What would have to be true about the world?

On evidence for the possibility of consciousness surviving death

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August 2021

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Summary

Do we have an afterlife? This is one of the most enduring questions in philosophy. Throughout the ages, people have had experiences that suggest we do, but as science reveals more about the nature of the world, it increasingly seems to preclude the sort of beings and places present in typical afterlife narratives. Without some sort of theory to explain how an afterlife might be possible, many scientists assume that the experiences simply must have some other explanation. Consequently, the ensuing debate has largely stalled in discussions about the credibility of these experiences.

In our view, the history of science shows us that we have to move the focus of the debate if we are to make progress with this question. This calls for a new type of evidence and approach. To begin, we need a viable survival hypothesis that is detailed enough to be scientifically investigated and evaluated. Next, we need to investigate that hypothesis in search of a scientifically credible theory that explains how survival could be possible. Consequently, we hold that evidence for survival must include evidence for the plausibility of some such theory, not just evidence for the prevalence and credibility of the phenomena that suggest it.

Over the first part of our essay, we review experiences suggestive of survival and affirm that they warrant scientific investigation. We zero in on veridical cardiac arrest near-death experiences as the most credible, discriminating and useful phenomena for analysis.

In the second part, we draw on such experiences to develop a detailed survival hypothesis. We start by using insights from the metaphysics of science to identify the characteristics of scientific theories. These form guiderails for ensuring our hypothesis is amenable to scientific enquiry. Taking on board logical opportunities and immovable constraints, we arrive at a form of naturalistic non-Cartesian dualism that has the potential to account for the data while also adhering to the guiderails of science.

We proceed to address ten key questions that have historically been used to challenge the possibility of a dualistic yet naturalistic theory of survival. In each case we discuss what would have to be true about the world for the question to be addressed in a way that aligns with the experiences people have while being possible within a scientific worldview. We then present evidence and arguments to show that it is plausible for the world actually to be like that. This increases our confidence that the survival hypothesis is true.

From this starting point a more fruitful debate can emerge, one that could lead to a deeper understanding of our nature, our place in the natural world, and the significance of our afterlife.

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1. Evidence that matters

1.1. Our optimism about science

In 1169 the celebrated Spanish Islamic philosopher Ibn Rushd was on a visit to Marrakesh when he was invited to an audience with the caliph Abu Ya'qub Yusuf. The caliph wanted to ask him "the latest opinion of philosophers on the nature and composition of the sky". They must have had a satisfying discussion, because the caliph became Rushd's patron and friend for the rest of his life.

At the time, a question such as "why is the sky blue?" must have been considered a compelling but intractable mystery, with apparently no hope of a plausible practical route to resolution. After all, the sky seemed beyond reach even to investigate. And yet today scientists understand the nature of the sky very well.

Although the sky and the stars were everyday mysteries, one can see the same successes with spontaneous phenomena such as lightning or the aurora. Many phenomena that occur so unpredictably as to seem beyond study have in fact yielded their secrets to science.

We find the stories of emerging scientific breakthroughs to be both reassuring and thought-provoking. Reassuring, because they remind us that even phenomena that seem inaccessible to experimentation can be explored if we can find the right approach, and thought-provoking because we can often extract insights about the pitfalls and strategies for finding such new approaches. We are convinced that it is reasonable for scientists to approach seemingly intractable mysteries with optimism.

1.2. Science and the BICS question

Amongst the many such intractable questions that remain, perhaps the most intriguing and important one is whether human consciousness survives bodily death.

Belief in some kind of survival has been a dominant view in most of the earlier societies we know about, and it is still widespread cross-culturally today. It forms part of a wider belief system according to which the world has a spiritual dimension with which our destinies are intertwined, so it has historically been at the heart of how people find meaning in their existence and for their actions. Such meaning-making has been a prime driver of our social and cultural evolution.

However, most scientists are currently sceptical about the possibility of survival. Our scientific knowledge is extensive, coherent and appears to leave no room in the 'story of the real world' for such fundamentally different ideas as are typical in afterlife narratives. Even though some acknowledge substantial credible evidence *suggestive* of survival, it is not unreasonable that most scientists suspect the evidence cannot possibly mean what it seems to mean.

Not unreasonable, perhaps, but too quick. If we look at our knowledge of the *content* of the real world as captured by science, it does indeed seem impossible to accommodate survival while preserving the integrity of what we already know. However, if we look at our knowledge of the *nature* of the real world as derived from science by philosophers, there is nothing in principle to rule this out. This holds out the intriguing possibility that with appropriate philosophical underpinnings, we may find the right route to a scientific understanding of survival.

As a team comprising a philosopher (Rousseau) and a scientist (Billingham), we believe this insight opens an opportunity for resolving a key source of tension between science and society. The path to such an outcome is still uncertain, but after years in business and industry we have also come to appreciate the pragmatism needed to make progress under uncertainty. It is not assured that science can lead us to a new worldview that is both scientifically warranted and culturally meaningful. However, we need to acknowledge that science has emerged as our most reliable route to objective knowledge about the real world. Given its authority, for any new proposal to be credible it must be obtained through the same scientific methods that have produced science's scepticism. This is ultimately how science should work: striving to come closer to the truth while acknowledging the incompleteness of our knowledge and thus being open to challenge and revision in the face of new evidence or even new arguments based on familiar data.

Science has emerged as our most reliable route to objective knowledge about the real world

It is in this spirit that we approach the question framed in 2021 by the Bigelow Institute for Consciousness Studies (BICS): What is the best available evidence for the survival of human consciousness after permanent bodily death? The process of unpacking this question and the potential nuances involved in answering it will highlight many of the challenges and opportunities facing survival research today.

One key obstacle to progress is that the issue of survival has multiple dimensions that are interrelated in complex ways, and it even incorporates other unresolved mysteries in science such as the nature of consciousness. Many disciplines have contributions to make towards this issue. This means that anyone developing a survival claim has to be very careful in selecting evidence and determining when and how to bring it to bear on these dimensions. For such a complex situation, it is helpful to use a methodology designed to handle complexity. For this reason, we will draw on the emerging sciences of multi-disciplinarity, systems theory and complexity science to extend the worldview and methods of established science and philosophy along the route to our answer to the BICS question.

1.3. Kinds of evidence and their roles

The first thing to note about the BICS question is that it embeds a *survival hypothesis*, namely that human consciousness survives the permanent death of the body. The question calls for the best available evidence supporting this hypothesis.

It is helpful to be clear about the meaning of the term 'evidence' in this context. Hugh Gauch explains in his highly-regarded text on the scientific method:

> "Evidence is data that bear differentially on the credibilities of the hypotheses under consideration. Evidence must be admissible, being meaningful in view of the available presuppositions, and it must also be relevant, bearing differentially on the hypotheses" [1].

This definition makes it clear that evidence is data deployed for a particular purpose in a particular context. The context determines admissibility of any piece of evidence; as in a law court, BICS will accept credible witness testimony as evidence but not a claim from a religious text. The purpose of evidence is to help adjudicate between rival hypotheses, so for us, evidence is relevant if it appears to have a bearing on evaluating the survival hypothesis.

The survival data consists of the observations from many 'survival cases': detailed records relating to experiences people have reported as suggestive of survival. Data will only be admissible as evidence in the first place if it is trustworthy, so there must be an argument (in the sense of a chain of reasoning) for the credibility of the case from which it was drawn. There must also be an argument for its relevance, i.e. whether it is reasonable to interpret it as a survival case. Where there are sufficient survival cases exhibiting similar attributes, the data may be clustered into a class designated as a survival phenomenon, e.g. poltergeists. An argument may then be needed to extrapolate from the credibility of individual cases to the credibility of the phenomenon represented by that case class.

The data can then be deployed as evidence for the purpose of supporting the survival hypothesis. This is where things get a bit more complicated. What are the criteria by which hypotheses are evaluated? Unlike mathematics, in science a hypothesis cannot be proven, we can only argue for its plausibility. Plausibility lies on a spectrum between impossibility and truth, and our task is to find evidence and arguments that increase our confidence in the plausibility of the survival hypothesis.

A hypothesis cannot be proven, we can only argue for its plausibility

In its current form, the survival hypothesis is essentially an interpretation of the data. It generalises the common ground between survival phenomena, turning the collective interpretations of individual survival cases into a claim about something that generally occurs. It explains very little. It is inevitably superficial because of the variety and complexity of the data over which it is generalising.

The way to increase confidence in a scientific hypothesis is to show how its claim can fit into the existing framework of scientific knowledge about the world. We have to ask ourselves: What would have to be true about the world for this interpretation to be correct? The survival hypothesis as it stands is too underdeveloped for us to answer this yet. We will need to unpack it to expose its premises, entailments and the questions it raises. Each of these will stimulate us to add a small but plausible sub-hypothesis supported by evidence and arguments for its compatibility with science and consistency with the survival data. We may need to extend the knowledge frameworks of science or the metaphysics of science – the branch of philosophy seeking to understand the nature of reality and clarify the concepts needed to describe it. If we extend these, it should be in a principled way that preserves the integrity of what we already know.

A set of connected hypotheses that together add up to a more general one is known as a theory. We will effectively be developing a theory of survival, and the more plausible the theory is, the more plausible the survival hypothesis will become. By continuing to unpack the hypotheses and deploying evidence to respond to the questions raised, we gradually enrich the theory and improve the plausibility of the survival hypothesis.

We should expect then that the 'best' evidence will actually include many different sorts of 'best', each doing its own essential work. There will be the most credible evidence suggestive of survival, the most challenging to alternative hypotheses, the most insightful for theory building and the most discriminating for each claim in the theory. All these will play a role in arguments that increase our confidence in the plausibility of the BICS hypothesis.

The 'best' evidence will include many different sorts of 'best', each doing its own essential work

That said, we cannot pick the best evidence of each sort until we have a better idea of the explanatory hurdles facing the survival hypothesis, as well as those that the survival data sets up for rival hypotheses. The history of science shows us that things often turn out to be not quite the way they seem at face value, e.g. the sun does not actually go around the earth. Survival may turn out to be true but not in the way that we expect. We should not be surprised if at some point the data drives us to make unanticipated claims in the theory.

We will start this process by identifying the most credible evidence that is relevant to survival and extrapolate from that to the most credible phenomena. This will give us the confidence that there is an important scientific opportunity to pursue here. We will then move on to developing a plausible survival theory. But first, in the spirit of learning from the way in which this process has unfolded in the past, we will explore a recent example where science resisted controversial data for half a century before finally undergoing a rapid and significant theoretical shift.

1.4. A scientific revolution triggered by new data

What is now called "the revolution in geology" took place between the mid-1950s and the mid-1960s and resulted in the general acceptance of the theory of continental drift. The American philosopher of science Ronald Giere has used this example to illustrate the usefulness of his Cognitive Theory of Science, and although he had a different aim, his comprehensive analysis of the cognitive forces at work is revealing and relevant for our purpose. As he points out:

> "One particularly interesting fact about this episode is that the models of the new geology are similar to a model developed in the years 1911-15 and debated in scientific circles throughout the 1920s. This makes possible a fruitful comparison. What was different in the 1960s that might explain why there was a revolution then and not in the 1920s?" [2].

We see many parallels between the state of the evidence for continental drift in 1900 and that of survival research in 2020. It is helpful to understand some of the factors that triggered the change in geology, to extract lessons that might be valuable to us today.

Ever since the continents of Africa and South America were first mapped, their complimentary shape had invited speculation that they were once joined. However that idea was usually embedded in a model involving the sort of catastrophic change that is part of the biblical tradition, for example in the story of Noah's flood. Yet geologists at the time believed change to be gradual and localised. They saw the Earth as an originally molten sphere that had cooled by radiating heat into space according to well-known laws of physics. As it cooled it restructured internally and contracted, causing cracks to develop in the outer crust. Experiments seemed to confirm the theory. As a result, any forces in the crust were expected to be radial, gradually moving geological features up or down, never sideways. The 1929 president of the Geological Society of America, Bailey Willis, wrote in 1910: "The great ocean basins are permanent features of the earth's surface and they have existed where they now are with moderate changes of outline since the waters first gathered" [3] cited in [2]. As Giere puts it, "By 1900, anyone attempting to make a scientific case for large-scale lateral displacements of the continents was sure to face strong opposition".

However, unbeknownst to geophysicists, data was beginning to emerge in other disciplines that supported the idea that the continents were once joined. For example, rock strata and fossil records showed striking similarities on either side of the Atlantic. The first person to pull all this information together into a scientific hypothesis of gradual continental drift was an innovative scientist on the margins, the astronomer and atmospheric physicist Alfred Wegener, in 1910. Wegener was inspired by the movement of ice floes in the Arctic, where his primary work lay, but

took his evidence from many sources including geology, geophysics, paleontology, paleobotany and paleoclimatology.

His proposal met with strong resistance from geophysicists on the basis that "nowhere in or on the earth did there seem to be forces that could account for the lateral movement of continents". A 1926 symposium convened specifically to debate the hypothesis rejected it, presenting an array of arguments based in widely recognized facts and basic principles of physics, and concluding that "large-scale drift is *physically impossible*" (Giere's emphasis). In parallel, other scientists disputed the significance of the data itself, arguing that similarities are not improbable and the congruence in shapes was not exact. Other mechanisms were proposed that were more in line with the prevailing theory, to which many of the most vehement objectors do seem to have had deep-seated professional commitments.

"Large-scale continental drift is physically impossible"

Giere suggests a number of reasons why there was no revolution in thought in the 1920s. In terms of his theory of science, there were simply too few scientists for whom it seemed a satisfactory option. Amongst other things, the great centres of culture and learning were in the Northern hemisphere, whereas the most compelling geological data came from the home territory of Southern geologists. Having speculated that a different balance of power might have led to a different outcome, he takes care to dismiss any inference that science is merely a social construct:

> "It simply means that the decision of a scientific community is a function of the decisions of its members, and that the decisions of individuals are, in part, a function of their individual cognitive resources, some of which are derived from their experiences of the world" [2].

Wegener died prematurely in 1930 and, despite other proponents, the hypothesis sank into obscurity.

What changed after the Second World War was the emergence of new technology-driven sub-disciplines such as oceanography and paleo-magnetism. In the 1950s, it was discovered that rocks on either side of the mid-Atlantic ridges had symmetrical patterns of magnetic orientation. To account for it, the researchers suggested a basic model of seafloor spreading that was in essence fairly similar to the model proposed in the 1920s. Again, it attracted strong criticism. Counter-arguments were advanced, either to point to data not accounted for by the spreading model in its current form, or to suggest how the new evidence could be explained via patches to the traditional model, even ones that had previously been dismissed. Laying aside the many technical twists and turns, the clinching data came from surveys of other oceanic ridges, showing that similar symmetries occurred worldwide. This was a finding that no variation of the traditional model could possibly explain. Within a

few months of this discovery, seafloor spreading became the most satisfactory explanation for the majority of geologists, even in its basic form as a fairly lightweight theory.

1.5. Implications for survival research

There are two lessons to draw from the story at this point. Firstly, although the idea of continents moving laterally may have seemed a minor change to people faced with the wealth of observational data from either side of the Atlantic, in fact what was at stake was science's entire narrative of the origin and evolution of the earth. Resistance was not unreasonable.

What was at stake was science's entire narrative of the origin and evolution of the earth

Secondly, it is helpful to note that the decisive data was not more or better evidence for the phenomena that had triggered the initial controversy. That evidence – the correspondences across continents – was necessary but insufficient; no additional fossil records or rock strata comparisons would have made a difference. The situation was not even influenced by the presence of alternative theories. What mattered was evidence that supported a proposed *mechanism* and that could not be explained by the traditional theory. In other words, what eventually mattered was 'evidence *how*', not just 'evidence *that*'. It is only by discovering mechanisms that science can come to understand the world [4]–[6].

What eventually mattered was 'evidence how', not just 'evidence that'

It is for these reasons that we argue for a broader perspective on the available evidence for any survival hypothesis. The survival data is incompatible with the science community's current narrative about the nature of the world. The point of wielding survival evidence is to challenge and enhance that narrative, and this process has both evidential and social aspects. On the evidence side, it happens in steps that inch closer to a theory that includes a mechanism. Social inertia requires that mechanism to be able to explain data that cannot be explained by the mechanisms of existing theories. For this reason, anomalous or inexplicable data in various disciplines may turn out to be relevant. In fact, the data that is ultimately most indicative of the mechanism may not have any obvious relation to the survival phenomena themselves. Whichever way it turns out, the "best evidence" will not just be the most credible data that on the face of it most plainly suggests survival.

The story of continental drift shows that to trigger a change, we need to give scientists more and better cognitive resources, and this is not just more and better data but also concepts, arguments, models and theories grounded in data. As we've discussed, theory development involves enriching the theory iteratively by adding specifics that are scientifically plausible while ensuring the theory can still account

for the appearances of the phenomena. This balancing act requires close attention to the survival data as well as to existing theories and data from other disciplines. In fact, we will keep coming back to the survival data for clues as we add more detail to the emerging theory.

Of course none of this is worth attempting unless we are convinced that the data is in fact credible and relevant to the validity of the survival hypothesis. We will take a look at the arguments for this next.

2. Towards admissible survival data

2.1. Phenomena suggestive of survival

Since ancient times, people have had experiences that they have interpreted as interactions with the dead. Belief in the survival of human consciousness beyond bodily death is widespread across cultures today and has been so throughout known history, perhaps because of the widespread occurrence of experiences that suggest it. Also, the face-value interpretations of these experiences have been taken up into popular culture and religious models.

A large of body of records of such experiences has been amassed by researchers in a wide variety of fields: anthropology, religious studies, medicine, psychical research, and parapsychology, amongst others. These case reports are not rare and they take many forms. They have been categorised into phenomena depending on the context of the claimed interaction with the dead, whether as a waking visual experience (apparitions), during a dream (e.g. revenants), during a severe threat to life (near-death experiences), through a 3rd party in a séance (mediumship), through physical disturbances (poltergeists), via their apparent control of another person's body (possession) or through claimed memories of a past life (reincarnation).[1]

By the late 1800s, it was becoming increasingly clear that the notion of survival was at odds with the emerging scientific worldview. Scientifically minded researchers were raising questions about the plausibility of the survival concept. Various organisations started up to conduct scientific research into the survival data, the first being the Society for Psychical Research (SPR), London, founded in 1882 by a group of scholars including philosophers and scientists of very high standing in academia and society.

The evolution of focus in the scientific research into this topic is interesting, because it reflects the evolution of theorising about the meaning of the survival data. As the thinking changed, so too did the types of data researchers sought, and so changed the requirements for evidence of survival.

As survival thinking changed, so did the types of data researchers sought

[1] For an introductory bibliography of case studies, see [7, pp. 645–651]

The SPR's initial step was to select cases for a curated collection of data suggestive of survival. Selection hinges on two factors. Firstly, are the reports of the experiences *credible*: are they sincerely and truthfully reported rather than faked, embellished or incomplete, and not significantly distorted by negative cognitive factors such as hallucinations, malobservations, delusions or mental illness? Secondly, is the data *relevant:* are the survivalist interpretations of the percipients reasonable or could they be wishful thinking, fantasy, bereavement coping strategies or cultural constructions?

The first line of research focused on credibility. Thousands of reports were solicited and assessed individually through direct contact with percipients and witnesses. Although many cases were rejected, a large number were judged acceptable for the collection. In the first two decades after its founding, SPR researchers published books and papers totalling tens of thousands of pages. The credibility of the researchers, the high quality of their research and the consistency of the phenomena over large sample sizes all set up a strong case for the credibility of their collection of survival data [8]–[10].

A second line of research investigated the relevance of the survival data to the notion of survival. An initial strategy was to establish relevance by looking for cases in which the 'deceased person' conveyed information that could later be verified as both true and unlikely to have come from a living person. Cases with this characteristic come in at least three types. In one type, the information was known only to the deceased person, such as where they hid money or a will. In another, the information was also known by the experiencer but relayed via a third party such as a medium who could not normally have known it, such as details of a significant life event. In a third, the information was relayed via a medium and both the information and the apparent communicator were unknown to anyone present, yet could be verified by subsequent research. Many credible veridical cases were identified and published, giving strong support to the reasonableness of a survivalist interpretation of this data [7], [10].

Credibility and relevance simply allow cases to be admissible as evidence

However, credibility and relevance simply allow the cases to be classified as survival data, i.e. to be admissible as evidence accompanying an argument in support of some hypotheses about the meaning of the data. In parallel, other SPR research had been ongoing, and this ended up suggesting a challenger hypothesis to the survival one. This research centred on the question of whether the mind has capabilities beyond those of the body, as opposed to the then emerging view of it as a wholly physical phenomenon. This interest was not directly driven by the survival question, but it was seen as connected because the survival hypothesis entails that a person is in some sense more than their physical body.

The initial approach was to investigate whether minds have powers of observation or influence other than through the known bodily channels. Researchers identified credible cases of people apparently obtaining information about a remote location (clairvoyance or remote viewing), from another mind (telepathy) or another time (precognition, retrocognition), or exerting influence on another thing (psychokinesis) or on another person (e.g. psychic healing). These cases suggested that people have abilities beyond the capabilities of the physical body [7], [10]–[12].

Early researchers named these capabilities 'psychic' powers from the Greek for 'mental', to distinguish them from the known physical means of observation and influence. It should be emphasized that from the outset psychical researchers were committed to the idea that psychic powers could be understood scientifically, and for this reason they argued that psychic powers were 'supernormal' (out of the ordinary) but not supernatural (above the laws of nature) [13]. The more neutral term 'psi' was later coined for these capabilities.

As early as 1890, a Russian psychical researcher based in Germany, Alexander Aksakof, pointed out that if psychic powers existed in living people, it would open up the possibility that all the phenomena of mediumship could be produced by means of those psychic powers rather than by 'spirits'. Aksakof named this psychic power 'animus' after the Latin for 'soul'. This created a division between what was termed the animistic and the spiritistic interpretations of the survival data. Aksakof's 'animus' would in 1970 be renamed as 'superpsi' [14] and in 2009 again, more precisely, as 'living agent psi' (LAP) [15].

The naming 'superpsi' created an unfortunate diversion because it implied, as many survivalists later tried to argue, that the living agent psi required to explain survival data is of an implausibly powerful kind for which there is no independent evidence. More recently however, philosophers Stephen Braude and Michael Sudduth provided in-depth analyses of the living agent psi hypothesis and showed compellingly that the psi required for it is not in principle more powerful or more complex than the psi that survivalists must lay claim to anyway [15]–[17].

The living agent psi hypothesis clearly presented a serious alternative to the survival hypothesis [9], [16]. It was considered more parsimonious because it accepted the existence of psi but did not require non-physical entities such as souls or spirits. It remained open whether psi might one day be understood scientifically without invoking any non-physical elements. Without understanding its basis, its scope and limits were unknown. Neither interpretation could be decisively ruled out.

The result of the impasse was to convince many researchers that the survival question could not be usefully investigated until the nature and limits of psi were better understood [18], [19]. From the 1940s onwards, the focus thus shifted to psi research and direct survival research all but died out in university settings. A notable exception was the research group at the University of Virginia [20]. The core of their innovative research involved the study of near death experiences and cases suggestive of reincarnation, although they also investigated mediumship, apparitions

and deathbed experiences. This research did not resolve the impasse [21] but generated important survival data. In parallel, research into non-survival-related psi continued in university settings under the heading of 'parapsychology', but so far the results of controlled experiments remain controversial and the effects rather mild compared with the spontaneous case data, bringing us no closer to a resolution.

Ironically, the potential for a resolution emerged from a new line of enquiry into the same question that had cast the original doubt: whether mental capabilities go beyond those of the body. In this approach, researchers looked for evidence of mental competence under conditions of compromised brain functioning. Credible phenomena that were identified include dementia sufferers regaining their normal faculties just before death (terminal lucidity) [22]–[24], vivid and sometimes veridical experiences during cardiac arrest (a narrow subset of near-death experiences)[25], [26], and asymmetries between cognitive and brain development (e.g. high-functioning people with hydranencephaly) [27]. Collectively, these phenomena suggest that that the functioning of the mind does not depend wholly on the functioning of the brain.

All of these phenomena are relevant to the survival question but, in our view, the most credible data suggestive of survival is found in veridical cardiac arrest near-death experiences. In fact, within this collection are also cases that provide the most significant challenges both to mainstream science's view on the consciousness-brain relationship and to the plausibility of the living agent psi hypothesis as an interpretation of the survival data. It is therefore worth describing these in a little more detail, to explain their significance.

2.2. The most credible phenomena

Near Death Experiences (NDEs) have been studied by academics ever since Raymond Moody's book *Life after Life* was published in 1975 [28]. However, it is only in fairly recent times that researchers have encountered cases that occurred during cardiac arrest. This is probably because, unlike a heart attack, cardiac arrest is such a physically brutal event that recovery has historically been rare. Even with modern techniques and equipment, only about 10% of people who suffer a cardiac arrest survive it [29]–[31]. Of these, some 10-20% report having had a near-death experience [32]–[35].

The phenomenology of cardiac arrest NDEs is similar to that of the broader NDE category. Patients typically report one or more portions of the following narrative: an out-of-body experience in the ordinary world, a transition to some other realm, encounters with a being of light or a spirit guide, a life review, encounters with deceased relatives, a barrier or limit, and a decision to return to the body [28], [36]. In many reported experiences, the sense of individuality evident in parts of the above narrative is replaced by a sense of oneness with everything (mystical unitive experiences). The other-worldly realm may also contain spirit beings and landscapes. The different kinds of experiences can occur simultaneously or sequentially.

Tens of thousands of NDE cases have been investigated and recorded by scholarly researchers. Four important case archives have been established (at the Religious Experience Research Centre based at the University of Wales Trinity Saint David, the Division of Personality Studies at the University of Virginia, the Near-Death Research Foundation and the International Association of Near-Death Studies) and these collectively hold more than 7,000 case reports. The field is attracting increasing academic attention; by 2005 more than 65 research studies involving nearly 3,500 NDE experiencers had been published [37].

This body of evidence will be significant for our thinking, but for the moment we will focus on the documented NDE cases that occurred during cardiac arrest. By 2007, more than a hundred had been reported in the scholarly literature [7, p. 418], and many more have been reported since.

Cardiac arrest leads within 10-20 seconds to clinical death, a state characterised by the absence of any heartbeat, breathing, detectable electrical activity in the brain, or brain-stem reflexes [38], [39]. Without medical intervention (or very cold temperatures), irreversible brain damage begins within 5 minutes [40], and actual death occurs within 10 minutes [40], [41]. Those who survive a cardiac arrest were often already in hospital when it occurred so they could receive the necessary attention extremely quickly. For this reason, cardiac arrest NDEs are typically reported in an intensive hospital setting with comprehensive medical records, sometimes with instrumented data measured throughout the experience, and with credible, medically qualified witnesses.

Any suggestion that people have rich and vivid experiences while they are clinically dead would raise a clear challenge for mainstream neuro-psychiatry. Complex narrative thought is associated with considerable electrical activity in the brain, whereas with lower levels of electrical activity thoughts tend to be confused [38]. During cardiac arrest there is no detectable activity at all, even in the deep structures of the brain, as is known from animal studies [38]. Yet people say that their thoughts felt exceptionally clear, and the coherent, detailed narratives they relay correlate compellingly with those of other experiencers (NDErs). Cardiac arrest NDEs challenge the notion that consciousness is solely a by-product of brain processes.

The initial neuroscience argument against this conclusion was that the reported experience does not happen during the cardiac arrest but is actually a dream or confabulation generated as part of the brain waking up. In this model, the consistency of the experiences only reflects a consistency in the architecture of the human brain. The objection ultimately founders against a particular subset of these experiences called *veridical cardiac arrest NDEs*. In these cases, patients report events that happened during their NDE which they claim to have witnessed from an out-of-body vantage point and which are later verified to have occurred as they reported. In the most striking cases, the event was a particularly unusual incident. Dozens of veridical

NDE cases under cardiac arrest have been published in the scholarly literature [7], [25], [42], [43].

An example case was reported by a male nurse who was the head nurse of a UK cardiac ward at the time it occurred. An elderly man suffered a cardiac arrest in the ward and had to be resuscitated. While rushing in, the nurse dropped the kidney tray holding the syringe full of cardio stimulants. As he quickly prepared another syringe the attending physician chided him for his clumsiness. The patient responded well and was transferred to intensive care. When he transferred back to the ward three days later, he told the nurse that he had witnessed his resuscitation from a vantage point above the bed. He mentioned the incident with the syringe, the doctor's chiding, and even knew that the fallen syringe had rolled under a bedside locker. The nurse reported that patients had regularly told him about their NDEs and that he had found this one particularly striking ([44], cited in [26]).

For more than ten further veridical NDE cases in situations where the brain was severely compromised, see [25], [26], [33]. Some of these have withstood considerable public debate, with exchanges published in book chapters and appendices as well as on blogs and discussion groups, e.g. reflected in [26, pp. 245–318], [43], [45]–[51].

Even without unusual incidents, patient reports of what they perceived during their cardiac arrest and resuscitation are remarkably accurate: one review showed that 90% of reports contained no errors [25]. In contrast, cardiac arrest survivors who did not report an NDE could not accurately guess what had happened [52]. This rules out the suggestion that the reports represented lucky guesses. Overall, veridical cardiac arrest NDEs seem to provide a time stamp that anchors the experience to the period of clinical death.

In a further variation on the out-of-body phase of NDEs, patients sometimes correctly report incidents that occurred in other rooms or even more remote locations well beyond the reach of the body's senses [53]–[56]. This eliminates any possible suggestion of sensory leakage or the resurfacing of long forgotten memories of medical procedures.

In general, if during a cardiac arrest NDE a person accurately observes their surroundings from a vantage point outside their body, they cannot be using their normal physical channels of observation. This means they must be using some form of psi to obtain the information.

When viewed from a traditional neurological perspective, these cases represent a significant challenge because they provide evidence that consciousness, identity, memory and perception can function while the body is clinically dead. This is inexplicable within a standard physicalist model.

However, if psi capability is acknowledged to be real, then it can fairly be asked whether living-agent psi could be responsible. Psi capabilities include an apparent ability to obtain information about the future (precognition), the past (retrocognition), and the remote present (clairvoyance). Taking such capabilities into account, both Braude and Sudduth have suggested that the experiences might in fact

not have been contemporaneous with the cardiac arrest, instead being psychically informed confabulations. Braude went further and suggested that perhaps there is some undetectably low brain activity during the cardiac arrest and living agent psi (LAP) can operate under these conditions, so the experience could be explained even if contemporaneous [15]–[17].

The arguments involved many complexities and nuances, so neither Braude nor Sudduth claimed them to be decisive. They only claimed, quite fairly, that LAP represented a more rationally careful way to think about such a potentially important phenomenon. Survivalists were generally unconvinced. Most focused on trying to dismiss the hypothesis as requiring unrealistically complex or powerful LAP (e.g. [57], [58]). Others accepted the impasse and continued to look for more and better cases suggestive of survival [21], [59]. A debate ensued that only seemed to confirm the impasse further.

However, in 2012, one of us (Rousseau, in [60]) presented a counter-argument based on evidence that stands against the basic *premises* of the LAP hypothesis, which were clearly laid out by Braude [16]. This is a far more effective way of challenging a hypothesis. The argument was published in the Journal of Scientific Exploration, of which Braude is the long-term Editor-in-Chief and Sudduth was at the time an Associate Editor. In our view, this argument renders the LAP hypothesis so implausible as to be deprioritised for our consideration. Others have defended the same view, e.g. [26]. Amongst some researchers, however, the debate continues as though the impasse still exists.

A brief overview of this argument will be helpful here as it introduces new types of NDE data and underscores the plausibility of the survival hypothesis as an interpretation of the survival data.

2.3. The most relevant phenomena

The living agent psi hypothesis is grounded in an assumption that the use and focus of psi faculties is determined by the agent's needs and interests, just like any other cognitive faculty. For this reason, Braude has characterised it as the "motivated psi hypothesis" [16]. In the case of veridical cardiac arrest NDEs, these motivations are taken to be fear of death and need for reassurance that death not the end. Under the LAP hypothesis, the out-of-body experience is thus an example of a psychological coping mechanism, albeit unusual for the fact that it involves psychic functioning. The veridical information is obtained precognitively and woven into a memory immediately before the onset of unconsciousness, thus creating the illusion of it being contemporaneous with the cardiac arrest.

Rousseau argued that there is a range of NDE cases where the LAP hypothesis simply does not fit the facts. There are cases of NDEs in children too young to understand the concept of death and therefore unlikely to have that motivation. It has been suggested that they might know their parents' fears about them and wish to

assuage them. However this does not fit with the NDEs of preverbal children, who cannot yet understand their parents' needs and fears.

Surprisingly, there are such cases. An example is the case of Mark Bots, who spontaneously reported at age 5 years an NDE he had during a cardiac arrest at age 9 months. He reported seeing the doctors and nurses working on him and his grandmother wandering around the hospital corridors looking for his mother, as his family later confirmed did happen [61]. For 15 other cases of NDEs in preverbal children see [61]–[69]. Phenomenologically the NDEs of preverbal children are very similar to NDEs generally [70].

Amongst pre and post verbal children about 3% of NDEs are frightening and can lead to lifelong trauma. As neither parent nor child could be motivated to produce such an effect, the LAP hypothesis fails here too. Similarly challenging are the cases of NDEs in committed atheists, who are just as likely to have them as non-atheists and agnostics.

These cases and arguments undermine the LAP hypothesis' claim that NDEs do not occur simultaneously with the events they report. This in turn defuses its contention that consciousness still depends on brain activity in an essential way. These are important findings in terms of the credibility and relevance of NDEs to the survival question.

However, Braude anticipated that such cases might be found. He pointed out that even if veridical experiences could be shown to happen in the total absence of brain activity, it would only imply that consciousness can be sustained beyond clinical death for a short period of time. This would not help survivalists argue for persistent survival [16].

For this we need to look to the poetically but awkwardly named "Peak in Darien" cases, in which experiencers encounter persons who were unknown to them or not known to have died (by them, or sometimes by anyone still living). These cases occur in various contexts including dreams and apparitions as well as NDEs. They are not rare in NDEs but they are scattered throughout the literature and often not very well documented. The psychiatrist Bruce Greyson has reviewed 28 cases in some depth; of these, five were cardiac arrest NDEs and five were other types of NDE [71]. Most involved encounters with persons who had died during or shortly before the experience, but ten involved persons who had been dead for years or decades.

Here is an example collected by cardiologist Pim van Lommel, quoting the percipient:

> "During my cardiac arrest I had an extensive experience (...) and later I saw, apart from my deceased grandmother, a man who had looked at me lovingly, but whom I did not know. More than 10 years later, at my mother's deathbed, she confessed to me that I had been born out of an extramarital relationship, my father being a Jewish man who had been deported and killed during the second World War, and my mother showed me his picture. The unknown man that I

had seen more than 10 years before during my NDE turned out to be my biological father. " [72].

Here is another, collected by cardiologist Maurice Rawlings. In this case, a 48 year old man had a cardiac arrest, leading to an NDE in which he found himself in a beautiful place where he met both his stepmother and his biological mother. His mother had died when he was only 15 months old and his father had remarried soon after. He had never seen a photo of his real mother. However, a few weeks later his aunt, having heard about his account, came to visit him and brought a photo of his mother amongst a group of people. The man immediately pointed out his mother, to the amazement of his father [73].

Given the credibility already attached to veridical cardiac arrest NDEs, these veridical other-world encounters with people who died long ago and who were unknown to the experiencer certainly seem to suggest long-term survival.

2.4. Core admissible evidence … but for what?

In summary, we propose that the most credible cases in the survival literature are the veridical cardiac arrest NDEs incorporating unusual events. We have a substantial body of evidence and many of the cases have been carefully documented and followed up by academics and medical professionals. Several of the particularly striking cases have withstood considerable public debate, having been critiqued by sceptics and vigorously defended by advocates providing supplementary and more detailed information. When evaluating human testimony about such important matters it might not be possible to satisfy all critics, but we believe that enough has been done to establish beyond reasonable doubt that the NDE experiencers are giving their accounts in good faith and are reporting, as accurately and fully as they are able to do, what they think they experienced.

A valid concern has been raised that these experiences might not actually be authentic but rather 'false memories' arising before the cardiac arrest event, generated by a combination of psychological needs and psychically garnered veridical information (the 'living agent psi hypothesis'). If this were true then the cardiac cases would lose their relevance. However, we have been able to argue that certain cases contradict the premises of the living agent psi hypothesis.

This means we can have confidence that these conscious experiences occurred during cardiac arrest while brain functions were severely compromised. This reaffirms the credibility of these cases and renders them highly relevant to the possibility of survival. The level of relevance is increased further by the Peak-in-Darien cases, which can now be taken to suggest that consciousness and personhood can survive long after the permanent death of the body.

We have established the admissibility of the evidence by demonstrating its credibility and relevance. However, the story of continental drift showed us that the value of credible data relevant to the phenomena lies mainly in challenging the established hypothesis and setting up the need for change. The ruling hypothesis cannot actually change until a plausible alternative has emerged. Although data can illustrate an alternative hypothesis, it cannot by itself make that hypothesis more plausible. For this we need to build on that data to determine what it actually means. Does evidence for the survival phenomenon amount to evidence for the survival hypothesis, and if so what arguments and/or further evidence would be needed to make the case?

The ruling hypothesis cannot actually change until a plausible alternative has emerged

3. From admissible evidence to an investigable hypothesis

3.1. The role of evidence in refining a hypothesis

For clues about how to build on credible and relevant data, it is helpful to return briefly to the story of continental drift. The original data suggestive of continental movement included the almost but not quite matching outlines of Africa and South America, the continuity of rock strata on either side, the presence of very similar but not quite identical fossils, the alignment of geological features and so on.

The early data stimulated a simple hypothesis: that the continents used to be together and subsequently separated. This is about at the level of the simple survival hypothesis contained in the BICS question: that human consciousness survives the permanent death of the body. In both cases, this interpretation is too thin to attract fruitful attention.

Wegener's first step was to develop a richer hypothesis by considering the scope and characteristics of the data and capturing more precisely what they seemed to suggest. The deviations in the data were as meaningful as the similarities, for example on examination, the differences in fossil records indicated that the separation of continents was a gradual process rather than a catastrophic one. This claim could be added to the hypothesis. We will likewise develop a richer hypothesis, taking account of the scope and characteristics of the admissible cases.

Wegener's hypothesis became a theory when he started trying to answer the question "What would have to be true about the world for this hypothesis to be plausible?" He proposed a model of the earth with continents floating on a layer of magma and convection currents in the magma dragging them apart. This was contrary to key assumptions in geology at the time. Ultimately the evidence that made the difference was evidence from elsewhere that proved that the seafloor was spreading in all the great ocean basins, confirming the magma flow hypothesis. The

detail was fleshed out later. He couldn't get started without the initial data, but he couldn't make progress without the latter.

This distinction is very important. A detailed description of what the phenomena suggest is not enough for our purpose on its own. That said, such a description is an important prerequisite for a theory because it highlights what the theory will have to accommodate and explain. Our next step will thus be to develop a more detailed hypothesis that can steer our theory development.

3.2. Pragmatically softening restrictions on the evidence

There is an important point to make regarding the evidence we will draw on. The most credible cases are clearly the veridical cardiac arrest NDEs, but these are only a small fraction of the complete NDE database. However NDEs are typically made up of a set of recognisable components, and it has been shown that there are no significant qualitative differences between cardiac arrest NDEs and other NDEs triggered under different circumstances, e.g. birth trauma, surgical emergency, accidents or suicide attempts [64], [74]–[77]. Given that the phenomena are the same, it is reasonable to assume that they are mediated by a common mechanism. We therefore argue that when we are seeking ideas for theory building in the NDE literature, we do not need to limit ourselves to the cardiac arrest NDEs. At this point, we would rather be looking for the most thought-provoking or paradigm-challenging cases and need only require that they share sufficient common ground with the most credible subset to have an implied credibility. This may occasionally lead us astray, but this will self-correct – any scientific theory will have to be tested by science and meet its criteria for adequacy. What matters is achieving a theory with predictive powers and practical utility. The specific data that inspired a particular theory often becomes less important once that theory has demonstrated its power. This is what we should hope to achieve with a scientific theory of survival.

While seeking a theory with predictive powers and practical utility, it is more important for data to be thought-provoking than watertight

3.3. Our refined survival hypothesis

We have argued that the BICS hypothesis is a reasonable interpretation of the survival data, and the NDE evidence provides more detail that allows us to refine the hypothesis further. What is more, that relevant evidence is embedded in an account that provides additional context and information. The entirety of the case report must be interpreted as we refine the hypothesis. Doing this, we arrive at the following.

The evidence suggests that in ordinary life a person is some kind of composite entity consisting of their physical body and some other enduring part that is distinct from the physical body, that can survive the demise of the physical body and that

carries the kinds of distinctive attributes we recognize in persons generally, e.g. having feelings, interests, values, intentions, will, agency and social relationships, as well as being able to perceive and assess matters of interest to them in the world, to form intentions based on such assessments and to act on these in a way that aligns with their values and intentions.

We will adopt a traditional usage to call this part a "soul", while noting that for now we leave open what the nature of the soul might be beyond it being the bearer of consciousness, personhood and personal identity.[2]

The evidence suggests that the soul's connection with the body is conditional and can under some circumstances be compromised and restored (as in NDEs), directed towards other things (as in unitive experiences) or broken (as in actual death).

The evidence also suggests that souls have means to observe and interact with the worlds of the living and the discarnate, and these means do not involve the known physical bodily channels of perception and action. This fits the traditional notion of psychic capabilities, so we can interpret the data as suggesting that psi exists and is a power of the soul and not of the ordinary body.

Finally, the evidence suggests that there exists a realm other than the ordinary physical world known to science, in which discarnate beings exist and from where they can interact with living people.

Note that we have not made any suggestions about *how* these things might be possible. We are simply stating the face-value interpretation of what the evidence suggests. We are also not at this stage making any claims about the nature of the world, only that it must be such as to yield the phenomena that suggest this interpretation.

4. Can we think scientifically about the survival hypothesis?

4.1. Strategies for scientific thinking about survival

To build on these findings, we must now begin developing a scientific understanding of what the data might plausibly mean. At first glance, our more detailed hypothesis seems to describe a real world that is very different from the one mainstream science describes. Science is so coherent and competent that this first impression must make the survival hypothesis seem extremely implausible. It is not surprising that most scientists choose not to take an interest in the survival data, given that it seems so unlikely to yield any breakthrough insights.

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[2] Note that in historical usage the term "soul" does not have a fixed meaning but was characterized differently in different models. For example there is the Cartesian soul which has no spatial extension, the Tertullian soul which does have a spatial location and shape, the Anglican soul which is an information pattern, the Aristotelian soul which is something that formats 'prime matter' to become a physical being, and so on. There is a long list of such alternative ideas.

However, as we hinted at the start, if we look at the nature of the real world described by the metaphysics of science, there is nothing in principle to rule out the claims in the hypothesis. This concept of nature is used to ground scientific method, therefore as long as we abide by the approach of science, we may yet be able to widen the scientific worldview to accommodate the survival evidence without violating science's principles or refuting anything it can currently predict. This hope gives us the confidence to try making scientific sense of the data.

What does it take for a theory to be scientific? What sorts of evidence and arguments are allowed? As science studies the natural world, it finds patterns. The philosophy of science captures and generalises these patterns into a philosophical framework that provides the concepts and constraints to which science adheres. At any time, science assumes that all of reality conforms to this framework, or principled extensions of it. If we wish to extend the scientific worldview to accommodate new patterns while not disturbing existing ones, we have to start by looking for an opportunity within the framework provided by the philosophy of science.

A key insight from the story of the revolution in geology was that to trigger change, we need to give scientists more and better cognitive resources. As we pointed out, this is not just more and better data, but also richer concepts, arguments, models and theories grounded in data.

To trigger change we need to give scientists better cognitive resources

We will start by reviewing the guiderails of science as articulated in the metaphysics of science. Although metaphysics has been an important aspect of philosophy for millennia, it is only in very recent years that the metaphysics of science has been formalised into a discipline. There is as yet no single source for the guiderails of science, although the individual topics have been explored in substantial detail. For this reason, one of us (Rousseau) has started collating them into an accessible resource for exploratory scientists, of which some components have already been published [78]–[80]. We will briefly review the key guiderails that pertain when thinking about the survival hypothesis. Staying within these guiderails will ensure that the survival theory we develop is viable within a scientific framework.

4.2. Guiderails for scientific thinking about survival

It is sometimes claimed that the notion of survival is unintelligible because it requires a non-physical thing that can interact with the physical world. The root of this objection is that science currently assumes that all *concrete things* – things that can cause or undergo change – are *physical things*, exhibiting only physical properties. However, this claim is actually a conflation of two separate assumptions that bear individual examination.

Naturalistic things are the things science can study

If the changes that concrete things cause or undergo are always constrained in some way, i.e. they seem to follow some sort of pattern or rule, whether or not it is known, they are called *naturalistic things*. Naturalistic things are the things science can study; science's goal is to discover their patterns of change in order to be able to explain and make predictions about how things will change under new circumstances. They stand in contrast to *supernatural things*, which by definition have no constraints on their ability to change, are thus inherently unpredictable so are inaccessible to scientific understanding.

Science's claim combines two assumptions: "all concrete things are naturalistic" and "all naturalistic things are physical", to conclude that therefore "all concrete things are physical". The first equates to the assumption that there are no supernatural things, while the second claims there are no things accessible to science that have non-physical properties.

This combined assumption has been powerful for scientists and has allowed science to demystify a large number of phenomena that were previously attributed to supernatural agents such as gods, angels or demons. As a result of this success, the assumption has become so entrenched that the terms physical and naturalistic are often used interchangeably, and the distinction between the concepts can be lost. The same holds for the concept of *matter*, which is the stuff of which naturalistic things are made, which is often conflated with *physical matter*, the stuff of which physical things are made. The result is that any talk of a non-physical concrete thing is immediately deemed to be invoking something supernatural. This would not only put that thing beyond the reach of science, it is seen as potentially undermining science's hard-won victories over superstition.

It is conceivable that a naturalistic thing might exist that is non-physical

However, when professional philosophers engage with metaphysics of science, they typically draw these distinctions rather more carefully[3]. It is conceivable that a naturalistic thing might exist that is non-physical, because the requirements for something being naturalistic are not the same as the requirements for something being physical. Being naturalistic, it would change in a regulated way and could thus be studied by science.

[3] It is worth pointing out that although the concepts are clear and distinct, the language used to name them has changed over time and is certainly not fixed, even today. Philosophers typically get around this by defining at the start of any argument exactly what they mean by each term they use, as we have done here. We have adopted an integrated set of terms with definitions that we feel comes closest to majority use while providing the clearest distinction between the concepts we need for our argument. We have published more extensive discussions of these terms and concepts elsewhere [78]–[80]. See also the references therein.

Being non-physical, it would have properties of a different *kind* to those currently known to science. This situation is logically *possible*, though it remains to be discussed whether or not it is *plausible* that such a thing might exist.

So, what might a naturalistic non-physical thing might be like? A *thing* is a bearer of properties, so a non-physical thing will have non-physical properties. Unfortunately there is no tidy definition for the notion of physical properties – it is usually defined by example, with a list of the sort of properties we think of as physical, such as mass and charge. One agreed characteristic is that the properties are objective and will thus appear the same to independent, external observers. In other words they represent a third-person perspective only.

Once we start to think about properties of a different kind to physical ones, there is an obvious candidate that springs to mind. In the field of consciousness studies there are a number of properties that are argued to be potentially non-physical. Consciousness confers on persons the ability for subjective awareness. Thomas Nagel famously characterized this as that 'there is something it is like' to be conscious [81]. This subjective awareness is the foundation of all the mental and psychological capacities humans have, such as having thoughts and being able to reason, find meanings, have values, make choices, form intentions, and direct our actions in line with our purposes. The subjective properties of consciousness can apparently only be experienced 'from the inside' so are private to the experiencer. They represent a first-person perspective only. The subjectivity of mental states thus represents a property utterly unlike physical ones, which are by definition only observable 'from the outside' [82].

The subjectivity of mental states represents a property utterly unlike physical ones

Also, many properties of awareness are *intensional*, meaning they are *about* something else than the thing of which they are a property, e.g. desire is *for* something. Physical properties such as mass and charge relate only to the thing itself. This raises the question at the heart of consciousness studies: if our bodies are only comprised of substances with objective physical properties, how can they give rise to subjective and intensional properties?

The majority view amongst philosophers of mind is that this gap cannot be bridged without giving up on the idea that the natural world is exclusively physical. Scientifically speaking, things either inherit their properties directly from the properties of the stuff of which they are made, or derivatively from how that stuff is arranged. For an example of the latter, water has the property of wetness even though its constituents, hydrogen and oxygen, do not. These are known as emergent properties. There does not seem to be any plausible way for subjective properties to emerge from a rearrangement of things with only objective properties.

Philosophers have proposed a number of logical options that could resolve the problem. It might be that the fundamental stuff of the universe is non-physical and physical stuff derives from it, or that physical stuff has both physical and non-physical properties, or that some neutral stuff exists that can be configured to manifest as either physical, non-physical or "dual-aspect" kinds of stuff. Whichever way, we have to make to make room in our model of the world for kinds of stuff and kinds of things that can provide for consciousness and other subjective properties without solely relying on wholly physical stuff.

In the absence of any existing terms, we will refer to subjective properties that are naturalistic but non-physical as *psychonic* properties and to things that exhibit such properties as *psychonic* things.

We are now able to articulate what it would take for a theory to be scientific, as a basic framework for thinking scientifically about the survival hypothesis. Science only studies things that change in proportionate ways, and as we saw, such things are called naturalistic things. Science tracks changes using *energy*, a property that naturalistic things have; when such things interact, their relative amounts of energy change proportionately [83]. We can thus see that the total energy involved in naturalistic interactions does not change. This idea is known as the principle of the conservation of energy, and it is arguably the most fundamental principle in science. Conservation of energy is thus not an observation or convention; it is simply a logical inference from the definitions of 'naturalistic' and 'energy'. This makes it non-negotiable in science.

Change is brought about by things interacting. For two objects to be distinct they have to be in different places at any given time, which means every naturalistic thing must have a location in space. From science's perspective, things interact via properties they have in common, and the means of interaction propagates via waves along a continuous space-time track between them. This feature allows science to associate a cause with an effect and is the way to demonstrate regularities in change.

Given that change must always be comprehensible, we must also be able to arrive at some understanding of how each distinct thing came to be. This latter implies the need for a cosmology: a story of how things originated and how complex things arise from simpler ones.

The concepts and requirements articulated above will be useful. They provide us with constraints on our theory building, but they also highlight the opportunities. They show us where we can be creative and where we have to be disciplined if we wish our theory to be a scientific one.

Science's guiderails show us where we may and may not be creative

5. Exploring the potential meaning of the evidence

5.1. The survival hypothesis as seen from science

For our theory building, we commit to two requirements: the theory that emerges must be naturalistic in all its aspects, and it must be consistent with the survival data as interpreted in the survival hypothesis.

We will start with the more detailed survival hypothesis that we formulated earlier using the NDE data. Now that we know the requirements for a naturalistic theory, we are in a position to articulate the questions that will have to be answered by our survival theory if it is to defend the scientific plausibility of that survival hypothesis.

There are many such questions, but we will focus on the most crucial ones, despite these being the hardest. As we have argued in [84], the questions that make up a worldview are interconnected, so any answer to one question constrains the options for answers to the others. If the worldview underpinning our theory is to be internally consistent we need to make sure all our answers align. This means addressing the most fundamental questions first.

The questions in a worldview are interconnected; any answer to one constrains the options for the others

Each of these questions arises because of a tension between something the refined hypothesis suggests and something the current scientific worldview claims or assumes. We have grouped them into four areas of interest.

The nature of the soul:

- Could a soul be a naturalistic thing?
- Where might a soul be?
- What might a soul look like?

The soul-body connection:

- How could soul-body interaction be possible?
- Could the soul-body system be naturalistic?

The soul's dependence on the world:

- How could a soul perceive the world without the bodily senses?
- What might be the purpose of embodiment?
- How could a soul survive?

The soul's journey in the world:

- How might souls arise?
- Would it matter if we had souls?

5.2. Could a soul be a naturalistic thing?

Our refined survival hypothesis suggests that in life humans are a compound of a soul and a physical body. This idea is known in philosophy as "soul-body dualism". The first person in the scientific era to frame a dualist model was the 17th century polymath Rene Descartes [85]. For political reasons, Descartes defined the soul[4] as the opposite of the physical body in every conceivable way; all that they have in common is that both exist and that they interact. This means that from a scientific perspective, almost everything that can go wrong in a model has gone wrong here. For Descartes, the body is material, has a location in space, has a size and a shape, has a complex structure (is "divisible" in his terminology), has no 'mentalistic' properties and is mortal. In contrast, the soul is not made of stuff (is 'immaterial'), is not located in space, has no size or shape, has no structure (is 'simple' and 'indivisible'), is a mind, and is immortal.

This model implies that both the soul and its interaction with the body are supernaturalistic. Within science's guiderails it is impossible to make sense of how something that is not anywhere can even exist, never mind interact with something that is actually located in space. Or how something with no structure can change so as to have different thoughts at different times, or how anything natural can be inherently everlasting (immortal). The list goes on.

This model was unpopular from the start and came to be called "Cartesian Dualism" as philosophers tried to work out ways to fix the problems it presented. Various alternative kinds of dualism have been proposed, especially amongst philosophers of religion, but these tend to be either not fully naturalistic or not detailed to enough to be compelling. In a previous work one of us (Rousseau) has given an overview of 12 kinds of mind-body models and identified some of the advocates of each [78]. Fully half of these models hold that consciousness is a property of something other than the physical body.

Although none of these proposed alternative dualisms has become widely accepted, hardly anyone has been a Cartesian dualist in recent times. Even the logical possibility of Cartesian dualism has been called into question. That said, the philosopher William Lycan explained in a famous 2009 paper how many of the objections to Cartesian dualism can be met by alternative dualisms, and argued that the hurdles facing it are not of a different magnitude to those facing rival models that propose that the mind is somehow grounded in physical matter [86]. Lycan mounted his defence of dualism not because he believed in it, but as an act of "intellectual honesty". In fact he says in his paper that he does not believe dualism to be true and never will, but (in another act of intellectual honesty) admits that he is "not proportioning his belief to the evidence". He excuses himself with "if only because we have not got any evidence", but goes on to confess that his faith in materialism (by

[4] For Descartes, the mind and the soul were the same thing, so his model is also known as a "mind-body dualism".

which he means physicalism[5]) is based on "science-worship", and not on any evidence in favour of it. The psychology that played out in the continental drift story is evident here.

Lycan's position in 2009 still reflects the situation that exists today. However, things might now change. Like Lycan, we think that Cartesian dualism is not viable but grant that the idea of soul-body dualism can be defended on logical grounds. Unlike him, we think there is in fact plenty of relevant evidence to draw on, and hold that even if one were inclined to worship science, it would not be a sin to contemplate the existence of non-physical things, so long as they are *naturalistic* non-physical things.

We have not yet answered the question of whether the soul could be a naturalistic thing. We will build up to an answer by addressing the sorts of questions that a naturalistic soul-body dualism has to face. In our responses we will sketch scientifically credible answers and present evidence for their plausibility. Developing final answers to all of them would be an extensive project but by drawing on our prior work in this area [78], [80], [87]–[89], we can, we believe, show a way towards such answers and render it plausible that survival could be true under a naturalistic model of soul-body dualism.

5.3. How could soul-body interaction be possible?

How can the soul interact with the body? In science, interaction is understood to be mediated via properties things have in common. For example, something that has an electrical charge will interact with another charged thing proportionally to their relative amounts of charge. It will not react to something that is electrically neutral, although such a pair may nevertheless interact if they have some other property in common, such as mass.

The survival hypothesis claims that the soul has subjective (psychonic) properties and the body has only objective (physical) ones. These are disjunct categories, so how can souls and bodies interact naturalistically?

The resolution lies in the fact that the claim rules out the body having psychonic properties in addition to physical ones, but it does not does not rule out the soul having physical properties in addition to its non-physical ones. To preserve naturalism, we have to assume that souls are psycho-physical things and interact with bodies via shared physical properties. This is interesting because it implies that soul-body interaction is mediated by physical fields rather than some other more exotic phenomenon.

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[5] "Physicalism" is the view that all concrete things are exclusively physical things, made of physical matter. "Materialism" is the view that all concrete things are naturalistic things, made of matter (whether physical or not). Those who assume that all matter is physical matter often use these labels interchangeably.

The challenge now is to find evidence to indicate that in practice physical forces are involved in this and to give clues about the nature of the force(s) involved. There is suggestive evidence in some NDE cases.

To understand this point, we must think about a living person as a complex system. A system is a structure that functions as a whole in virtue of the causal relationships between its parts [90].

The body is of course a complex system in its own right, but we will focus on the person being a system comprised of a soul and a physical body. When a complex system works well it is sometimes difficult to tell how it works due to the many interdependencies between its parts. Properties can emerge that do not belong to the parts individually but only to the system as a whole.

A feature of complex systems is that if you take them apart, the emergent properties disappear, e.g. the parts of an aircraft cannot fly. To restore the original functionality the parts have to be carefully reassembled so that everything goes together correctly and we end up with a properly and fully integrated system. If in this process parts are lost, damaged or misaligned, the system level properties will be proportionately compromised. The more complex the system, the higher the risk of something going wrong during reintegration.

Given this model, we can now conceptualise the NDE as an event in which soul-body integration is disrupted and then restored when the person recovers. With very rare exceptions, the onset of an NDE is accompanied by a very rapid loss of all control over the body and sensation of bodily states. These are rapidly regained when the NDE ends. NDE experiencers notice this primarily because while they are in the OBE portion of their NDE, they lose the sensation of pain and also find themselves unable to communicate physically with people around their body. The following cases are typical:

> "…there was the most searing pain in my arm… Then I was aware that I was losing consciousness and of people rushing around me, knocking things over in the rush to get emergency equipment set up. Then there was nothing – no pain at all. And I was up there on a level with the ceiling…I could see…my body, down there on the bed… the light… I…was being drawn into it…I had the most wonderful feeling of peace… And then suddenly, I was pulled back, away from it, back, slammed into my body again, *and back with the pain*, and I didn't want to go" ([64], our emphasis).

> "I began bleeding badly after the birth of my daughter and I was instantly surrounded by medical staff who started working on me. I was in great pain. Then suddenly the pain was gone and I was looking down on them working on me. I heard one doctor say he couldn't find a pulse. Next I was travelling down a tunnel toward a bright light. But I never reached the end of the tunnel. A gentle voice told me I had to go back… I hit the hospital bed with an

> electrifying jerk *and the pain was back*. I was being rushed into an operating theatre for surgery to stop the bleeding" ([91], our emphasis).

The very sudden transition from a state of intense pain to complete painlessness at the onset of the NDE, and the immediate return of pain when the NDE ends, is remarkable. Natural endorphins can suppress pain and engender feelings of well-being, but their effects last for hours whereas NDEs last only seconds or minutes [77], so it is unlikely that these effects are due to exclusively *bodily* mechanisms. This point is reinforced by the cases in which a person can see their body receiving electric shocks, their chest being pounded, their face stroked, and so on, while they themselves feel no relevant bodily sensations [28], e.g. [64], [92]. Greyson reported an interesting case in which the patient could see their body reacting to hallucinogenic drugs while they themselves were mentally lucid [93].

If this model of NDEs as disruptions of soul-body integration is correct, and if the way the connection is made is naturalistic, then we can foresee the possibility that reintegration can sometimes go wrong. This gives us an opportunity to learn about how the system normally works. For complex natural systems, studying failure modes is in general a useful route to understanding them better. For example in medical research, correlating injured or diseased brain parts with functional deficits is an important way of working out which parts of the brain are involved in which cognitive or motor functions.

We can regard a healthy person in ordinary life as closely integrated so that influences can be smoothly exchanged between their mind and their body. If this integration is compromised, then a number of interesting consequences might be expected. Some influences from the mind might no longer reach the relevant parts of the body (e.g. the brain), and so some physical control might be lost, manifesting for example as kinds of paralysis, tremors or coordination problems. Likewise we might expect that information about some states of the body is no longer properly conveyed to the mind, manifesting for example as inattentions to parts of the body or compromises of some kinds of sensory awareness. Medically, such signs are known as 'neurological deficits' and assumed to be caused by damage to the brain or nervous system.

Other effects are possible too: influences directed from the soul towards the body might 'miss their target' and cause unintended physical changes beyond the body, while attempts by the soul to restore 'missing' information about the body might result in the soul mistakenly processing information from bodies other than its own. These latter two problems would manifest as psi phenomena.

Therefore we might anticipate that some people might, after an NDE, exhibit what look like neurological deficits and acquire psychic abilities. Intriguingly, many people who have had NDEs experience exhibit both neurological deficits and new or enhanced psi abilities.

The is substantial evidence in the professional NDE literature for experiencers afterwards having both enhanced *functional* psychic abilities of the informational type (e.g. spontaneous telepathic impressions) and *dysfunctional* PK abilities (e.g. unintentional disruptions of nearby electronic equipment) [64], [91], [94]–[98].

The neurological deficits are difficult to judge because people may have acquired them due to brain or nervous systems damage caused by the physiological trauma of their NDE incident, for example oxygen starvation. However, there is much general medical evidence for people exhibiting neurological deficits without having any relevant nervous system damage. Medically, these are known as 'conversion disorders' and attributed to psychological causes. Such cases are well known in medical practice, where the prevalence of unexplained neurological symptoms typically ranges between 30 and 50% of presenting cases and in some specialities approaches 70% [99]–[101]. In orthodox models, the flows of information and influence are between the brain and the body, so it seems mysterious how there can be deficits without physical damage. By postulating a pathway between the brain and the soul, we have opened up the possibility of another mechanism that can malfunction and lead to neurological symptoms.

That said, the disruptive physical psi effects provide the clearest evidential clues, so we will concentrate on those at this stage. NDE experiencers widely report that since their NDE, their presence causes interference, malfunctions or failures in electronic and electro-mechanical equipment such as radios, light sources, cell phones, security systems, toasters, VCRs, TVs, and so on [96], [102, Ch. 9]. Here is an example report:

> "Watches do not keep time for me. But mechanical things seem to work, even for no reason. If I get too close to FM radio frequencies I raise Cain with reception. Electronic equipment functions strangely around me. I touch electrical appliances to make them work. They start up with my energy. I blew my computer terminal when I got excited. [I] have burned up three cassette recorders [and] one overhead projector" [102].

Melvin Morse has found that wristwatches were unreliable for 25% of adults who survived childhood NDEs, whereas the same is true for only 4% of adults who have never had an NDE or paranormal experience [91]. In fact, NDErs reported every kind of such effect more frequently than these control groups [103]. Nouri also found that the depth of the NDE correlated with the frequency of these after-effects [103].

Overall, the electromagnetic nature of these side-effects supports the idea that soul-body interaction is mediated by physical forces and that these involve at least electromagnetic fields. We therefore infer that it is logically plausible that the soul has physical properties in addition to psychonic ones and that soul-body interaction, being based on physical fields, is naturalistic. A deeper exploration of these issues can be found the prior work of one of us [80].

5.4. Where might a soul be?

If souls are distinct from bodies, then to be naturalistic they must be located in space somewhere. However, science has not been able to detect any non-physical things or substances. How do we reconcile this with the claim that kinds of psychonic stuff and things actually exist? This is especially puzzling now we have proposed that souls have physical properties in addition to psychonic ones. Where might the soul be, and why has science not been able to detect its presence?

It is natural for people to think that they are 'in' their bodies, viewing the world from 'behind their eyes'. We think this because that is where our sensory locus is, but the location of the body provides no evidence for the location of the soul. It is logically possible that the body is a sophisticated but nevertheless remotely controlled organic robot interlinked via a secure means of communication with a 'controller' (the soul) that is located elsewhere. Something like this has in fact been proposed by John Smythies [104].

This theoretical speculation suggests that we might be able to investigate where the soul is by looking at NDE cases involving out-of-body experiences (OBEs), where the soul is observing the physical world without using the physical senses. We might be able to infer a useful hypothesis from the perspectival location of the soul's perceptions and/or from the qualities of that perception.

We are fortunate to have many NDE OBE cases with features that are revealing in just the right way. Many NDE experiencers report remarkable perception while in the OBE state. Here are some typical examples:

> "I was hovering over a stretcher in one of the emergency rooms at the hospital. I glanced down at the stretcher, knew the body wrapped in blankets was mine, and really didn't care. The room was much more interesting than my body. And what a neat perspective. I could see everything. And I do mean everything! I could see the top of the light on the ceiling, and the underside of the stretcher. I could see the tiles on the ceiling and the tiles on the floor, simultaneously. Three hundred sixty degree spherical vision. And not just spherical. Detailed! I could see every single hair and the follicle out of which it grew on the head of the nurse standing beside the stretcher. At the time I knew exactly how many hairs there were to look at. But I shifted focus. She was wearing glittery white nylons. Every single shimmer and sheen stood out in glowing detail, and once again I knew exactly how many sparkles there were" [105].

> "I could see behind me, from several sides simultaneously, and through objects. I was able to see what was going on in the room and in the corridor, behind the wall… My sight was very particular[6]. I don't know how to describe it: I saw everything with a total sight: the lake, the mountain, people

[6] The cases given by Jourdan are all French cases, translated by him into English as cited.

> along the banks of Evian, the texture of their clothes. I could see in the boats, in the houses, little animals in their burrows, the roots, the blades of grass, I saw all that simultaneously and if I focused on something I could see it through any obstacle and with every minute detail, from its surface to the organization of its atoms. Really a detailed and overall vision" [106].
>
> "It's very difficult to explain, but I was able to see the bed and my body simultaneously from all directions. I could see the top of my head and in the same time I saw my left and right sides, and the bed from below and from above, and all the room like that, I was everywhere at the same time, you see? ... I was surprised that I could see at an angle of 360°, I could see in front and behind, I could see underneath, from far, I could see up close and also transparently. I remember seeing a stick of lipstick in one of the nurses' pockets. If I wanted to see inside the lamp which illuminated the room, I would manage to, and all of this instantly, as soon as I wanted to. I could say how people were dressed, I could see the sandstone wall, and also the stone slabs of the floor. I was able to verify their presence in a photograph later on since I thought it strange and anachronistic to have such slabs in an operating room. It was surprising and I could see, all at once, a green plaque with white letters saying 'Manufacture de Saint Etienne'. The plaque was under the edge of the operating table, covered up by the sheet I was lying on. I could see with multiple axes of vision, from many places at once. This is the reason why I saw this plaque under the operating table, from a completely different angle, since I was up there by the ceiling and I still managed to see this plaque located under the table, itself covered by a sheet. When I wanted to check this, we[7] realized the plaque really was there and read 'Manufacture d'armes de Saint Etienne'"[107].
>
> "I visited various places I managed to identify afterwards. I remember a window in a village, a building with very white plaster, sand-carved windows. My curiosity was attracted to details. This is quite important, since we cannot do this normally, like seeing inside and outside at the same time, an impression of a quasi holographic vision... Not a panoramic view, but seeing in front, behind, all details simultaneously which is completely different from ordinary sight. It is very rich" [107].
>
> "I saw all around me, I saw the inside of my body" [107].

The perceptual phenomena described in such reports include being able to see simultaneously in all directions away from the vantage point and being able to see things from all angles simultaneously as though that vantage point is omnipresent,

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[7] The "we" here is significant: in another account of this case, J.M. says: "When I talked about that to the surgeon, he said: 'Let's check that together'. He knew nothing about the plate that was indeed there, exactly like I had seen it" [106, p. 15].

being able to see through things as if they were transparent, being able to see the internal structures of things while also seeing their outsides, being able to instantly 'zoom in' on anything that is thought about and clearly see minute details, even in remote places, being able to see different places simultaneously, essentially seeing everywhere simultaneously. These remarkable reports are not rare; in a study of 70 NDE cases Jean-Pierre Jourdan found that of the 48 cases that included an OBE, 34 (71%) of the experiencers reported such radical spatial aspects to their vision [107]. Further cases are quoted and discussed in [106], [108]–[113].

As NDE researchers have pointed out, such perceptions would only be possible if the vantage point were in a proximate higher-dimensional space ("hyperspace"). Roughly, just as everything laid out on the two-dimensional surface of a table is visible to us simultaneously from our elevated vantage point in a third spatial dimension, so everything in a three-dimensional world would be simultaneously visible from an elevated fourth-dimensional vantage point. Once this connection is made these strange reports become immediately interpretable.

Sometimes the experiencers report that they were aware of being in a space with unusual characteristics and attempted to explore it.

> "I was much higher, much higher. I had a perception, an overview. I was not at three meters up. It was a holistic, panoramic view into the room. But from very high as if I could have seen through the concrete and at the same time it is not the same thing. I would rather say that I was in another dimension of space where I had another vision capability as if I were both very close and very far because I could see very fine details, every detail." [107].

> "I could see the whole room under me despite this position (...) It was then that I noticed I could move around in space voluntarily. This was interesting, new, and so I made a few trial movements. It seems to me that although my view of the room was always complete, panoramic, that the perspective changed a little according to my movements and my position in that space" [107].

> "[Seeing was] like a zoom and a displacement all at once. When we take an interest in something, it's as if we zoomed in. It is the displacement and perception occurring simultaneously which allows this to happen. It is hard to separate them, in the sense that there is no notion of time, thus no time spent moving. However, there is a certain notion of space, but not of space with limits and boundaries like in usual space. In the same way there is no compartmentalization or delineated directions, the notion of time and space aren't compartmentalized. It's hard to explain" [107].

The idea that the 'ordinary' physical world is a sort of three-dimensional 'membrane' embedded in an extensive hyperspatial 'bulk' is not orthodoxy, but it is a credible view in current physics circles and supported by significant physicists e.g.

[114]–[116], cosmologists e.g. [117], and philosophers e.g. [118]. It is important to note that this view is backed up by detailed and rigorous theoretical work in physics and mathematics and is not just a speculation on the part of these researchers. This distinguishes the present situation from earlier eras in which researchers claimed that hyperspatial geometries could account for psychical phenomena without any credible theories grounded in physics to lend support to their views, e.g. [119].

To return to the original question, from this evidence we can conclude that the soul does have a spatial location, which in principle resolves the puzzle of how the unique pairing between soul and body is possible. However, the NDE reports imply a number of interesting other points.

Not only does the vantage point seem to be in a hyperspatial location but also experiencers are able to see with a sensory apparatus that exploits hyperspatial geometries. Seeing the ordinary three-dimensional (3D) world requires a 3D lens focusing an image of a portion of the world onto a 2D retina. By (inadequate) extrapolation, seeing in an omni-perspectival way would require a 'retina' that is at least 3D on which an 'image' is focused by a 'lens' that is at least 4D. Omni-perspectival vision requires not only an 'eye' *located* in hyperspace, but also an 'eye' that is itself a hyperspatial structure. By implication the soul is a hyperspatial structure too, since an ordinary-spatial structure cannot incorporate a hyperspatial structure.

This is an important conclusion. A thing cannot fit into a space that has a lower dimensionality than the thing itself, so by implication the soul cannot ever be 'in' the body. This suggests that the soul is normally 'elsewhere' from the body; when the OBE commences, perception switches from seeing via the body to direct observation by the soul, without it having moved at all. The sense of being somewhere in the physical world during the OBE, or moving around in it, is therefore seen to be a data-processing artefact, an 'interpretation' that the mind places on the perceptual data based on psychological interests and expectancy effects.

If the soul is in hyperspace then this may be part of the reason why science has not detected souls directly. Ordinary physical instruments may just not be able to look in the right direction.

The theoretical possibility that the ordinary world is a 3D membrane in a hyperspatial bulk is helpful, but it would be even more compelling if we had independent evidence that information and influence can flow between these domains. Might wholly physical phenomena exploit such mechanisms, if they exist? A potential candidate is the mysterious "quasi-crystals", physical crystals discovered in 1982 by Daniel Shechtman, for which he was awarded the 2011 Nobel Prize in Chemistry. These structures are aperiodic in three dimensions, meaning that their 'stacking pattern' never repeats. It can be shown mathematically that there is no algorithm for deciding how to complete such a stacking pattern by manipulating three-dimensional components [120]. This makes the existence of such crystals in the real world a puzzle: how could the components stack themselves so as to grow a

homogenous crystal? However, the crystals can be mathematically modelled as three-dimensional cross-sections through periodic five-dimensional structures [121]. The implication is that although these crystals are impossible to construct via naturalistic processes restricted to the 3-membrane, their existence would be unproblematic if hyperspatial processes are involved.

The hypothesis that the soul is in a proximate hyperspace that is causally connected to our ordinary physical space is therefore plausible in the light of both NDE evidence and recent discoveries in physics.

5.5. What might a soul look like?

Mental states have complex properties and change in complex ways. Naturalistic things exhibit complex attributes and behaviours by means of a complex structure, which also entails having a size and shape. Might souls have such attributes?

In the previous section, we suggested that the soul is a hyperspatial thing with a complex structure, but this is only a hint at what the soul looks like. We also need to decide whether it really is a complex thing or just does things that would require it to be complex if it were a naturalistic thing. What we ideally desire is evidence of what it looks like when looked at by a competent observer.

If the soul has a hyperspatial shape it might be very hard for people to interpret what they see in a way unconditioned by expectation effects. Our minds naturally make sense of what we see by referring to our experiences and focusing on aspects of interest to us. We see such cognitive disconnects very clearly in NDE cases where people encounter a 'being of light' and experience it in terms of a familiar mental model such as Jesus, Krishna or Buddha. This is quite common, but some people have sufficient conceptual versatility to mitigate or overcome such effects to some degree. Given the size of the NDE database, we might reasonably hope to obtain some revealing reports, and indeed we do.

In Greyson and Stevenson's retrospective study of 78 cases, 58% of the NDE experiencers reported having some kind of 'body' during their NDE [76]. According to Moody:

> "Most people say they are not just some spot of consciousness when this [the OBE] happens. They still seem to be in some kind of body even though they are out of their physical bodies. They say the spiritual body has shape and form unlike our physical bodies. It has arms and a shape although most are at a loss to describe what it looks like. Some people describe it as a cloud of colors, or an energy field. One NDEer I spoke to several years ago said he studied his hands while he was in this state and saw them to be composed of light with tiny structures in them. He could see the delicate whorls of his fingerprints and tubes of light up his arms" [54].

Here are some direct reports:

> "My being had no physical characteristics, but I have to describe it with physical terms. I could describe it in so many ways, in so many words, but none of them would be exactly right. It's so hard to describe" [28].

> "[When I came out of the physical body] it was like I did come out of my body and go into something else. I didn't think I was just nothing. It was another body ... but not another regular human body. It's a little bit different. It was not exactly like a human body, but it wasn't any big glob of matter, either. It had form to it, but no colors. And I know I still had something you could call hands. I can't describe it. I was more fascinated with everything around me – seeing my own body there, and all – so I didn't think about the type of body I was in" [28].

> "I was still in a body – not a physical body, but something I can best describe as an energy pattern. If I had to put it into words, I would say that it was transparent, a spiritual as opposed to a material being. Yet, it definitely had different parts" [28].

These reports suggest that a soul is a complex system, having a full complement of spatial properties including size, shape and structure in addition to location. If the soul is a hyperspatial structure it is hardly surprising that people are so often at a loss to describe what they saw, or that different people interpret the experience in different ways. Given their lack of an experiential reference or relevant vocabulary it is impossible for us at present to reconstruct from their reports exactly what they saw, but the evidence is sufficiently clear to support a conclusion that souls are complex systems. This resolves the question about the soul's spatial properties in a way that is naturalistic. It opens up possibilities for understanding how the soul can have different causal powers at different times and changing 'mental states', and undergo changes in mental aspects while remaining the same individual. All of this is consistent with naturalistic requirements.

5.6. How could a soul perceive the world without the bodily senses?

The survival evidence suggests that disembodied souls can observe and interact with the physical world by some other means than the normal bodily channels. In living beings, this type of capability is referred to as psi. Could psi be naturalistic?

It is often claimed that psi transcends the limits of time, space and energy, but if that were true psi would be supernatural. The evidence suggests that psi is a capability of the soul, but if the soul really had a supernatural capability, it would be impossible to conceive of it as a naturalistic thing.

One approach to investigating this is to reflect on what would be required of psi for it to work in a naturalistic way and then to see if there is evidence supporting such ideas and models. This a big topic, so for present purposes we will focus on

'informational' psi, and consider whether phenomena of this type, e.g. clairvoyance (aka 'remote viewing') and telepathy, can plausibly be understood in terms of naturalistic models of how sensory systems work.

Any normal physical sensory channel has certain components. There will be a sensor (e.g. an eye) that picks up some external signal (e.g. light) originating from some source (e.g. an object) and sends it to a data processing unit (e.g. a brain) to convert into data (e.g. an image) that can be evaluated and some meaning extracted. A dog's sense of smell and a bat's sonar have this same conceptual architecture, as do manufactured communication channels such as television and radar systems.

For psi to be naturalistic it would require that psi faculties are also facilitated by sensors, signals and data processors that operate in ways that follow a regular pattern that can be investigated. It would mean that the signals to which psi faculties respond are also naturalistic, whether they are physical or psychonic.

The structure of a signal can be characterised by a measure called its Shannon entropy, and the degree of fluctuation in that measure reflects how complex or interesting the signal is. It has been shown that biological sensors are more responsive to complex signals – think about how you tune out a constant sound. Edwin May and colleagues have demonstrated that psi works the same way. In a key series of studies they showed that success in remote viewing tasks scales with the gradient of Shannon entropy of the target [122]. It has long been claimed that psi works best in situations of meaningful significance, and this regularity reinforces that notion.

In another line of research it has been shown that success in psi tasks varies in a systematic way with changes in specific frequency bands of the local geomagnetic field [123]–[127]. It is common for physical senses to be influenced by environmental factors (e.g. when fog reduces the visibility of a landscape), so again this reinforces the notion that psi is also naturalistic, albeit psychonic or psycho-physical rather than physical.

It is often claimed that psi must be supernatural because its power appears to be independent of the distance between the observer and the target [128]. However, as Rousseau pointed out in [78], this is a misconception borne of a focus on the sensor itself while neglecting the rest of the sensory architecture. In particular, all signals undergo data processing in order to extract meaning, and the nature of the processing is determined by the types of decisions that need to be made using that signal. For example, a radar system displays a dot on a screen to indicate that an aircraft has been detected. In fact, the strength of the radar signal drops off with distance and other environmental factors and the system has to guess whether a weak signal represents an aircraft or some background noise. On the display screen, the dot is either there or not there, there is no indication on screen of how strong or weak that signal really was; representing 3D space on a 2D screen is enough of a challenge without unnecessary clutter. It is the processor that decides on the basis of some rule whether to display a dot or not. Psi functions in a similar pattern: it tends to work or

not, so it may well be that the impression of distance insensitivity when it works simply reflects the way in which the human data processing system operates. We see similar effects in ordinary biological perceptual systems where ambiguity or cognitive dissonance is resolved using threshold levels, confirmation bias and inattentional blindness.

These examples show that it is plausible that psi could be naturalistic, and the insights that arise from thinking about it in this way can be useful triggers for further hypothesis development and testing.

5.7. What might be the purpose of embodiment?

In the early days of psychical research it was noticed that when psi capabilities manifested they were very powerful. If fact, nothing seemed in principle to be hidden from psi; there was so much potential knowledge available, yet in everyday life our senses and abilities seemed to be much more modest. This triggered a question: if the mind is so much more competent on its own, what then is the purpose of the brain?

It was suggested at the time that the flow of psychic information into a person's consciousness is so vast that they would be overwhelmed were it not for the brain limiting that inflow of information. Theories of this kind were developed by William James, Henri Bergson, F.C.S. Schiller and Aldous Huxley [129]–[132]. The theories suggested that although the brain is not the producer of consciousness, it is an important filter for it, acting like a 'reducing valve'. This idea has been widely adopted and is still promoted in current times [133].

However, the early researchers did not have access to NDE cases. Now that we do, we find evidence that contradicts this notion. A significant proportion of experiencers report their mental faculties in the NDE state to be greatly enhanced. In an analysis of the large collection of NDE cases in the University of Virginia archive, it was found that 80% of NDErs reported the clarity of their thinking to have been unimpaired during their NDEs (45% "clearer than usual" and 35% "as clear as usual"); 74% reported the speed of their thinking to have been unimpaired (37% "faster than usual" and 37% "at the usual speed"), 65% reported their logic to have been unimpaired (29% "more logical than usual" and 36% "as logical as usual"), and 55% reported no decline in control over their thoughts (19% "more control than usual" and 36% "as much control as usual") [7].

This counts against the filter theory but reinforces the original question. The faculties of souls seem to be so much more powerful, sophisticated and diverse than those of the body, what then could be the point of being embodied?

To investigate this question afresh, it will be helpful to take a deeper look at systems theory, which is also a more recent addition to our arsenal of methods. We discussed previously that a system gains new properties via the way in which its parts work together, a phenomenon called *emergence*. However, the guiderails for science require that every change is balanced by proportionate changes elsewhere, so it is to be expected that the emergence of a new capability at the whole system level is

balanced by the loss or inhibition of the powers of the parts. This effect is called *submergence*. The capabilities and behaviours of the parts are constrained by their systemic context, but these restrictions are key to the performance of the whole.

We see this kind of balancing in all complex systems. Think of what a team can achieve that individual team members cannot do by themselves, but also the freedoms that team members give up in order to be a part of the team. Rousseau has explained elsewhere how this systemic balancing is another manifestation of the principle of conservation of energy and is thus characteristic of complex naturalistic systems [134].

We can now see that the embodiment question is really about what the total system gains or loses by the presence or absence of certain parts. The powers of systems are extended by their emergent properties, but there is a price to pay for the gain, in the reduction in the powers of the parts. In naturalistic systems, system-level capabilities that are not worth the price disappear, while high-value capabilities are enhanced or added. This is why fish that live in caves are blind, while migrating birds see not only light but also the magnetic field of the earth and the polarization of sunlight.

This suggests that the integration of the body into the soul-body system provides an emergent capability, and that the reduction of the soul's inherent powers while in this system context is worth the price. What that emergent capability might be we cannot yet say, but we do know that the value gained is worth at least as much as the value ceded.

The right question to ask is thus not: 'What is the purpose of embodiment?' but rather, 'What is the purpose of the soul-body system?'.

5.8. How could a soul survive?

Naturalistic things have to acquire resources in order to sustain themselves or else they would decline and dissipate. They cannot be inherently everlasting, although they may be so contingently. Could souls be like this?

One way to approach this is to think about soul-body interaction. Naturalistically, this interaction implies that the soul and the body are exchanging energies. This raises an interesting puzzle. We understand where bodies get their energy from, e.g. by eating and metabolizing food. These energy sources sustain the health and hence the survival of the body (subject to other factors of course).

If the soul is a naturalistic system, it must also have an energy source. We have almost no immediately relevant data with which to develop a model, but there is NDE data suggesting that the soul does indeed have something like a dependence on sources of energy as well as a metabolism. For example, in the remarkable, well-known and very detailed NDE reported by Pam Reynolds, she gives an account of a veridical OBE, followed by an "other-realm experience" (ORE) which apparently commenced at the point where the surgical team arrested her heartbeat. In the ORE

she reports that she met some of her deceased relatives. Towards the end of the surgical procure she was undergoing,

> "…they [the deceased relatives] were feeding me. They were not doing this through my mouth, like with food, but they were nourishing me with something. The only way I know how to put it is something sparkly. Sparkles is the image that I get. I definitely recall the sensation of being nurtured and being fed and being made strong. I know it sounds funny, because obviously it wasn't a physical thing, but inside the experience I felt physically strong, ready for whatever" [135].

This evidence supports the idea that some kind of psychonic energy source exists that sustains the soul. We cannot develop these ideas any further here, but there are interesting lines of investigation for future work. For example, there is interesting additional data to consider from outside the NDE cases, such as phenomena related to the Indian concept of *kundalini* and the Chinese concept of *chi*.

This topic is still deeply mysterious, but the data we have so far suggests that the health and survival of the soul are not supernatural but depend on naturalistic mechanisms and resources.

5.9. Could the soul-body system be naturalistic?

Complex naturalistic systems can have many kinds of parts, performing different kinds of services in support of the overall capability of the total system. A good place to start when analysing such a system is to reflect on what it does and then to look into how it gets that done. To get something concrete done, systems must be able to perform some action by means of an actuator, i.e. something that can exert an influence. The more sophisticated the action required, the more carefully the working of the actuator must be controlled. To control the actuator, the controller must have current data that can be used to manage the operation, and for that it needs sensors. From this perspective the key elements of an effective system are the actuators and the sensors. Most of the rest of the system is about connecting these two and providing them with the resources they need to do their work.

In complex systems, sensors and actuators operate in a coordinated way so as to facilitate the overall goals of the system. Any naturalistic system will have limited resources at any one time, so it will balance the deployment of those resources depending on the needs of the moment. This means that different sensors or actuators may be more or less active as required in different contexts. We see this clearly in psychology where, for example, cognitive resource management manifests in phenomena such as attentional blindness.

We have already argued that the soul is sustained by some sort of psychonic energy source. Does the soul then manage its activities to optimise the deployment of that energy, as a naturalistic thing would do?

To address this, let us consider the types of interactions that the soul undertakes. Rousseau has previously proposed that soul-body interactions can be categorised in four logical groups [89]. These derive from a dual dichotomy: on one hand the soul can interact with either psychonic or physical things, while on the other the nature of that interaction can be either differentiating, maintaining its separateness, or integrative, involving some type of merging or blending.

The categories are:

- Integrative unification with physical things, e.g. with the body
- Integrative unification with psychonic things, e.g. unitive experiences
- Differentiating interaction with physical things, e.g. remote viewing
- Differentiating interaction with psychonic things, e.g. telepathy

All these forms of interaction involve flows of information and/or influence. Both aspects ultimately depend on the ability to process information, because the effective application of influence requires information processing too. If the soul manages its resources as a naturalistic thing would, one would expect to see trade-offs being made between these different interaction-driven capabilities.

Under ordinary circumstances, the soul-body system is tightly integrated. At such times people typically have weak (but not insignificant) psi abilities, enabling them for instance to detect when they are being stared at, to know when a remote friend is thinking about them, to sense that a remote loved one is in crisis, to engender useful "co-incidences" and to facilitate or hinder the smooth working of equipment [136]–[142]. Surveys have revealed a high prevalence of notable but minor experiences of this sort [143], [144], while the incidence of strong effects or dramatic experiences is low [145]–[147].

During an NDE, when the soul-body integration is disrupted, the flow of information and influence between the soul and the body is drastically reduced, as we have seen for example from the cessation of pain. At the same time, the soul's capabilities and sensory channels are greatly enhanced, as evident from the clarity of thought, powerful vision and telepathy characteristic of the OBE state. Leading on from this state, patients typically experience either a differentiating interaction with other realms and beings, or a mystical unitive experience with powerful yet inexpressible noetic aspects. Upon resuscitation, soul-body integration is re-established and psi faculties are once more largely suppressed. This suggests a trade-off between these faculties under fluctuating conditions; more use is made of the soul's capabilities when the capabilities of the body are not being utilised.

This conclusion is borne out by the broader psychical research literature. Spontaneous psi experiences occur predominantly in dreams [148]–[150] or when a person is alone and engaged in activities that are minimally demanding in both mental and physical respects [144], [151]. In fact the use of mild sensory deprivation and physiological calm has become standard practice in certain kinds of parapsychological experiments, resulting in positive results being obtained with

good reliability [152]. Conversely, an increase in mental alertness or sensory activity suppresses psi ability.

This suggests that mind-body integration and the effective operation of the body is ordinarily highly prioritised over psi or mystical ability, again affirming that embodiment is valuable in its own right. For a more nuanced analysis of the data leading to this conclusion see [89].

The interplay in strengths between these faculties across fluctuating conditions suggests that the information processing capacity of the soul is limited and that this resource is allocated to different uses at different times based on needs, interests, and contexts. This dynamic suggests that the workings of the soul are subject to conservation laws. Overall, the indications are that the soul-body system works in a naturalistic way.

5.10. How might souls arise?

Complex naturalistic things do not simply appear; that would be supernatural. Could souls have arisen naturalistically? Science understands the natural world to have arisen by a process of evolution, with more complex creatures having gradually evolved from simpler ones. Evolution drives change differentially based on context, with the result that both complex and simple creatures exist in the world today. If souls were naturalistic, one would similarly expect to see a complexity spectrum of soul-like things in terms of structure, composition and capabilities, making it unlikely that human souls would be the only kind.

There is NDE evidence that that this is indeed the case. Some NDE experiencers report being met by their deceased pets [153], [154], and in fact these are also encountered in death-bed visions [155] and apparitions [156]–[158]. Those who report experiencing other realms report seeing creatures there resembling animals, insects and plants [159]. This does suggest that there may be a spectrum of psychonic things that could be considered souls, albeit not human souls.

The other realms experienced in NDEs are famously reported also to contain other, unearthly kinds of beings often labelled ‘angels’ or ‘beings of light’. Although these beings appear to be very different from souls, they have psychonic properties and capacities such as intensionality, consciousness, values, means of communication and social relationships. Given their distinct natures they might represent independent psychonic evolutionary lineages.

If we believe that souls have evolutionary origins it opens up other more speculative but interesting explanatory opportunities. For example, orthodox evolutionary theories indicate that living things developed relatively recently in cosmological history and consciousness perhaps even more recently. One might wonder how conscious living things could have evolved from the components of an earlier physical universe. However if, as we have argued, the physical universe is embedded in a broader hyper-dimensional universe, this puzzle might simply reflect that interaction between psychonic things and physical things could not begin until

the physical universe had evolved beyond a certain level of complexity and stability. In fact, one might wonder whether psychonic influences originating in hyperspace could have been responsible for the "anthropic principle", the mysterious 'fine tuning' of the cosmological parameters to the specific combination of values that are just right for supporting the emergence of organic life.

5.11. Would it matter if we had souls?

Our exploration so far is of things and contexts that are in many ways analogous to how things are in the ordinary world; it looks as though the soul is a kind a of body with means of perception and action analogous to physical ones, that exists in a kind of place and environment that is unusual but not radically strange. Overall, this looks like an enlarged perspective but not a transformative one. Or so it seems.

We know that we are vulnerable to an array of perceptual traps and hazards that lead us to experience things in ways that are conditioned by our expectations and prior mental models. We can also miss important details in a scene because we focus our attention closely on aspects that particularly interest us. We should suspect that such effects may have hidden from us key aspects of the NDE experience and its meaning. Perhaps it all looks rather familiar because that is all we able or likely to notice, rather than that there was not much more to see. It is very likely that key aspects of the meaning of the evidence remain to be uncovered.

This being the case, we should look for ways in which we can shift our perspective to where we can see more clearly. Can we find ways to look for evidence of phenomena that have no familiar analogue in ordinary experience?

There are techniques for doing this. One way is to try to look beyond the immediately apparent *content* of the experiences, and reflect on what the *attributes* of the experiences might reveal. Perhaps we might find interesting insights 'hiding in plain sight'. We will offer one example of this.

A central theme of the NDE narrative is a meeting with a 'being of light', often identified by the experiencers as the central deity of their religion. Of course there are expectation effects at work here, so the real nature of the 'being of light' is mysterious to us. However, that identification issue is only about the immediately apparent content of the experience. Something else is going on here that is equally interesting, something remarkable that lies at the heart of the transformative power of the NDE experience. Here are some typical examples:

> "…I floated…up into this pure crystal light…it was beautiful, and so bright, so radiant, but it didn't hurt my eyes. It's not any kind of light you can describe on earth. I didn't actually see a person in this light, and yet it has a special identity, it definitely does. It is a light of perfect understanding and perfect love" [28].

> "I recall thinking to myself 'This is *it* – Death.' And 'looked around' to see straight ahead a bright light, sending warmth and benevolence…" [160]

> "All the time I was up there I never felt afraid, or alone. There was someone or something up there. A presence that radiated love, joy, warmth and deep awesome spiritual feeling… It was the most beautiful experience I have ever had, and I will always cherish it" [74]

> "Around me, as the tunnel began to lighten, there were presences. They were not people, and I didn't see anything, but I was aware of their *minds*…There was total wisdom and goodness in them" [64], (emphasis in original).

These experiences are remarkable, not just for what was encountered but for how it was perceived, which is even more astonishing. We see here that souls have the ability to directly perceive qualities that we normally only experience subjectively, such as love, benevolence, goodness and wisdom. Besides the fact that these qualities are directly observable, they were perceived in a context with which the experiencer had no prior experience. There would have been no cues about how to interpret the beings' nature or intent. As this perception is direct, it has objective qualities like the redness of a rose.

Any suggestion that people are simply jumping to positive conclusions fails due to reports of encounters with beings and presences that are observed in a negative way. Here are examples:

> "I seemed to arrive in a huge, broad place like a void of pitch-black darkness....in the darkness, I sensed the most incredible coldness and fear coming over me.... I began to sense evil in the darkness. The darkness seemed not just physical but spiritual. I felt like I was being watched. A cold encroaching evil seemed to pervade the air around me. I knew there was something around me" [161].

> "I was going down, deep down into the earth. There was anger and I felt this horrible fear. Everything was grey… There was this terrible feeling of being lost. …there were two beings of some kind near me. I believe one was evil, maybe the Devil. He was the force that was tugging me down into that awful place. I felt enveloped by dark, black evil" [162].

Contrary to these, we have many cases of people reporting being 'embraced' or 'enveloped' by love or goodness [64]. These accounts are mirrored in the broader literature on spontaneous religious experiences, where love, beauty, joy or sacredness is often experienced as a power and/or an influence [160], [163], [164].

The objectivity of these impressions appears to be confirmed by the fact that exposure to them appears to generate lasting and commensurate effects. For example, an encounter with the 'being of light' during NDEs appears to have a lasting positive

effect on a person; more than 80% of NDErs report a strong positive change in their attitudes [61], [165]–[167] and Morse has found that "the deeper the experience of light, the greater the transformation" [91].

The ability to objectively project and directly perceive such qualities seems unlike anything we normally expect to find in the ordinary world. However, as we know from the models explored earlier, if the soul has a power in the out-of-body state then that power might still be present in the normal embodied state, albeit rather weakened. This is something we can look for beyond the NDE evidence.

Many philosophers have in fact argued that that when we encounter other beings we are directly aware of more than what is physically present before us or can be inferred from it. Here is Wittgenstein:

> In general I do not surmise fear in him - I see it. I do not feel that I am deducing the probable existence of something inside from something outside; rather it is as if the human face were in a way translucent and that I was seeing it not in reflected light but rather in its own [168].

Talents are unevenly distributed in the population, so some people might have this ability to an extraordinary degree, and perhaps be recognized as 'spiritual' or having high 'emotional intelligence'. Others might have less of it than usual and so perhaps be perceived as having a syndrome such as autism. As we explore this topic we can also look for evidence that these unusual abilities are naturalistic.

Interestingly, we do have data suggestive of the direct emission and perception of value-oriented qualities in ordinary life. A striking example of a deficit is provided by the neuropsychiatrist Oliver Sacks, describing his encounter with the well-known autist Temple Grandin:

> "I was struck by the enormous difference, the gulf, between Temple's immediate, intuitive recognition of animal moods and signs and her extraordinary difficulties understanding human beings, their codes and signals, the way they conduct themselves. One cannot say that she is devoid of feeling or has a fundamental lack of sympathy. On the contrary, her sense of animals' moods and feelings is so strong that these almost take possession of her, overwhelm her at times. She feels she can have sympathy for what is physical or physiological - for an animal's pain or terror - but lacks empathy for people's states of mind and perspectives. When she was younger, she was hardly able to interpret even the simplest expressions of emotion; she learned to 'decode' them later... Temple had longed for friends at school and would have been totally, fiercely loyal to a friend…, but there was something about the way she talked, the way she acted, that seemed to alienate others... Something was going on between the other kids, something swift, subtle, constantly changing - an exchange of meanings, a negotiation, a swiftness of understanding so remarkable that sometimes she wondered if they were all telepathic. She is now aware of the existence of these social signals. She can

> infer them, she says, but she herself cannot perceive them, cannot participate in this magical communication directly..." [169].

From this it looks as though people really *can* be, as Wittgenstein put it, 'aspect blind'. Grandin has learnt to infer such properties from body language by asking others to explain the correlations to her, so she could memorise them. She clearly has the ability to note non-verbal cues and to associate meanings with them, but this is a poor substitute for the faculty non-autistic people have and not a model of how they do it.

From a naturalistic perspective, we know that perception is mediated by fields that are emitted or reflected by the thing perceived and absorbed by the percipient's sensor. This means that if this ability is naturalistic, a field must exist capable of carrying such information. There was a suggestion of this in some of the experiences quoted above, where people reported the 'being of light' as *sending* warmth and benevolence, or *radiating* love, joy, and warmth.

Here are two credible and telling anecdotes. The first comes from the journalist Dominic Lawson,[8] talking about the chess Grand Master Garry Kasparov:

> "I first met him as a teenager in 1983 when I helped to organise a world chess championship semi-final in London. He was quite unlike anyone I have met before or since – and it didn't take any understanding of the rules of chess to appreciate his exceptionality. Waves of mental energy and, yes, aggression, emanated from his body in a way that intimidated everyone in his presence" [170].

Such influences have also been seen in formal research and personally experienced by researchers. For example, people report being affected by encounters with seasoned meditation practitioners [171] or simply by being in the presence of 'naturally good' people like the Dalai Lama.

The psychologist and expert researcher into emotions Paul Ekman[9], in a meeting with the Dalai Lama, experienced a spontaneous remission of his quickness to anger, a problem that he had struggled with for more than forty-five years:

> I had a very strong physical sensation for which we do not have an English word – it comes closest to "warmth", but there was no heat. It certainly felt

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[8] **Dominic Lawson** was editor of *The Spectator* (1990-1995) and editor of *The Daily Telegraph* (1995-2005). He is a strong chess player and author of *The Inner Game*, on the inside story of the 1993 world chess championship.

[9] **Paul Ekman** (b. 1934) holds a Ph.D. in clinical psychology and is the world's foremost expert on the study of emotional reactions. In 2001 he was named by the American Psychological Association as one of the most influential psychologists of the 20th century based on publications, citations and awards, and in 2009 he was named in TIME Magazine's Top 100 most influential people.

> very good, and like nothing I have felt before or after… As a scientist, I cannot ignore what I experienced… I think the change that occurred within me started with that physical sensation. I think that what I experienced was – a non-scientific term – "goodness". Every one of the other eight people I interviewed [who reported similar experiences] said they felt goodness; they felt it radiating and felt the same kind of warmth that I did. I have no idea what it is or how it happens, but it is not my imagination. Though we do not have the tools to understand it, that does not mean it does not exist [172].

These cases strongly suggest that people can both project and perceive such qualities. The implications of this could be far-reaching. If people and other beings can have such qualities objectively, there is an implication that people and beings, and perhaps places and substances, can be good or bad in an objective sense, not just as a matter of culturally conditioned judgement. We know that qualities such as emotional intelligence can be developed, so perhaps there are ways for people to grow into persons that are objectively better or worse. Perhaps such qualities survive across contexts, including the transition from embodied life to an afterlife and whatever lies beyond. If that is the case, our cosmological understanding of the evolutionary journey that we are on is far from complete, and exciting discoveries await us as we further investigate the evidence for survival beyond death.

6. The best evidence and its value

We have argued that the best available evidence for the survival of human consciousness after permanent bodily death is, in fact, a collection of different types of evidence and accompanying arguments, each doing different work. In combination, they defend the plausibility of the survival hypothesis as an interpretation of the evidence.

Veridical cardiac arrest NDEs demonstrate convincingly that there is a phenomenon in need of explanation, and the NDEs of pre-verbal children render the living agent psi hypothesis implausible. Peak-in-Darien NDEs under cardiac arrest reinforce the case for investigating a dualistic model of long-term survival.

We drew on the broader NDE evidence to formulate a more detailed survival hypothesis to be evaluated in the light of the guiderails of science. This raises questions in response to which we added more detailed sub-hypotheses. We turned again to the broader NDE research for clues as to how we could formulate these sub-hypotheses in a way that respects the data while staying within the boundaries of science.

Next we turned to science itself for evidence to support the plausibility of these more detailed sub-hypotheses. At this point, the evidence we used might be surprising. Quasi-crystals, radar systems and autism have no obvious connection to survival, but here they provide useful evidence in support of our contention that the survival hypothesis can be understood within science. In fact, every question we have

investigated has resulted in evidence and arguments supporting a naturalistic conception of dualism. This evidence greatly increases the plausibility of our scientific dualistic survival hypothesis.

Along the way, we have identified evidence that suggests that certain qualities normally associated with socially constructed values such as goodness may be an objective feature of reality, and thus that our current cosmological understanding of the nature of persons and their place in the scheme of things may be radically incomplete.

Our analysis suggests that all of the evidence that we used is comprehensible within a scientific and hence naturalistic framework, raising the hope that science can expand our worldview to accommodate the phenomena suggestive of survival in a non-dismissive way.

7. Where can we go from here?

The survival theory we have outlined is only a sketch but we have shown it to be plausibly true, and we hope that this will motivate scientific researchers to take a greater interest in the topic. Diverse effort will be needed to bring us closer to determining what is actually true with greater certainty.

There is much more that could be done to further assess and either defend or challenge the plausibility of the survival hypothesis. There are many interesting questions to explore that we have not touched on in this essay. An immediate one relates to the mechanism by which the soul-body connection is modulated and controlled. There is research that suggests that N,N-Dimethyltryptamine (DMT) may play a role [173], [174]. If we can identify chemical pathways involved, it could lead to a deeper understanding of the mechanisms supporting soul-body interaction and alternative states of consciousness.

There are many aspects of NDE experiences that bear deeper thought. For example, not all NDE experiences are positive, and not all entities encountered are benevolent. We have discussed the evidence for resource limits and evolutionary pressures in the psychonic world, which might suggest that the hierarchy of psychonic beings forms a complex ecosystem. Understanding this better would help us to understand our own nature and future potential.

For us, this is the real potential of survival research, going far beyond the survival question itself. Every time that science has asked "What would have to be true about the world?", and had the answer trigger the addition of a concept that is really new and fundamental, the impact has been tremendous. Such discoveries often lead to insights far beyond the starting problem as well as wildly unforeseen technological opportunities.

Beyond that, this research holds out the promise of a deeper understanding of ourselves and our place in the natural world. Trying to understand the survival data in the context of a scientific model has already led us to some surprising discoveries. We have come to realise that we have perceptual abilities that we have not remarked

on because they are so much a part of our everyday experience. These seem to relate to our spirituality and the authenticity of our moral intuitions. Investigating these capabilities could significantly improve the way we engage with each other and with the natural world. One could hardly hope for a more worthwhile goal for science to pursue.

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