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Issue: *Perspectives on the Self***Near-death experiences: the experience of the self as real and not as an illusion**

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Because the publication of several prospective studies on near-death experience (NDE) in survivors of cardiac arrest have shown strikingly similar results and conclusions, the phenomenon of the NDE can no longer be scientifically ignored. The NDE is an authentic experience that cannot be simply reduced to imagination, fear of death, hallucination, psychosis, the use of drugs, or oxygen deficiency. Patients appear to be permanently changed by an NDE during a cardiac arrest of only some minutes' duration. It is a scientific challenge to discuss new hypotheses that could explain the possibility of a clear and enhanced consciousness—with memories, self-identity, cognition, and emotions—during a period of apparent coma. The current materialistic view of the relationship between consciousness and the brain, as held by most physicians, philosophers, and psychologists, seems to be too restricted for a proper understanding of this phenomenon. There are good reasons to assume that our consciousness, with the continuous experience of self, does not always coincide with the functioning of our brain: enhanced or nonlocal consciousness, with unaltered self-identity, apparently can be experienced independently from the lifeless body. People are convinced that the self they experienced during their NDE is a reality and not an illusion.

**Keywords:** near-death experience; cardiac arrest; consciousness; brain function; self-identity; illusion

*To study the abnormal is the best way of understanding the normal.*

WILLIAM JAMES

**Introduction**

A near-death experience (NDE) can be defined as the reported memory of a range of impressions during a special state of consciousness, including a number of special elements, such as an out-of-body experience (OBE), pleasant feelings, seeing a tunnel and/or light, seeing deceased relatives, a life review, or a conscious return into the body. Many circumstances are described during which NDEs are reported, such as cardiac arrest (clinical death), shock after loss of blood (childbirth), traumatic brain injury or stroke, near-drowning (children), or asphyxia, but also in serious diseases not immediately life threatening—during isolation, depression, or meditation, or without any obvious reason. The NDE is usually transformational, causing enhanced intuitive sensibility, profound changes of life insight,

and the loss of the fear of death.<sup>1</sup> The content of an NDE and the effects on patients seem similar worldwide, across all cultures and all times. However, the subjective nature and absence of a single frame of reference for this near-ineffable experience lead to individual, cultural, and religious factors determining the vocabulary used to describe and interpret this experience.<sup>1</sup>

Near-death experiences occur with increasing frequency because of the improved survival rates resulting from modern techniques of resuscitation. According to a recent random poll in the United States and Germany, about 4% of the total population in the Western world have experienced NDEs.<sup>2,3</sup> Thus, about nine million people in the United States should have had this extraordinary conscious experience. NDEs seem to occur relatively regularly and to many physicians are inexplicable phenomena and hence often ignored results of survival in a critical medical situation. Physicians hardly ever hear a patient tell about his or her NDE, and patients are reluctant to share their experience with others

because of the many negative responses they usually get.<sup>1</sup>

The phenomenon of the NDE raises a number of fundamental questions. An NDE is a special state of consciousness that occurs during an imminent or actual period of death, or sometimes without any obvious reason. But how and why does an NDE occur? How does the content of an NDE come about? Is there a biological basis of consciousness? Is it possible to speak of a beginning of our consciousness, and will our consciousness ever end? Why does a person's life change so radically after an NDE? Why is the experience of the self during an NDE so real? How is it possible to experience enhanced consciousness with the possibility of veridical perception independently of the lifeless body? In order to answer these questions, we need a better understanding of the relationship between brain function and consciousness. We shall have to start by examining whether there is any indication that consciousness with self-identity can be experienced during sleep, general anesthesia, coma, brain death, clinical death, the process of dying, and, finally, after confirmed death. If the answers to any of these questions are positive, we must look for scientific explanations and scrutinize the relationship between brain function and consciousness in these different situations.<sup>1</sup>

### **The Dutch prospective study on near-death experiences in survivors of cardiac arrest**

In order to obtain more reliable data to corroborate or refute the existing theories on the cause and content of an NDE, we needed a properly designed scientific study. This was the reason why in 1988 we started a prospective study in the Netherlands.<sup>4</sup> At that point, no large-scale prospective studies into NDEs had been undertaken anywhere in the world. Our study aimed to include all consecutive patients who had survived a cardiac arrest in 1 of the 10 participating Dutch hospitals. In other words, this prospective study would only be carried out among patients with a proven life-threatening crisis. This kind of design also creates a control group of patients who have survived a cardiac arrest but who have no recollection of the period of unconsciousness. In a prospective study, such patients are asked, within a few days of their resuscitation, whether they have any recollection of the period of their cardiac arrest, that is, of the period of their unconsciousness.

All patients' medical and other data are carefully recorded before, during, and after their resuscitation. The advantage of this prospective study design was that all procedures were defined in advance and no selection bias could occur.<sup>4</sup>

Within four years, between 1988 and 1992, 344 successive patients who had undergone a total of 509 successful resuscitations were included in the study. In other words, all the patients in our study had been clinically dead. *Clinical death* is defined as the period of unconsciousness caused by total lack of oxygen in the brain (anoxia) because of the arrest of circulation, breathing, or both, as caused by cardiac arrest in patients with an acute myocardial infarction. If in this situation no resuscitation is initiated, the brain cells will be irreversibly damaged within 5–10 min, and the patient will always die.<sup>4</sup>

A longitudinal study into life changes was based on interviews after two and eight years with all patients who had reported an NDE and who were still alive, as well as with a control group of postresuscitation patients who were matched for age and gender, but who had not reported an NDE. The question was whether the customary changes in attitude to life after an NDE were the result of surviving a cardiac arrest or whether these changes were caused by the experience of an NDE. This question had never been subject to scientific and systematic research with a prospective design before. The Dutch study was published in *The Lancet* in December 2001.<sup>4</sup>

If patients reported memories from the period of unconsciousness, the experiences were scored according to a certain index, the WCEI, or Weighted Core Experience Index.<sup>5</sup> The higher the number of elements reported, the higher the score, and the deeper the NDE. Our study found that 282 patients (82%) had no recollection of the period of their unconsciousness, whereas 62 patients—18% of the 344 patients—reported an NDE. Of these 62 patients with memories, 21 patients (6%) had some recollection; having experienced only some elements, they had a superficial NDE with a low score. Forty-one patients (12%) reported a core experience: 18 patients had a moderately deep NDE, 17 patients reported a deep NDE, and 6 patients reported a very deep NDE. The following elements were reported: half of the patients with an NDE were aware of being dead and had positive emotions; 30% had a tunnel experience, observed a celestial landscape, or met with deceased persons; approximately a

quarter had an out-of-body experience, communication with “the light” or perception of colors; 13% had a life review; and 8% experienced the presence of a border. In other words, all the familiar elements of an NDE were reported in our study, with the exception of a frightening or negative NDE.

Were there any reasons why some people did, but that most people did not, recollect the period of their unconsciousness? In order to answer this question, we compared the recorded data of the 62 patients with an NDE to the data of the 282 patients without an NDE. To our big surprise, we did not identify any significant differences in the duration of the cardiac arrest (2 or 8 min), no differences in the duration of unconsciousness (5 min or 3 weeks in coma), and no differences in whether intubation was necessary for artificial respiration in seriously ill patients who remained in a coma for days or weeks after a complicated resuscitation. Nor did we find statistical differences in 30 patients who had a cardiac arrest during electrophysiological stimulation in the catheterization laboratory and whose heart rhythms were always reestablished via defibrillation (an electric shock) within 15–30 seconds. So, we failed to identify any differences between the patients with a very long or a very brief cardiac arrest. The degree or gravity of the lack of oxygen in the brain (anoxia) appeared to be irrelevant. Similarly, it was established that medication played no role. Most patients suffering a myocardial infarction receive morphine-type painkillers, while people who are put on a respirator following complicated resuscitation are given extremely high doses of sedatives. A psychological cause, such as the infrequently noted fear of death, did not affect the occurrence of an NDE either, although it did affect the depth of the experience. Whether patients had heard or read anything about NDEs in the past made no difference either. Any kind of religious belief, or indeed its absence in nonreligious people or atheists, was irrelevant, and the same was true for the standard of education reached.<sup>4</sup>

We were particularly surprised to find no medical explanation for the occurrence of an NDE. All the patients in our study had been clinically dead, and only a small percentage reported an enhanced consciousness with lucid thoughts, emotions, memories, self-identity, and sometimes perception, from a position outside and above their lifeless body while doctors and nursing staff were carrying out resus-

citation. If there were a physiological explanation, such as a lack of oxygen in the brain (anoxia), for the occurrence of this enhanced consciousness, one might have expected all patients in our study to have reported an NDE. They had all been unconscious as a result of their cardiac arrest, which caused the loss of blood pressure, the cessation of breathing, and the loss of all body and brainstem reflexes. In studies in patients with induced cardiac arrest, the electrical activity of the brain could be measured by the registration of the electroencephalogram (EEG), and in these patients the EEG became always totally flat between 10 and 20 seconds (a flatline EEG).<sup>1</sup> It is also well established that people without any lack of oxygen in the brain, like in depression or meditation, can experience an “NDE.” Similarly, the gravity of the medical situation, such as long-term coma after a complicated resuscitation, failed to explain why patients did or did not report an NDE. The psychological explanation is doubtful because most patients did not experience any fear of death during their cardiac arrest, as it occurred so suddenly they failed to notice it. In most cases, they were left without any recollection of their resuscitation. A pharmacological explanation could be excluded as well, as the medication had no effect on whether patients reported an NDE.<sup>4</sup>

The later interviews in our Dutch longitudinal study were conducted using a standardized inventory featuring 34 life-change questions.<sup>6</sup> Among the 74 patients who consented to be interviewed after two years, 13 of the total of 34 factors listed in the questionnaire turned out to be significantly different for people with or without an NDE. The second interviews showed that, in people with an NDE, fear of death in particular had significantly decreased, while belief in an afterlife had significantly increased. We then compared these 13 factors, which had been so significantly different between the two groups with and without an NDE after two years, in the same patients after eight years. It struck us that after eight years the people without an NDE were also undergoing unmistakable processes of transformation. Nevertheless, clear differences remained between people with and without an NDE, although by now these differences had become a little less marked. We were also surprised to find that the processes of transformation that had begun in people with an NDE after two years had clearly intensified after eight years. The same was true for the people

without an NDE. Nevertheless, the people who had experienced an NDE during their cardiac arrest continued to be clearly different.<sup>1</sup> An NDE is an unforgettable confrontation with unlimited dimensions in our consciousness. As long as one has not experienced an NDE, it seems that it would be impossible to really understand the impact and the life-changing aftereffects of this overwhelming experience. The existing worldview has radically changed. One person said, "It felt as if I had become another person but with the same identity." The integration and acceptance of an NDE is a process that may take many years, with feelings of depression, homesickness, and loneliness, because of its far-reaching impact on people's pre-NDE understanding of life and value system. Finally, it is quite remarkable to see that a cardiac arrest, which lasts just a few minutes, give rise to such a lifelong process of transformation.<sup>1</sup>

### Other prospective studies on NDEs

Bruce Greyson, who published a prospective study of 116 survivors of cardiac arrest in the United States, found that 15.5% of the patients reported an NDE: 9.5% reported a core NDE and 6% reported a superficial NDE. He writes, "no one physiological or psychological model by itself could explain all the common features of an NDE. The paradoxical occurrence of a heightened, lucid awareness, and logical thought processes during a period of impaired cerebral perfusion raises particular perplexing questions for our current understanding of consciousness, and its relation to brain function. A clear sensorium and complex perceptual processes during a period of apparent clinical death challenge the concept that consciousness is localized exclusively in the brain."<sup>7</sup>

The British prospective study by Parnia *et al.* included 63 patients who survived their cardiac arrest. They found in their study that 11% reported an NDE: 6.3% reported a core NDE and 4.8% reported a superficial NDE. They write that the NDE reports suggest that the NDE occurs during the period of unconsciousness. This is a surprising conclusion, in their view, because "when the brain is so dysfunctional that the patient is deeply comatose, those cerebral structures, which underpin subjective experience and memory, must be severely impaired. Complex experiences as reported in the NDE should not arise or be retained in memory. Such patients

would be expected to have no subjective experience, as was the case in the vast majority of patients who survive cardiac arrest, since all centers in the brain that are responsible for generating conscious experiences have stopped functioning as a result of the lack of oxygen." Another, frequently cited explanation might be that the observed experiences occur during the early phases of the cessation or during the recovery of consciousness. Parnia *et al.*, however, claim that, "the verifiable elements of an OBE during unconsciousness, such as patients' reports on their resuscitation, render this extremely unlikely."<sup>8</sup>

Over a period of four years, Sartori carried out an even smaller study into NDEs, in 39 survivors of cardiac arrest in the United Kingdom. She found that 23% reported an NDE: 18% reported a core NDE and 5% reported a superficial NDE. She concludes that, "according to mainstream science, it is quite impossible to find a scientific explanation for the NDE as long as we 'believe' that consciousness is only a side effect of a functioning brain." The fact that people report lucid experiences in their consciousness when brain activity has ceased is, in her view, "difficult to reconcile with current medical opinion."<sup>9</sup>

### Some typical elements of an NDE

#### *Out-of-body experience*

During their OBE, people have the feeling that they have apparently taken off their body like an old coat, and to their surprise and confusion, they apparently have retained their own self-identity with the possibility of perception, emotions, and a very clear consciousness. Following a successful resuscitation, they can report veridical perceptions from a position outside and above their lifeless body. This OBE is scientifically important because doctors, nurses, and relatives can verify the reported perceptions, and they can also corroborate the precise moment the NDE with OBE occurred during the period of cardiopulmonary resuscitation (CPR). It is also important to mention that until now, it has been impossible to induce a real OBE with veridical perception from a position out and above the body by any method whatsoever,<sup>10</sup> despite incorrect suggestions about this possibility in the medical literature while just describing bodily illusions.<sup>11-14</sup> In a recent review of 93 corroborated reports of potentially verifiable out-of-body perceptions during an NDE, about 90% were found to be completely accurate,

8% contained some minor error, and only 2% were completely erroneous.<sup>15</sup> This proves that an OBE cannot be a hallucination, that is, the experiencing of a perception that has no basis in “reality,” like in psychosis; neither can it be a delusion, which is an incorrect assessment of a correct perception, nor an illusion, which means a misapprehension or misleading image.

Most scientists are reluctant to accept the possibility of veridical perception from a position out and above the lifeless body, because this could be the decisive evidence that conscious perception by the self is possible outside the body, and so deliberately they call these perceptions just anecdotes. These scientists want to have more “objective” proof, and of course most NDE researchers will agree. This is why hidden signs or targets have been put close to the ceiling in resuscitation rooms, coronary care units, and intensive care units, with the purpose that these hidden signs, not visible from the bed, could be an objective proof for veridical perception if patients during cardiac arrest are able to perceive details of their resuscitation from a position out and above their lifeless body during their CPR, and that later these perceptions can be corroborated by doctors, nurses, and relatives. Until now, however, there has been no published case where a patient has perceived this hidden sign during CPR, despite perceiving veridical details of their resuscitation previously unknown to them. Could there be a plausible explanation for this impossibility to “proof” the reported perception during OBE by a hidden sign? This lack of objective proof could be caused by so-called inattentional blindness, also known as perceptual blindness.<sup>16,17</sup> This is the phenomenon of not being able to perceive things that are in plain sight. It can be a result of having no internal frame of reference to perceive the unseen object, or it can be caused by the lack of mental focus or attention caused by mental distractions. This inattentional blindness is the failure to notice a fully visible, but unexpected, object because attention was engaged on another task, event, or object, because humans have a limited capacity for attention and intention.<sup>18,19</sup> Only if we have the intention to decide where to place the attention will we perceive consciously the event or object we focus upon. Our conclusion, based on the many corroborated cases of veridical perception from a position out and above the body during an NDE, is that it seems obvious that perception can actually occur

during an OBE, and that missing a hidden target during an OBE must be the result of a lack of intention and attention for this unexpected hidden object, inasmuch as during the OBE, patients are too surprised to be able to “see” the resuscitation of their own lifeless body from above during their cardiac arrest or surgery.

### *Life review*

During a holographic life review, the subject feels the presence and renewed experience of not only every act but also every thought from one’s life, and one realizes that, in some way, we are connected to others and to ourselves, such that we influence ourselves as well as others. Because one is connected with the memories, emotions, and consciousness of another person, you experience the consequences of your own thoughts about, words to, and actions toward that other person at the very moment in the past that they occurred (interconnectedness or entanglement). All that has been done and thought seems to be significant and stored. Patients survey their whole life in one glance; time and space do not seem to exist during such an experience (non-locality). Instantaneously, they are where they concentrate upon, and they can talk for hours about the content of the life review even though the resuscitation only took minutes. This panoramic review of one’s life seems to contain all the conscious and unconscious aspects or the essence of one’s self in constant and instantaneous connection with the consciousness of others.<sup>1</sup> Quotation:<sup>20</sup> “Not only did I perceive everything from my own viewpoint, but I also knew the thoughts of everyone involved in the event, as if I had their thoughts within me. This meant that I perceived not only what I had done or thought, but even in what way it had influenced others, as if I saw things with all-seeing eyes. And so, even your thoughts are apparently not wiped out. Time and distance seemed not to exist. I was in all places at the same time.”

### *Meeting deceased relatives*

If deceased acquaintances or relatives are encountered in an otherworldly dimension, they are usually recognized by their appearance, and communication is possible through what is experienced as thought transfer. Thus, it is also possible to come into contact with the consciousness or “self” of deceased persons (interconnectedness), even if it was not possible to know that these relatives had died.

Quotation:<sup>20</sup> “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.”

### *Conscious return of the self in the body*

Some patients can describe how they consciously returned into their body, mostly through the top of the head, after they had come to understand that “it wasn’t their time yet” or that “they still had a task to fulfil.” This conscious return of the self into the body is experienced as something very oppressive. They regain consciousness in their body and realize that they are “locked up” in their damaged body, meaning again all the pain and restriction of their disease.<sup>1</sup>

### **Theories about NDEs, consciousness, and the brain**

In the last decades, many articles and books have been published about consciousness, but up to now, there are no uniform scientific views about the relationship between consciousness and the brain.<sup>21</sup> Most people who study consciousness, neuroscientists, psychologists, psychiatrists, and philosophers, are still of the opinion that there is a materialist and reductionist explanation for consciousness. The well-known philosopher Daniel Dennett still believes, and many with him, that consciousness is nothing other than matter, and that our subjective experience that our consciousness is something purely personal and differs from someone else’s consciousness is merely an “illusion.”<sup>22</sup> According to these scientists, consciousness originates entirely from the matter that constitutes our brain. So the prevailing paradigm holds that memories, consciousness, and the experience of self are produced by large groups of neurons or neural networks. For want of evidence for the aforementioned explanations of the cause and content of an NDE, this commonly accepted but never proven assumption that consciousness is localized in the brain should be

questioned. After all, how can an extremely lucid consciousness be experienced outside the body at a time when the brain has a transient loss of all functions during a period of clinical death, even with a flatline EEG? Furthermore, even people who are blind from birth have described veridical perceptions during OBEs at the time of their NDE.<sup>23</sup> Scientific studies into the phenomenon of NDEs highlight the limitations of our current medical and neurophysiological ideas about the various aspects of human consciousness or self, and the relationship between consciousness and memories on the one hand, and the brain on the other. A new theory about NDE holds that an NDE might be a changing state of consciousness (the theory of continuity), in which memories, self-identity, and cognition, with emotion, function independently from the unconscious body, and retain the possibility of “nonsensory” perception. Obviously, during an NDE, enhanced consciousness is experienced independently from the normal body-linked waking consciousness or ego, even during the period of cardiac arrest or during the period of apparent unconsciousness or coma.<sup>1</sup>

### **Consciousness and brain function**

For decades, extensive research has been done to localize consciousness and memories inside the brain, so far without success. We should also ask ourselves how a nonmaterial activity, such as concentrated attention or thinking, can correspond to an observable (material) reaction in the form of measurable electrical, magnetic, and chemical activity at a certain place in the brain by EEGs, MEGs, and PET scans, and in the form of increased blood flow by shown by an fMRI. Neuroimaging studies have shown these aforesaid activities, with specific areas of the brain becoming metabolically active, in response to a thought or feeling. However, although providing evidence for the role of neuronal networks as an intermediary for the manifestations of thoughts (neural correlates), those studies do not necessary imply that those cells also produce the thoughts. A correlation does not elucidate anything about cause or result, and how should “unconscious” matter like our brain “produce” consciousness, while the brain is only composed of atoms and molecules in cells with an abundance of chemical and electrical processes? Direct evidence of how neurons or neuronal networks could possibly produce the subjective essence

of the mind and thoughts is currently lacking. We cannot measure what we think or feel.<sup>1</sup> There are no known examples of neural–perceptual matches, and hence, reasons to doubt the truth of the “matching content” doctrine. The assumption in the matching content doctrine is that following activation of special neuronal networks, one will always have the same content of thoughts or feelings. This seems extremely unlikely, because neural activation is simply neural activation; it only reflects the use of structures. This could be compared with a radio: you can activate the radio by turning it on, and you can activate a certain wavelength by tuning in on a special channel, but you will not have any influence on the content of the program you are going to hear. Activating the radio does not influence the content of the program, and neural activation alone does not explain the content of emotions or sensations.<sup>1</sup>

### **Summary of conclusions from research on NDEs, consciousness, and brain function**

In summarizing the aforementioned studies, one can conclude that, at present, more and more experiences are being reported by serious and reliable people who, to their own surprise and confusion, have experienced, independent of their physical body, an enhanced consciousness with a persistent experience of self. These experiences have been reported in all times, in all cultures, and in all religions.<sup>1</sup> In several prospective empirical studies, it has been proven that an enhanced and clear consciousness with self-identity can be experienced during the period of cardiac arrest (clinical death), when global cerebral function can at best be described as severely impaired and at worst nonfunctional.<sup>4,9</sup> One has to come to the conclusion that, based on these aforementioned well-documented prospective studies about NDEs in survivors of cardiac arrest, current scientific views fail to explain the cause and content of an NDE. Additionally, it seems indeed scientifically proven that during cardiac arrest no activity of the cortex and the brainstem can be measured, and also the clinical findings point out the transient loss of all functions of the brain.<sup>24,25</sup> In studying the function of the brain, it has been proven that under normal daily circumstances, during deep sleep, and during general anesthesia, a functioning network and a cooperation between many different centers of the brain is a prerequisite for the experience of our waking consciousness.<sup>26,27</sup> This is never

the case during a cardiac arrest. All scientists who performed the prospective studies on NDEs came to the same conclusion: lack of oxygen by itself cannot explain the cause and content of NDEs. This view is also supported by the fact that an NDE can be reported by people who did not have life-threatening illnesses but were in fear of death, in depression, or in meditation.<sup>1</sup>

### **Nonlocal consciousness**

So, it is indeed a scientific challenge to discuss new hypotheses that could explain the reported interconnectedness with the consciousness or self of other persons and of deceased relatives; to explain the possibility to experience instantaneously and simultaneously (nonlocality) a review and a preview of someone’s life in a dimension without our conventional body-linked concept of time and space, where all past, present, and future events exist and are available; and to discuss the possibility to have clear and enhanced consciousness with memories, with self-identity, with cognition, with emotion, with the possibility of perception out and above the lifeless body, and even with the experience of the conscious return of the self into the body.<sup>1</sup>

In my recent book, I describe a concept in which our endless consciousness with all the aspects or essence of self finds its origin in, and is stored in a nonlocal space as wave fields of information, and the brain only serves as a relay station for parts of these wave fields of consciousness to be received into or as our waking consciousness or ego in the shape of measurable and changing electromagnetic fields.<sup>1</sup> Could our brain be compared to the TV set, which receives electromagnetic waves and transforms them into image and sound? Could it as well be compared to the TV camera, which transforms image and sound into electromagnetic waves? These waves hold the essence of all information but are only perceivable by our senses through suitable instruments like the camera and TV set. The function of the brain should be compared with a transceiver, a transmitter/receiver, or interface, and the function of neuronal networks should be regarded as receivers and conveyors, not as retainers of consciousness and memories. This view is highly compatible with the concept of phenomenalism or immaterial (or neutral) monism.<sup>28</sup> In this concept, consciousness is not rooted in the measurable domain of physics, our manifest world. This also means that the wave

aspect of our indestructible consciousness in the nonlocal space is inherently not measurable by physical means. However, the physical aspect of consciousness, our waking consciousness or ego, which presumably originates from the wave aspect of our consciousness through collapse of the wave function, can be measured by means of neuroimaging techniques like EEGs, fMRIs, and PET scans. The impossibility to objectively measure or prove the nonlocal aspects of our consciousness, which also has been called “transpersonal,” “enhanced,” “higher,” “divine,” or “cosmic” consciousness, could be compared to gravitational fields, of which only the physical effects throughout the universe can be measured, but the fields themselves are not directly demonstrable.<sup>1</sup>

In trying to understand this concept of interaction between the invisible nonlocal space and our visible material body, it seems appropriate to compare it with modern worldwide communication. There is a continuous exchange of objective information by means of electromagnetic fields for radio, TV, mobile telephone, or laptop computer. We are not consciously aware of the vast number of electromagnetic fields that constantly, day and night, exist around us and even permeate us, as well as permeate structures like walls and buildings. At any moment, we are invaded by hundreds of thousands of telephone calls, by hundreds of radio and TV programs, and by innumerable websites. We only become aware of these electromagnetic informative fields at the moment we use our mobile telephone or by switching on our radio, TV, or laptop computer. What we receive is neither inside the instrument, nor in the components, but thanks to the receiver, the information from the electromagnetic fields becomes observable to our senses, and hence perception occurs in our consciousness. The voice we hear over our telephone is not inside the telephone. The concert we hear over our radio is transmitted to our radio. The images and music we hear and see on TV are transmitted to our TV set. The Internet, with more than a billion websites, can be received at about the same moment in the United States, in Europe, and in Australia, and is obviously not located in, nor produced by, our laptop.<sup>1</sup>

One cannot avoid the conclusion that endless or nonlocal consciousness has always existed and will always exist independently from the body, because there is no beginning, nor will there ever be, an end

to our consciousness. There is a kind of biological basis of our waking consciousness or ego, because, during life, our physical body functions as an interface or place of resonance. But there is no biological basis for our whole, endless, or enhanced consciousness because it is rooted in a nonlocal space. Our nonlocal consciousness with the experience of self resides not in our brain and is not limited to our brain. So our brain seems to have a facilitating, and not a producing, function to experience consciousness.<sup>1</sup>

## Conclusion

Thousands and thousands of people have reported an enhanced consciousness with self-identity during cardiac arrest or during a period of clinical death, when the function of the cortex and the brainstem has temporarily ceased. These patients are able to have an OBE with veridical perceptions from a position out and above their lifeless body. Their consciousness or self can be experienced in another dimension, without the concept of time and space, where past and future events are available. They are convinced that in this nonlocal dimension, the reality they experience is much more real than they ever experienced in the physical world. Moreover, they experience an enhanced cognitive function, with emotions, with memories, and with an interconnectedness with the content of the consciousness of other people in the past. They can be in contact with the consciousness or self of deceased relatives, and communication is possible through thought transfer. Finally, they can experience the conscious return of self back into the physical body.<sup>1</sup>

They realize that the physical world, as well as their ego or waking consciousness, only seems to have a subjective reality. They are convinced that the self as they experienced independently of the non-functioning brain during the NDE is a reality and not an illusion. But what is a generally and well-accepted definition of an illusion? One could define an illusion as a false or misleading impression of reality. Others define it not only as an erroneous perception of reality but also as an erroneous concept or erroneous belief. Additionally, many philosophers demarcate illusion from truth and falsehood. And for a lot of Indian philosophers, illusion is not the opposite of truth, but it is something that is not true and not false. On the basis of this philosophy, the physical world as humans normally



perceive is an illusion, but this does not mean that the world is not real. This could be said as well about the ego, or our body-linked waking consciousness, which can be regarded as a physical aspect of the self.

By studying people who have experienced an NDE, we found, to our surprise, that a persistent and unaltered self-identity can be experienced independently from the lifeless body at a moment the brain does not function during cardiac arrest, even with a flatline EEG, and so consciousness or self does not reside in our brain, nor is it limited to our brain, which proves that the self cannot be the product of brain function. Without a body, we still can have conscious experiences. Recently, someone with an NDE wrote me: "I can live without my body, but apparently my body cannot live without me." The conclusion seems compelling that endless or nonlocal consciousness with all the aspects of self has existed and will always exist independently from the body; people who have experienced an NDE tell us that the content of the consciousness they experienced during an NDE was far more real than they ever had experienced in their waking or daily consciousness.<sup>1</sup> For those people, the self is not something that is true or false, but it is real, even though it still can be called an illusion by some scientists, until, perhaps, they experience an NDE themselves.

It looks as if a single unusual finding that cannot be explained through widely accepted concepts and ideas is capable of bringing about a fundamental change in science. By making a scientific case for consciousness as a nonlocal and thus ubiquitous phenomenon, this view can contribute to new ideas about the relationship between consciousness and the brain. I am aware that this concept can be little more than a stimulus for further study and debate, because, at present, we lack definitive answers to the many important questions about our consciousness and its relationship to brain function. I have no doubt that in the future, too, many questions about consciousness and the mystery of life and death will remain unanswered. However, faced with extraordinary or anomalous findings, we must question a purely materialist paradigm in science. An NDE is one such extraordinary finding. Scientific studies of NDEs challenge our current concepts about consciousness and self and its relationship to brain function.<sup>1</sup>

## Conflicts of interest

The author declares no conflicts of interest.

## References

1. van Lommel, P. 2010. *Consciousness Beyond Life. The Science of the Near-Death Experience*. Harper Collins. New York. Translation from P. van Lommel, 2007. *Eindeeloos Bewustzijn*. Een wetenschappelijke visie op de bijna-dood ervaring. Ten Have. Kampen.
2. Gallup, G. & W. Proctor. 1982. *Adventures in Immortality: A Look Beyond the Threshold of Death*. McGraw-Hill. New York.
3. Schmied, I., H. Knoblauch & B. Schnettler. 1999. Todesnaheerfahrungen in Ost- und Westdeutschland. Eine empirische Untersuchung. In *Todesnähe: Interdisziplinäre Zugänge zu Einem Außergewöhnlichen Phänomen*. H. Knoblauch & H.G. Soeffner, Eds.: 65–99. Universitätsverlag Konstanz. Konstanz.
4. van Lommel, P., R. Van Wees, V. Meyers, et al. 2001. Near-death experiences in survivors of cardiac arrest: a prospective study in the Netherlands. *Lancet* **358**: 2039–2045.
5. Ring, K. 1980. *Life at Death: A Scientific Investigation of the Near-Death Experience*. Coward, McCann & Geoghegan. New York.
6. Ring, K. 1984. *Heading Toward Omega: In Search of the Meaning of the Near-Death Experience*. William Morrow. New York.
7. Greyson, B. 2003. Incidence and correlates of near-death experiences in a cardiac care unit. *Gen. Hosp. Psychiatry* **25**: 269–276.
8. Parnia, S., D.G. Waller, R. Yeates, et al. 2001. A qualitative and quantitative study of the incidence, features and aetiology of near death experience in cardiac arrest survivors. *Resuscitation* **48**: 149–156.
9. Sartori, P. 2006. The incidence and phenomenology of near-death experiences. *Network Review (Scientific and Medical Network)* **90**: 23–25.
10. Penfield, W. 1975. *The Mystery of the Mind*. Princeton University Press. Princeton, NJ.
11. Blanke, O., S. Ortigue, T. Landis, et al. 2002. Stimulating illusory own-body perceptions. The part of the brain that can induce out-of-body experiences has been located. *Nature* **419**: 269–270.
12. Blanke, O., Th. Landis, L. Spinelli, et al. 2004. Out-of-body experience and autoscapy of neurological origin. *Brain* **127**: 243–258.
13. Blanke, O. & Th. Metzinger. 2008. Full-body illusions and minimal phenomenal selfhood. *Trends Cogn. Sci.* **13**: 7–13.
14. De Ridder, D., K. Van Laere, P. Dupont, et al. 2007. Visualizing out-of-body experience in the brain. *N. Engl. J. Med.* **357**: 1829–1933.
15. Holden, J.M., B. Greyson & B. James. 2009. Veridical perception in near-death experiences. In *The Handbook of Near-Death Experiences*. Praeger (ABC-CLIO). Santa Barbara, CA. pp. 185–211.
16. Mack, A. & I. Rock. 1998. *Inattentive Blindness*. MIT Press. Cambridge, MA.

17. Simons, D.J. & R.A. Rensink. 2005. Change blindness: past, present, and future. *Trends Cogn. Sci.* **9**: 16–20.
18. Most, S.B., B.J. Scholl, E. Clifford, *et al.* 2005. What you see is what you set: sustained inattention blindness and the capture of awareness. *Psychol. Rev.* **112**: 217–242.
19. Chun, M.M. & R. Marois. 2002. The dark side of visual attention. *Curr. Opin. Neurobiol.* **12**: 184–189.
20. van Lommel, P. 2004. About the continuity of our consciousness. *Adv. Exp. Med. Biol.* **550**: 115–132. In *Brain Death and Disorders of Consciousness*. C. Machado & D.A. Shewmon, Eds. Kluwer Academic (Plenum) Publishers. New York, Boston, Dordrecht, London, Moscow.
21. Chalmers, D.J. 1996. *The Conscious Mind: In Search of a Fundamental Theory*. Oxford University Press. New York, Oxford.
22. Dennett, D. 1991. *Consciousness Explained*. Little, Brown and Co. Boston, London.
23. Ring, K. & S. Cooper. 1999. Mindsight. *Near-Death and Out-of-Body Experiences in the Blind*. William James Center for Consciousness Studies. Palo Alto, CA.
24. De Vries, J.W., P.F.A. Bakker, G.H. Visser, *et al.* 1998. Changes in cerebral oxygen uptake and cerebral electrical activity during defibrillation threshold testing. *Anesth. Analg.* **87**: 16–20.
25. Parnia, S. & P. Fenwick. 2002. Near-death experiences in cardiac arrest: visions of a dying brain or visions of a new science of consciousness. Review article. *Resuscitation* **52**: 5–11.
26. Massimini, M., F. Ferrarelli, R. Huber, *et al.* 2005. Breakdown of cortical effective connectivity during sleep. *Science* **309**: 2228–2232.
27. Ferrarelli, F., M. Massimini, S. Sarasso, *et al.* 2010. Breakdown in cortical effective connectivity during midazolam-induced loss of consciousness. *Proc. Natl. Acad. Sci. USA* **107**: 2681–2686.
28. Chalmers, D.J. 2002. Consciousness and its place in nature. In *Philosophy of Mind: Classical and Contemporary Readings*. Oxford University Press. New York, Oxford. Also at [http://\(consc.net/papers/nature.html](http://(consc.net/papers/nature.html).