collates the results of experiments testing aspects of theories of non-local consciousness. Whilst the contents of this database might currently be rather sparse (although we have attempted to initiate this process in section 6.1), such an effort could help orient researchers towards proposing specific testable predictions alongside associated experimental studies. However, funding and resourcing the building and maintenance of such a database may prove challenging, although there might be scope for engaging a prominent funder or funders of parapsychological research in this effort. However, we are mindful that this would likely divert funding away from consciousness-related studies themselves, so there would inevitably be a trade-off from embarking on such an initiative.

7 Summary Conclusion

In this essay we have sought to review and evaluate contemporary theories of non-local consciousness in order to establish their merit and to suggest ways in which they might be developed so as to deliver more sustained progress towards enhancing our understanding of this most familiar yet most mysterious phenomenon. We recognised that defining consciousness is far from straightforward, but it was important from the outset to have a clear sense as to what was to be explained, especially given that failure to specify one's key terms has been a significant source of confusion and misunderstanding. Drawing on philosophical understandings derived from first-person introspection we identified a number of essential characteristics that we felt would need to be acknowledged within any comprehensive theory of consciousness: namely that it is fundamentally subjective, private, personal, and unitary, and encompasses phenomenal features that seem to resist description in physical terms (i.e., qualia); it should account for the occurrence of different states of consciousness (e.g., associated with the waking state, sleep, the consumption of psychedelics, etc.); it should explain why we have conscious experiences at all when it is possible to conceive of a functionally equivalent zombie; it should explain (or persuasively discount) free will; and it should be able to differentiate conscious things from non-conscious things. We also clarified what our expectations were for any scientific theory, which highlighted properties of parsimony, comprehensiveness, falsifiability, unexpectedness, and directiveness.

For context, we considered four prominent physicalist theories of consciousness, higher-order theories, global workspace theories, re-entry and predictive processing theories, and integrated information theory. This was done in part to rehearse the application of the criteria we had identified, but also to establish what kinds of expectations were reasonable for a competent — even productive — theory of consciousness. We noted recent attempts to compare and evaluate these theories in ways that might provide useful guidelines for the current exercise. We drew attention to recent innovations in compiling a comprehensive comparative database of empirical work, and in encouraging adversarial collaborations as initiatives that could also be beneficial for those exploring non-local consciousness.

We identified a cross-sample of eleven non-local theories of consciousness that represent markedly different ways of conceptualising the phenomenon that we were able to categorise into five types in which consciousness is quantum, hyperdimensional, field-like, everywhere, and all there is. This was not intended to be a comprehensive survey, but instead focuses on some of the more promising or popular proposals. These theories were summarised in a way that drew attention to how — if at all — they accounted for the defining features of consciousness, and whether they satisfied the demands of a 'good' scientific theory.

We wanted to pay particular attention to how these theories accommodated a range of phenomena that are traditionally neglected by the academic mainstream but which in our view are particularly important to our understanding of the nature and capacities of consciousness. We labelled these 'disturbing phenomena' to acknowledge that they do not fit neatly into the physicalist worldview, but may be exactly the kinds of anomaly that are needed to provoke a change in perspective that could lead to important insights and meaningful advances in understanding. We assessed the degree to which theories of non-local consciousness, which in principle might be more able to accommodate such phenomena, demonstrated an awareness of such phenomena and a capacity to incorporate them into their scheme. After considering each theory in isolation, we offered a comparative analysis across all fifteen theories. The outcomes were generally disappointing, with theories of non-local consciousness generally being too vaguely specified to convincingly represent the core features of

consciousness that we had identified, and exhibiting only limited interest in describing real-world consequences that might provide a scientific basis for preferring one theory over another.

In seeking to remedy this situation, we offered suggestions for how theoretical experiments might be developed, re-interpreting existing lines of research derived particularly from parapsychology, and also suggesting novel approaches. In this way we hope to encourage theorists to think more empirically about their work, and encourage empiricists to think more theoretically about their work. In this way we hope that this essay can be a valuable aid and act as impetus for building rigour and relevance.

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