

# Near-Death Experience

The term 'near-death experience' can describe any life-threatening event, but refers in particular to the cluster of anomalous mental events sometimes reported by people who have survived a potentially fatal accident or illness. The phenomenon was sporadically reported throughout history but began to receive widespread public notice in the late 1970s, as instances multiplied through the increased use of resuscitation technology.



The near-death experience, often referred to by the acronym 'NDE', has been the subject of considerable research by psychologists, medical doctors and others, also by experiencers themselves. Sceptics consider it to be a complex hallucination caused by neurobiological and psychological factors. Most specialist researchers consider these sorts of explanations insufficient, however.

## Introduction

The term Near-Death Experience was popularized by Raymond Moody, a psychologist and physician, in his 1975 book *Life after Life*, which described 150 case reports of subjective experiences that occurred during a life-threatening event.<sup>[1]</sup> The book aroused considerable interest among the general public and the topic was quickly followed up by other researchers.

Moody was the first to identify a commonly reported set of components, one or more of which may characterize a person's experience. It typically begins with a sudden sense of having 'left the body' and observing it from above. Feelings of ecstasy, peace and joy are prominent. The opening to a tunnel may be observed, and the person finds herself travelling through it at speed towards a light, which becomes extremely bright as she approaches but does not hurt the eyes.

Once immersed in the light she may find herself surrounded by beautiful landscapes; find herself in telepathic communication with deceased family members or friends; or encounter a 'being of light', or a religious figure that accords with her cultural upbringing. A review of her entire life may occur in a flash, during which she relives the entirety of her earthly experiences not just from her perspective, but also from that of the people with whom she interacted.

Towards the end of the experience the person may encounter a barrier, such as a fence or a stream, or be told by the loved ones she encounters that she may not pass any further and must return. Most experiencers do not recall making a conscious decision to return to life; some feel as though they re-enter the body through the head, or jolt back into it; others regain consciousness having returned to the body. A common feeling at this stage is one of anger and disappointment at having been resuscitated.<sup>[2]</sup> The experience is almost invariably reported as taking place in a *heightened* state of consciousness.

Following the event, the person typically undergoes life changes of a kind not usually reported by people who survive a near-death event without experiencing an NDE. These include:

- a new absence of fear of death
- loss of interest in money and material possessions
- increased love and compassion for others
- a renewed appreciation for family and friends and for nature
- career and relationship upheavals

Physiological changes may occur, including inexplicable self-healings.<sup>[3]</sup> Other reported changes include increased intuition or even psychic abilities, such as knowing what other people are thinking, and experiencing premonitions of future events. Some people find they have developed a curious sensitivity that causes electrical items to malfunction or even blow up. Wrist watches – whether wind-up or digital, expensive or inexpensive – can stop working for NDErs while continuing to work perfectly for other people.

## Transformation Effects

A commonly reported effect of an NDE is to initiate a disturbance in the experiencer's beliefs and values, often eventually

leading to a radical life transformation. Divorce is a frequently reported consequence.<sup>[4]</sup> Many experiencers embark on a spiritual journey, following Buddhism, Sufism, Christianity or other mystical/religious paths. Howard Storm<sup>[5]</sup> and George Rodonaia,<sup>[6]</sup> atheists at the time of their NDE, abandoned their previous occupations to train as Christian priests. Others become consumed with a new thirst for knowledge and find a new aptitude for previously unfamiliar subjects. Following an extensive NDE, Rajaa Benamour<sup>[7]</sup> reported having gained a sudden understanding of quantum physics, a subject she had never before studied; this motivated her to enrol in a university course, where her existing in-depth knowledge surprised her teachers.

Hungarian Tibor Putnoki<sup>[8]</sup> experienced a life changing NDE in 1993, when his heart stopped beating for nine minutes while in the intensive care unit. Since his recovery Putnoki has devoted his life to spreading the message of love and peace that he imbibed from his NDE, and became a co-founder of the Love of Light Foundation, travelling the world to give talks.

## Historical Cases

An experience clearly recognizable as the modern NDE is frequently referred to in historical literature.

The earliest known written account is found in the Tenth Book of Plato's *Republic* and describes the experience of a soldier named Er, who revived while lying on his funeral pyre twelve days after he had been killed in battle.<sup>[9]</sup> Er describes being escorted to a mysterious region and being confronted with two openings one next to the other. Judges sat between the entrances: those judged as righteous were sent to the right and upwards through the heaven, with tokens of their deeds attached to them. Those considered unjust were sent on the downward road to the left. At the mouths of other tunnels people were preparing for reincarnation on Earth. From above, happy souls reported visions of beauty; from below came the sounds of wailing, as souls bemoaned thousands of years of dreadful sufferings. A pillar of light resembling a rainbow extended from heaven to Earth, from which evolved a series of fates before those awaiting reincarnation. Prior to returning to life, each soul drank from the River of Forgetfulness, causing events to fade from memory. However, Er was not permitted to drink or forget, and so returned to life to tell the tale.

Accounts of near-death experiences in medieval times were presented by Carol Zaleski, an expert on world religions, in her scholarly study *Otherworld Journeys* (1987),<sup>[10]</sup> where they are compared with modern reports. Zaleski describes narratives that reflect the four phases in the development of the Christian otherworld journey: the vision of St Paul, which conveys an apocalyptic theme within the deathbed vision; miracles of ordinary people being sent back to life, as in the tales of Gregory the Great; the full visionary journey, including apocalyptic themes, as in the Vision of Drythelm; and finally, the otherworld journey as pilgrimage, as in that of St Patrick's Purgatory.

The typical medieval narrative appears to describe the same experience as the modern NDE, while using different symbolic imagery to describe it. Here, the journeys include a guide able to interpret unfamiliar signs, of archetypal, universal nature, usually that of an angel. Guides serve as a combination of instructor, protector and soul-taker in medieval accounts.

During the transition from this life to the next, Zaleski distinguishes a symbolic mode of passage, such as the wings of doves, Alexander's griffon and Elijah's chariot; or else the individual may follow the guide up a ladder or a waiting ship. Pathways encountered along the journey include pleasant imagery (rainbows, flowery meadows) or foreboding imagery (a dark forest, a thorny path laden obstructed by walls, rivers of fire or slippery bridges). Fire is a prevalent feature, its purpose seemingly to test, punish or purge. Sinners are burned according to the seriousness of their deeds; saints escape unharmed.

The bridge is a common feature in medieval accounts (being more of a hazard than now), symbolizing the danger of crossing the boundary into the other world. The bridges are perilous, obstructed by spikes, or too slippery to cross; they traverse rivers of knives, fire or foul smelling water, and narrow to a razor's edge for those guilty of wicked deeds.

Overall, the journeys can be seen as an initial encounter with hell followed by a taste of heaven, with a didactic purpose. Experiencers are warned by their guide to change their previous lifestyle and to warn others likewise, in order to secure their place in heaven. The narratives depict those who return as being profoundly changed, sometimes to the extent of giving up their possessions and living austere lives. Changes are physical as well as emotional: reviving from an NDE, Edmund of Eynsham found that an open leg wound had healed.<sup>[11]</sup>

Experiences of the NDE type have also been reported by explorers such as Henry Schoolcraft (1825)<sup>[12]</sup> and David Livingstone (1872).<sup>[13]</sup> A historical case from a non-Western culture is that of Black Elk, a Native American medicine man.

## Early Medical Literature

An article by the mountain climber Albert Heim, published in the Yearbook of the Swiss Alpine Club in 1892,<sup>[15]</sup> describes how climbers who survived serious falls subsequently recalled feeling no anxiety or pain during the experience, but rather a calmness and a sense of rapid mental acuity. Some also reported seeing ‘a review of their entire past’.<sup>[16]</sup>

Probably the earliest description of an NDE to be published in a medical journal is an account by physician AS Wiltse in the *Saint Louis Medical and Surgical Journal* in 1889.<sup>[17]</sup>

Early medical researchers in the field of near death studies included cardiologist Michael Sabom and paediatrician Melvin Morse. In 1976 Sabom, along with social worker colleague Sarah Kreutzinger, began asking patients who had survived a medical crisis if they recalled anything.<sup>[18]</sup> He subsequently developed a study to investigate whether the patients were close to death; whether the reported experiences were similar to those described by Moody; the frequency of NDEs; the possible influence on the content of educational, social, or religious background, or the type of medical crisis, or of the medical details; and whether the reduction in fear of death was due to the visionary elements of the experience, or merely to having had a close brush with death. Out of 78 patients who survived a near-death medical crisis it was estimated that 27% had an NDE.<sup>[19]</sup> Sabom further reported that those who claimed to have had an OBE during the experience gave an accurate portrayal of events that occurred in their vicinity at the time they were unconscious. He concluded that NDEs were common amongst patients who survived near-death medical events.<sup>[20]</sup>

In a later study, Sabom interviewed 160 hospital patients over a period two years.<sup>[21]</sup> A particularly noteworthy report elicited during this study is that of Pamela Reynolds (*see below*).

Melvin Morse was motivated to undertake a study into paediatric experiences<sup>[22]</sup> when a child patient who had nearly drowned reported ‘visiting heaven and seeing God’ during the period when she was unconscious.<sup>[23]</sup> At the paediatric intensive care unit he interviewed twelve children who had survived cardiac arrest and found that the majority (70%) described elements consistent with an NDE.<sup>[24]</sup> He followed up some of the patients fifteen years later, reporting that these young people were physically, spiritually and psychologically balanced, were more mature and did better in school than their peers, ate healthier food, and trusted their intuitions. In general, Morse reported, they felt a purpose to living and did not fear death as the end of all experience.<sup>[25]</sup>

Other hospital research was undertaken by Janice Miner Holden<sup>[26]</sup> and Madelaine Lawrence.<sup>[27]</sup> These researchers initiated veridical experiments to test the OBE component of the NDE by hiding images that could only be viewed from an out-of-body perspective in emergency wards. In Lawrence’s study of the experience of being unconscious, 10% reported an NDE, 6% reported an OBE and 8% reported near-death visitations.<sup>[28]</sup>

## Growing Public Awareness

Thanatologist Elisabeth Kübler-Ross was the first to document cases of NDEs that she encountered during the course of her work. German theologian Johann Hampe,<sup>[29]</sup> himself an experiencer, collected NDE cases which he published in a book in Germany in 1975, translated into English in 1979. However, it was Raymond Moody’s 1975 book that established NDEs in public awareness, quickly becoming a bestseller. Other researchers and scholars now began to take an interest, notably Paul and Linda Badham, Margot Grey, David Lorimer, and Peter and Elizabeth Fenwick in the UK, and Kenneth Ring, Bruce Greyson, Michael Sabom, Michael Grosso and Carol Zaleski in the US. A number of autobiographical accounts of NDEs began to be published.<sup>[30]</sup>

In 1977, a gathering of interested professionals and experiencers led to the founding of the Association for the Scientific Study of Near-Death Phenomena. Four years later this organization became the International Association of Near-Death Studies (IANDS).<sup>[31]</sup> Prominent founding members included Raymond Moody, medical sociologist John Audette, social psychologist Kenneth Ring, cardiologist Michael Sabom, and psychiatrist Bruce Greyson.<sup>[32]</sup> IANDS has many purposes, including research and education and the provision of a support network for experiencers and their families. It has developed a scholarly journal, initially called *Anabiosis: Journal of Near-Death Studies* published twice a year; this later became the quarterly *Journal of Near-Death Studies*. IANDS sponsors an annual conference, making presentations and testimonials available for purchase via its website. Many local and international support groups affiliated with IANDS have been established.

Since the advent of the internet many websites have been set up dedicated to NDEs. In 1996, Kevin Williams set up Near-Death Experiences and the Afterlife [www.near-death.com](http://www.near-death.com). In 1998, Jeffrey and Jodie Long set up the Near-Death

Experience Research Foundation website [www.nderf.org](http://www.nderf.org). Both sites receive millions of page hits per month and they continue to grow.

## Distressing NDEs

An aspect of NDEs that receives scant attention is the distressing or hellish type of experience, of being in a void, an eternal dark place, or even being dragged by demons into hell. These were first discussed by cardiologist Maurice Rawlings,<sup>[33]</sup> who reported that a patient being resuscitated begged to be brought back to life because he had found himself 'in hell'. Rawlings's emphasis on the hellish nature of certain NDEs was initially viewed with scepticism by other researchers, especially when scrutiny of his work revealed a fundamentalist Christian bias (which he later admitted).<sup>[34]</sup>

However, other researchers have since also reported cases of distressing NDEs,<sup>[35]</sup> and the occurrence is becoming more widely acknowledged. Nancy Evans Bush experienced a distressing NDE as a young adult, and has spent the past thirty years trying to understand the phenomenon, culminating in her book *Dancing Past the Dark*.<sup>[36]</sup>

British researcher Margot Grey<sup>[37]</sup> classified the type as 'negative NDEs' and 'hell-like NDEs'. A later study of fifty cases of the type was classified by Greyson and Bush<sup>[38]</sup> as essentially the familiar NDE, but interpreted in a distressing way. Cardiologist Barbara Rommer<sup>[39]</sup> added a further category of those who were distressed by reliving their life review. Rommer argued that, despite the distressing nature of these experiences, they had a positive effect in prompting changes to the experiencer's subsequent behaviour. However, this was contested by Bush<sup>[40]</sup> who pointed out a lack of objective evidence in its support.

Other documented cases have been distressing in the initial phase but turned into a pleasant experience,<sup>[41]</sup> or vice versa.<sup>[42]</sup> It has been suggested that those who fear the loss of their ego<sup>[43]</sup> and are used to being in control<sup>[44]</sup> are more likely to report a distressing NDE because they resist the experience of dying rather than surrender to it.

Greyson and Bush<sup>[45]</sup> explore the possibility that distressing NDEs can be a form of traumatic stress disorder, pointing out that the long term after-effects of these experiences are not yet known. Two cases reported in the literature suggest that these can last as long as the effects of pleasant NDEs.<sup>[46]</sup>

There are few statistics to describe the overall frequency of distressing NDEs, but estimates can be made from the work of individual researchers. Of 36 people interviewed after surviving a heart attack, Garfield found that among those who reported visions there were almost as many reports of unpleasant experiences as pleasant ones.<sup>[47]</sup> More commonly, distressing experiences account for a small minority, an eighth of Grey's forty-one NDE cases,<sup>[48]</sup> 105 out of the more than 700 cases collected by PMH Atwater,<sup>[49]</sup> and 18% of Rommer's collection of 300 NDEs.<sup>[50]</sup> Among prospective hospital studies only one has reported distressing NDEs, where two out of fifteen cases were of this kind.<sup>[51]</sup>

It must also be acknowledged that distressing spiritually transformative experiences have been reported in the absence of life threatening circumstances. Many such reports, found in the archives of the Religious Experience Research Centre founded by Sir Alister Hardy in 1969, have been discussed by Jakobsen.<sup>[52]</sup> Distressing experiences are found in the medieval literature,<sup>[53]</sup> and also in ancient texts such as the *Tibetan Book of the Dead*,<sup>[54]</sup> the *Egyptian Book of the Dead*,<sup>[55]</sup> and its European equivalent, *Ars Moriendi*.

The relative lack of research on this topic means only tentative conclusions can be drawn. Bush comments that both pleasant and distressing NDEs signify the depths of spiritual experience, neither type reflecting the moral character of the experiencer.<sup>[56]</sup> Prospective hospital research offers the potential to gather more cases of the distressing kind, enabling a more accurate estimate of their incidence. However, researchers would need to be alert to this type of experience, and the Greyson Scale would need to be modified to enable their inclusion.

## Key Researchers and Interpretations

Moody's *Life after Life* (1975), which defined the NDE and identified common components, was followed by other investigations and interpretations. In the 1970s, psychiatrist Russell Noyes Jr. and colleague Ray Kletti<sup>[57]</sup> extended the work of Heim<sup>[58]</sup> by conducting further descriptive and statistical studies of the experience of facing imminent death. They interpreted the experience as 'depersonalization', the ego's defensive response to stress, in which anxiety is reduced by a combination of detachment and transcendent feelings.

Moody acknowledged that *Life after Life* was not a scientific study. Kenneth Ring,<sup>[59]</sup> professor of psychology at the University of Connecticut, therefore set out to provide a substantial scientific foundational basis for the NDE, introducing

satisfactory sampling procedures and comparison groups, and quantifying variables.<sup>[60]</sup> He and his staff interviewed more than a hundred people who had come close to death. The aspects they investigated included the incidence of NDEs; whether NDEs are influenced by the circumstances that cause them; and the possible influence of religious beliefs. They also compared NDEs reported during suicide attempts, illness and accident, and went on to investigate the phenomenon of subsequent life changes.

To measure the experience Ring constructed the Weighted Core Experience Index (WCEI), based on the components identified by Moody.<sup>[61]</sup> The stages he incorporated were:

- the sense of being dead
- feelings of peace and well-being
- body separation
- entering the darkness
- encountering a presence or hearing a voice
- taking stock of one's life, seeing or being enveloped in the light
- seeing beautiful colours
- entering the light
- encountering visible 'spirits'

Each of the components included in the WCEI were assigned a value. The range of the experience was between 0 and 29, 0 indicating 'no components experienced' and 29 signifying a 'very deep experience'. Despite minor differences, Ring's findings reinforced Moody's work and provided a strong platform from which other research was to develop.

Bruce Greyson, former professor of psychiatry at the University of Virginia, has made a substantial contribution to NDE research over the past three decades, having published more than 100 articles in academic, medical and psychological journals, edited three books and been awarded several research grants and awards. He served as editor for *The Journal of Near-Death Studies* from its founding in 1981 until 2008.

Greyson conceptualized the NDE as set of factors that were cognitive, affective, paranormal and transcendental; his Greyson NDE Scale,<sup>[62]</sup> using factor analysis, has been used in many research studies. Along with colleague Nancy Bush, Greyson was one of the first researchers to attempt to distinguish between different kinds of distressing NDEs. In a summary co-authored by Edward and Emily Kelly,<sup>[63]</sup> he points out that the phenomenon of clear consciousness being maintained in the absence of vital life signs conflicts with prevailing scientific norms, concluding that:

The real challenge of explanatory models of NDEs lies in examining how complex consciousness, including thinking, sensory perception, and memory, can occur under conditions in which current physiological models of mind deem it impossible.

British neurophysiologist and neuropsychiatrist Peter Fenwick has researched NDEs since the 1980s. Fenwick was educated at Trinity College, Cambridge and is now visiting lecturer at King's College, London. He has run a neuropsychiatry unit at the Institute of Psychiatry London, and specialized in epilepsy. Over a period of ten years he spent up to six months a year at Riken Neuroscience Research Centre in Japan, where he published pioneering research papers on neurological functioning.

Fenwick has overseen and advised on the work of leading researchers in the field including Margot Grey, Sam Parnia, Penny Sartori, Ornella Corazza, Sue Brayne and Hilary Lovelace; he has also mentored PhD students. Following television documentaries he received hundreds of letters from people who reported an NDE, and this led to the publication of his book *The Truth in the Light* (1997) co-authored with his wife Elizabeth.<sup>[64]</sup> Further interest in end-of-life and deathbed visions resulted in the publication of *The Art of Dying* (2008),<sup>[65]</sup> also co-authored by Elizabeth. Fenwick continues to be president of the Scientific and Medical Network and The Horizon Research Foundation.

## Recent Studies

Following on from the work of Sabom and Morse, recent decades have seen the advent of prospective hospital studies. Prospective studies have the advantage of being able to verify the proximity to death, assess the blood results, verify which drugs if any were administered and potentially verify accounts of the out-of-body experience. Medical personnel who were present at the medical emergencies during which the NDE occurred can be interviewed. In some studies targets were hidden at vantage points in the emergency rooms in a position where they could only be viewed from an out-of-body perspective (*see below*).

A breakthrough study of this kind was published in 2001 by Dutch cardiologist Pim van Lommel and his colleagues in the prestigious medical journal *The Lancet*. It started with ten hospitals; one was withdrawn when it was found not all consecutive cardiac arrest cases could be followed up immediately. To test the veridical aspect of out-of-body perception, a sign was placed on the top of the surgical lamp in the resuscitation room in one of the hospitals, where it could only be seen from above.

The study included 344 consecutive patients who had survived cardiac arrest over a four year period (1988-1992). Patients were interviewed within the first few days of being successfully resuscitated. They were followed up after two years, and again at eight years, to establish what, if any, long-term changes had taken place. Sixty-two of the 344 patients reported an NDE (18%). Analysis showed that factors such as duration of cardiac arrest, duration of unconsciousness, intubation, induced cardiac arrest, medication, fear of death, prior knowledge of NDEs, religion and standard of education did not influence the occurrence of an NDE. Factors that appeared to influence the occurrence of an NDE were being aged below sixty and a first myocardial infarction. Patients who required multiple resuscitations were also more likely to report an NDE. Patients who had an NDE in the past reported them significantly more often in this study.

This study reported the case of the patient who, during an out-of-body experience at the time his resuscitation, observed a nurse remove his dentures and place them on the crash cart. This action was later verified by the nurse.

Previously mooted physiological, psychological or pharmacological causes were not corroborated during this study.

The longitudinal aspect of the study revealed that patients' behaviour and attitudes changed as a direct result of their NDE, and that these changes increased with time. Changes included:

- a reduced fear of death
- increase in compassion
- heightened sense of intuitive feeling
- greater involvement in family life
- greater interest in spirituality
- reduced interest in money, possessions and social norms
- experiences of clairvoyance, premonitions and visions

The eight-year follow-up interview revealed that all patients, including those that did not experience an NDE, had developed a greater interest in nature and the environment and in social justice; they also showed more loving emotion, and were more involved in family life. However, long-lasting changes such as those listed above proved to be significantly more extensive in those who had reported an NDE, a striking and unexpected finding, van Lommel concluded,<sup>[66]</sup> in an experience that lasts a matter of minutes.

A smaller year-long study undertaken at Southampton General Hospital by Dr Sam Parnia and colleagues was published in 2001. Of 63 patients who survived cardiac arrest, seven reported an NDE (11%). This study aimed to test the veridical component of the OBE by installing targets that could only be viewed from above; however, none of the patients reported an OBE.

An American study was undertaken between 1991 and 1994 at Barnes-Jewish Hospital at the Washington University School of Medicine in St Louis, MO.<sup>[67]</sup> Of 174 patients who underwent cardiac arrest, fifty-five survived; of these, thirty could be interviewed and seven reported an NDE (23%).

A larger study comprising 1,595 patients from the cardiac units at the University of Virginia Hospital was published by Bruce Greyson.<sup>[68]</sup> Of these patients, 5% reported a previous NDE. The comparative study examined 116 cases of cardiac arrest: a total of 15.5% reported an NDE. This study, too, tested the veridical component, but again, none of the patients identified the hidden target.

The results of a five-year UK study by hospital nurse Penny Sartori were published in 2008.<sup>[69]</sup> During the first year of the study, at a hospital in Swansea in Wales, every person who survived admission to the intensive care unit was interviewed. Not all were close to death; of the 243 patients who were interviewed only two reported an NDE (0.8%). However, when the sample was restricted to only those patients who survived cardiac arrest the frequency of NDE reports increased. During the five years of data collection there were thirty-nine survivors of cardiac arrest, of whom seven reported an NDE (17.9%). Analysis of physiological and pharmacological factors did not reveal a cause for these experiences. Eight out-of-body type experiences of varying quality were reported, but none of the individuals observed the hidden targets. One patient reported an NDE with an out-of-body component where he observed – and was later able to accurately describe –

the actions of three medical personnel, at a time when he was deeply unconscious.<sup>[70]</sup>

## AWARE Study

In 2014, the first results of the AWARE project were published.<sup>[71]</sup> This high profile, multicentre study was launched in 2008 and involved a total of fifteen hospitals in the UK, USA and Austria.

Over a period of four years, 2060 patients suffered cardiac arrest in the participating hospitals. The 330 who survived were potentially eligible to be entered into the study, and of these, 140 were found suitable for interview. Among these, fifty-five had memories of the time they were unconscious, and nine (6%) had memories consistent with an NDE. The group of fifty-five was further divided into three groups:

- Category 3 - detailed memories but no NDE = 46
- Category 4 - detailed memory and NDE but no auditory / visual awareness or recall = 7
- Category 5 - detailed memory and NDE with auditory / visual awareness and recall = 2

Of the two patients in Category 5, one had verified accuracy of events while the other had unverified accuracy of events. It is significant that verified memories were recalled during a time when the patient was unconscious and in cardiac arrest.

## Cases Reported by Famous People

NDEs have been reported by well-known figures. Psychoanalyst Carl Jung described an NDE that occurred in 1944 when he was hospitalized after suffering a heart attack.<sup>[72]</sup> Showbusiness celebrities who have described NDEs include Sharon Stone, Peter Sellers and Larry Hagman.

The year before he died, atheist philosopher AJ Ayer (1910-1989) described an experience that occurred when he was in hospital recovering from pneumonia.<sup>[73]</sup> He choked while eating, fell unconscious, was resuscitated and transferred to intensive care. The doctor who attended him later informed him that his heart had stopped for four minutes. Ayer had no recollection of the resuscitation and transfer to intensive care, but did recall an exceptionally vivid memory. He encountered a very bright, red light which he was convinced was 'responsible for the government of the universe'; and within it were two creatures that were 'responsible for space'. He realised that 'space was out of joint' because of these creatures' incompetence; he felt it was his job to rectify this with the insights he had suddenly acquired.

The experience appeared to affect him profoundly, to the extent that he wrote about it publicly, declaring '*death does not put an end to consciousness*'; he now doubted his previous belief that death would be the end and that there is no God. However, in an article published two months later<sup>[74]</sup> he retracted his original statement, denying that the experience had not weakened his belief that there is no life after death.

## Pamela Reynolds

Cardiologist Michael Sabom reported the case of Pamela Reynolds, who was operated on for a large basilar artery aneurysm requiring extreme surgical intervention.<sup>[75]</sup> Moulded ear plugs containing miniature speakers that emitted a loud clicking noise were placed in each of her ears to monitor auditory and brain stem reflexes; her electroencephalograph (EEG) was monitored to detect brain activity. The spikes that signalled the response to the clicks diminished until the EEG readout became flat, indicating a total lack of response. Her core body temperature was lowered to sixty degrees Fahrenheit and her heartbeat was stopped. The cardio-pulmonary bypass machine was switched off and the head of the operating table was tilted upwards to enable the blood to be drained from her head.

In the days following the operation Reynolds reported an extensive NDE, including an out-of-body component in which she observed – and was able later to accurately describe – the bone saw used during the procedure and the details of a conversation between the surgeons, both later confirmed by the medical records. This confounds expectations: physical hearing would have been rendered impossible, both ear canals having been occluded by the moulded speakers emitting loud clicks, while at the time the bone saw was being used the patient had been unconscious for approximately ninety minutes.

Possible explanations such as temporal lobe seizure were ruled out by the neurosurgeon who conducted the operation, Robert Spetzler: Reynolds's brain was monitored throughout the procedure, he pointed out, and the EEG detected no seizure. In a BBC documentary he stated 'I don't have an explanation for it, I don't know how it's possible for it to happen.'

Until recently, medical personnel were reluctant to discuss their own NDEs. However, the past few years have seen well-publicized reports by doctors such as orthopaedic surgeon Mary Neal, neurosurgeon Eben Alexander and Rajiv Parti former chief of anaesthesiology at Heart Hospital, Bakersfield, California.

## Scepticism and Controversy

Many causative theories have been suggested to explain the NDE within conventional science. One of the most commonly cited is lack of oxygen to the brain (anoxia). Dr Susan Blackmore<sup>[77]</sup> has further proposed that anoxia may induce abnormal firing of neurons on the margins of the brain, such as to create the illusion of a tunnel with a bright light at the end. Dutch anaesthetist Gerald Woerlee<sup>[78]</sup> further suggested that the pupils of the eye widen when adrenaline is administered; alongside the already anoxic brain, this would account for the light that does not hurt the eyes.

Critics of such approaches argue that they are insufficient. If Blackmore's thesis is true, why do not all survivors of cardiac arrest report the tunnel effect? Furthermore, onset of anoxia typically results in an acutely confused state that allows patients very little recall of the events,<sup>[79]</sup> contrasting sharply with the lucid thought processes and heightened state of awareness experienced during an NDE. Other popular theories propose a causative role in the high levels of carbon dioxide in the blood (hypercarbia) and the drugs and anaesthetics administered to the patient; however again, critics argue that none provides a definitive explanation when scrutinized in the light of the existing research.

Despite corroborated reports of out-of-body experiences reported in prospective studies<sup>[80]</sup> the prevalent materialist paradigm denies the possibility of such occurrences and reduces them to experiences created by a dysfunctional brain. The media has often given prominence to reports by scientists claiming to have discovered explanations for the out-of-body experience. However, it is questionable whether the findings apply to the phenomena discussed here, or rather to occurrences that share superficial similarities and to which the term 'out-of-body experience' is misleadingly applied.

Experimental research by Olaf Blanke et al<sup>[81]</sup> (2002), discussed in the prestigious scientific journal *Nature*,<sup>[82]</sup> proposed that the sensation of being outside the body can result from electrical stimulation of the angular gyrus within the brain. This and similar findings from a 2004 study by Blanke, reported in *Brain* journal,<sup>[83]</sup> have been hailed by leading sceptics such as Michael Shermer as confirmation that such experiences are essentially caused by neurological events and cannot be considered anomalous.<sup>[84]</sup>

Against this, Van Lommel argued that the experiences induced during Blanke's experiments led to a false sense of reality, not the heightened state of awareness described by people who experience an NDE. Greyson noted that evidence that the brain can stimulate OBE-like illusions cannot be held as proof that all OBEs are illusions. The experience on which Blanke's first finding was based was reported by just one subject, who suffered from uncontrollable epileptic seizures. The out-of-body experiences described by six subjects in a second study by Blanke, were quite different from those reported during an NDE: they included encounters with strangers, vague impressions of dreaming, feelings of distortion of body movement, and the feeling of being in two positions at once and of viewing only the legs and lower trunk. Also unlike the type of OBE discussed in the context of the near-death experience, the subjects could give no veridical details of events occurring in the vicinity of their body.

Other highly publicised media articles focused on the work of neurologist Kevin Nelson and colleagues<sup>[85]</sup> in the prestigious medical journal *Neurology*, which identified REM intrusion as the cause of near-death experiences. This was refuted in a detailed response by Long and Holden,<sup>[86]</sup> which highlights eight points where it fails as a sufficient explanation.

Philosopher Keith Augustine<sup>[87]</sup> has argued that NDEs are hallucinatory, claiming that neither the extensive prospective research nor well known cases such as that of Pamela Reynolds provide definitive evidence that information has been gained while the person was unconscious. Augustine's arguments were detailed in a series of papers in issues of *The Journal of Near-Death Studies* in 2007, where they were vigorously contested by experts in the field.

Further issues were debated in this same journal by Dutch anaesthetist Gerald Woerlee,<sup>[88]</sup> who contested the findings of an investigation<sup>[89]</sup> that confirmed the case of the man who saw his dentures being removed during resuscitation from an OBE perspective (as reported by Van Lommel et al).<sup>[90]</sup> Woerlee's claims were criticized as incorrect,<sup>[91]</sup> and he declined a challenge to support them by undertaking a simple experiment.<sup>[92]</sup>

Woerlee raised further objections regarding the Pamela Reynolds case,<sup>[93]</sup> arguing that her veridical perceptions could be attributed to an ability to retain a degree of hearing during periods of conscious awareness while under anaesthetic. This elicited rebuttals from professor of anaesthesiology and psychology Stuart Hameroff<sup>[94]</sup> and commentator Chris Carter,<sup>[95]</sup> to which Woerlee again responded.<sup>[96]</sup>



Former intensive care nurse Penny Sartori<sup>[97]</sup> argues that the attention given to such debates detracts from practical applications that can follow from a greater understanding of these experiences, especially in healthcare. Sartori considers it is of great importance that these experiences are understood by healthcare workers to be a natural part of the dying process, so that patients' spiritual needs are addressed as death approaches.<sup>[98]</sup> Those who survive a near-death event can then be supported in the process of integrating and understanding their NDE. Sartori believes that a greater understanding of events that occur during the dying process can help to ensure a peaceful transition.

Penny Sartori

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