

Seeing God in the Third Millennium

By Oliver Sacks

How the brain creates out-of-body experiences and religious epiphanies

There are many carefully documented accounts in the medical literature of intense, life-altering religious experience in epileptic seizures. Hallucinations of overwhelming intensity, sometimes accompanied by a sense of bliss and a strong feeling of the numinous, can occur especially with the so-called "ecstatic" seizures that may occur in temporal lobe epilepsy. Though such seizures may be brief, they can lead to a fundamental reorientation, a metanoia, in one's life. Fyodor Dostoevsky was prone to such seizures and described many of them, including this:

The air was filled with a big noise and I tried to move. I felt the heaven was going down upon the earth and that it engulfed me. I have really touched God. He came into me myself, yes God exists, I cried, and I don't remember anything else. You all, healthy people ... can't imagine the happiness which we epileptics feel during the second before our fit. ... I don't know if this felicity lasts for seconds, hours or months, but believe me, for all the joys that life may bring, I would not exchange this one.

A century later, Kenneth Dewhurst and A. W. Beard published a detailed report in the *Journal of Neurology, Neurosurgery, and Psychiatry* of a bus conductor who had a sudden feeling of elation while collecting fares. They wrote:

He was suddenly overcome with a feeling of bliss. He felt he was literally in Heaven. He collected the fares correctly, telling his passengers at the same time how pleased he was to be in Heaven. ... He remained in this state of exaltation, hearing divine and angelic voices, for two days. Afterwards he was able to recall these experiences and he continued to believe in their validity. [Three years later] following three seizures on three successive days, he became elated again. He stated that his mind had "cleared." ... During this episode he lost his faith.

He now no longer believed in heaven and hell, in an afterlife, or in the divinity of Christ. This second conversion -- to atheism -- carried the same excitement and revelatory quality as the original religious conversion.

More recently, Orrin Devinsky and his colleagues have been able to make video EEG recordings in patients who are having such seizures, and have observed an exact synchronization of the epiphany with a spike in epileptic activity in the temporal lobes (more commonly the right temporal lobe).

Ecstatic seizures are rare -- they only occur in something like 1 or 2 percent of patients with temporal lobe epilepsy. But the last half century has seen an enormous increase in the prevalence of other states sometimes permeated by religious joy and awe, "heavenly" visions and voices, and, not infrequently, religious conversion or metanoia. Among these are out-of-body experiences (OBEs), which are more common now that more patients can be brought back to life from serious cardiac arrests and the like -- and much more elaborate and numinous experiences called near-death experiences (NDEs).

Both OBEs and NDEs, which occur in waking but often profoundly altered states of consciousness, cause hallucinations so vivid and compelling that those who experience them may deny the term hallucination, and insist on their reality. And the fact that there are marked similarities in individual descriptions is taken by some to indicate their objective "reality."

EEG with epileptic waveforms [\[Wikimedia Commons\]](#)

But the fundamental reason that hallucinations -- whatever their cause or modality -- seem so real is that they deploy the very same systems in the brain that actual perceptions do. When one hallucinates voices, the auditory pathways are activated; when one hallucinates a face, the fusiform face area, normally used to perceive and identify faces in the environment, is stimulated.

In OBEs, subjects feel that they have left their bodies -- they seem to be floating in midair, or in a corner of the room, looking down on their vacated bodies from a distance. The experience may be felt as blissful, terrifying, or neutral. But its extraordinary nature -- the apparent separation of "spirit" from body, imprints it indelibly on the mind and may be taken by some people as evidence of an immaterial soul -- proof that consciousness, personality, and identity can exist independently of the body and even survive bodily death.

Neurologically, OBEs are a form of bodily illusion arising from a temporary dissociation of visual and proprioceptive representations -- normally these are coordinated, so that one views the world, including one's body, from the perspective of one's own eyes, one's head. OBEs, as Henrik Ehrsson and his fellow researchers in Stockholm have elegantly shown, can be produced experimentally, by using simple equipment -- video goggles, mannequins, rubber arms, etc. -- to confuse one's visual input and one's proprioceptive input and create an uncanny sense of disembodiedness.

A number of medical conditions can lead to OBEs -- cardiac arrest or arrhythmias, or a sudden lowering of blood pressure or blood sugar, often combined with anxiety or illness. I know of some patients who have experienced OBEs during difficult childbirths, and others who have had them in association with narcolepsy or sleep paralysis. Fighter pilots subjected to high G-forces in flight (or sometimes in training centrifuges) have reported OBEs as well as much more elaborate states of consciousness that resemble the near-death experience.

The near-death experience usually goes through a sequence of characteristic stages. One seems to be moving effortlessly and blissfully along a dark corridor or tunnel towards a wonderful "living" light -- often interpreted as Heaven or the boundary between life and death. There may be a vision of friends and relatives welcoming one to the other side, and there may be a rapid yet extremely detailed series of memories of one's life -- a lightning autobiography. The return to one's body may be abrupt, as when, for example, the beat is restored to an arrested heart. Or it may be more gradual, as when one emerges from a coma.

Not infrequently, an OBE turns into an NDE -- as happened with Tony Cicoria, a surgeon who told me how he had been struck by lightning. He gave me a vivid account of what then followed, as I wrote in *Musicophilia*.

"I was flying forwards. Bewildered. I looked around. I saw my own body on the ground. I said to myself, 'Oh shit, I'm dead.' I saw people converging on the body. I saw a woman -- she had been standing waiting to use the phone right behind me -- position herself over my body, give it CPR. . . . I floated up the stairs -- my consciousness came with me. I saw my kids, had the realization that they would be okay. Then I was surrounded by a bluish-white light . . . an enormous feeling of well-being and peace. The highest and lowest points of my life raced by me . . . pure thought, pure ecstasy. I had the perception of accelerating, being drawn up . . . there was speed and direction. Then, as I was saying to myself, 'This is the most glorious feeling I have ever had' -- SLAM! I was back."

Dr. Cicoria had some memory problems for a month or so after this, but he was able to resume his practice as an orthopedic surgeon. Yet he was, as he put it, "a changed man." Previously he had no particular interest in music, but now he was seized by an overwhelming desire to listen to classical music, especially Chopin. He bought a piano and started to play obsessively and to compose. He was convinced that the entire episode -- being struck by lightning, having a

transcendent vision, then being resuscitated and gifted so that he could bring music to the world, was part of a divine plan.

Cicoria has a Ph.D. in neuroscience, and he also felt that his sudden accession of spirituality and musicality must have gone with changes in his brain -- changes which we might be able to clarify, perhaps, with neuroimaging. He saw no contradiction between religion and neurology -- if God works on a man, or in a man, Cicoria felt, He would do so via the nervous system, via parts of the brain specialized, or potentially specializable, for spiritual feeling and belief.

Dr. Alexander's October 2012 *Newsweek* cover article

Cicoria's reasonable and (one might say) scientific attitude to his own spiritual conversion is in marked contrast to that of another surgeon, Dr. Eben Alexander, who describes, in his recent book, *Proof of Heaven: A Neurosurgeon's Journey into the Afterlife*, a detailed and complex NDE which occurred while he spent seven days in a coma caused by meningitis. During his NDE, he writes, he passed through the bright light -- the boundary between life and death -- to find himself in an idyllic and beautiful meadow (which he realized was Heaven) where he met a beautiful but unknown woman who conveyed various messages to him telepathically. Advancing farther into the afterlife, he felt the ever-more-embracing presence of God. Following this experience, Alexander became something of an evangelist, wanting to spread the good news, that heaven really exists.

Alexander makes much of his experience as a neurosurgeon and an expert on the workings of the brain. He provides an appendix to his book detailing "Neuroscientific Hypotheses I considered to explain my experience" -- but all of these he dismisses as inapplicable in his own case because, he insists, his cerebral cortex was completely shut down during the coma, precluding the possibility of any conscious experience.

Yet his NDE was rich in visual and auditory detail, as many such hallucinations are. He is puzzled by this, since such sensory details are normally produced by the cortex. Nonetheless, his consciousness had journeyed into the blissful, ineffable realm of the afterlife--a journey which he felt lasted for most of the time he lay in coma. Thus, he proposes, his essential self, his "soul," did not need a cerebral cortex, or indeed any material basis whatever.

It is not so easy, however, to dismiss neurological processes. Dr. Alexander presents himself as emerging from his coma suddenly: "My eyes opened ... my brain ... had just kicked back to life." But one almost always emerges gradually from coma; there are intermediate stages of consciousness. It is in these transitional stages, where consciousness of a sort has returned, but not yet fully lucid consciousness, that NDEs tend to occur.

Alexander insists that his journey, which subjectively lasted for days, could not have occurred except while he was deep in coma. But we know from the experience of Tony Cicoria and many others, that a hallucinatory journey to the bright light and beyond, a full-blown NDE, can occur in 20 or 30 seconds, even though it seems to last much longer. Subjectively, during such a crisis, the very concept of time may seem variable or meaningless. The one most plausible hypothesis in Dr. Alexander's case, then, is that his NDE occurred not during his coma, but as he was surfacing from the coma and his cortex was returning to full function. It is curious that he does not allow this obvious and natural explanation, but instead insists on a supernatural one.

To deny the possibility of any natural explanation for an NDE, as Dr. Alexander does, is more than unscientific -- it is antiscientific. It precludes the scientific investigation of such states.

Kevin Nelson, a neurologist at the University of Kentucky, has studied the neural basis of NDEs and other forms of "deep" hallucinating for many decades. In 2011, he published a wise and careful book about his research, *The Spiritual Doorway in the Brain: A Neurologist's Search for the God*

Experience.

Nelson feels that the "dark tunnel" described in most NDEs represents constriction of the visual fields due to compromised blood pressure in the eyes, and the "bright light" represents a flow of visual excitation from the brainstem, through visual relay stations, to the visual cortex (the so-called pons-geniculate-occipital or PGO pathway).

Simpler perceptual hallucinations -- of patterns, animals, people, landscapes, music, etc. -- as one may get in a variety of conditions (blindness, deafness, epilepsy, migraine, sensory deprivation, etc.) do not usually involve profound changes in consciousness, and while very startling, are nearly always recognized as hallucinations. It is different with the very complex hallucinations of ecstatic seizures or NDEs -- which are often taken to be veridical, truth-telling and often life-transforming revelations of a spiritual universe, and perhaps of a spiritual destiny or mission.

The tendency to spiritual feeling and religious belief lies deep in human nature and seems to have its own neurological basis, though it may be very strong in some people and less developed in others. For those who are religiously inclined, an NDE may seem to offer "proof of heaven," as Eben Alexander puts it.

Some religious people come to experience their proof of heaven by another route -- the route of prayer, as the anthropologist T. M. Luhrmann has explored in her book *When God Talks Back*. The very essence of divinity, of God, is immaterial. God cannot be seen, felt, or heard in the ordinary way. Luhrmann wondered how, in the face of this lack of evidence, God becomes a real, intimate presence in the lives of so many evangelicals and other people of faith.

She joined an evangelical community as a participant-observer, immersing herself in particular in their disciplines of prayer and visualization -- imagining in ever-richer, more concrete detail the figures and events depicted in the Bible. Congregants, she writes:

Practice seeing, hearing, smelling, and touching in the mind's eye. They give these imagined experiences the sensory vividness associated with the memories of real events. What they are able to imagine becomes more real to them.

Sooner or later, with this intensive practice, for some of the congregants, the mind may leap from imagination to hallucination, and the congregant *hears* God, *sees* God, *feels* God walking beside them. These yearned-for voices and visions have the reality of perception, and this is because they activate the perceptual systems of the brain, as all hallucinations do. These visions, voices, and feelings of "presence" are accompanied by intense emotion -- emotions of joy, peace, awe, revelation. Some evangelicals may have many such experiences; others only a single one -- but even a single experience of God, imbued with the overwhelming force of actual perception, can be enough to sustain a lifetime of faith. (For those who are not religiously inclined, such experiences may occur with meditation or intense concentration on an artistic or intellectual or emotional plane, whether this is falling in love or listening to Bach, observing the intricacies of a fern, or cracking a scientific problem.)

Of Interest



Samuel Shem, 34 Years After "The House of God"

In the last decade or two, there has been increasingly active research in the field of "spiritual neurosciences." There are special difficulties in this research, for religious experiences cannot be summoned at will; they come, if at all, in their own time and way -- the religious would say in God's time and way. Nonetheless, researchers have been able to demonstrate physiological changes not only in pathological states like seizures, OBEs, and NDEs, but also in positive states like prayer and meditation. Typically these changes are quite widespread, involving not only primary sensory areas in the brain, but limbic (emotional) systems, hippocampal (memory) systems, and the prefrontal cortex, where intentionality and judgement reside.

Hallucinations, whether revelatory or banal, are not of supernatural origin; they are part of the normal range of human consciousness and experience. This is not to say that they cannot play a part in the spiritual life, or have great meaning for an individual. Yet while it is understandable that one might attribute value, ground beliefs, or construct narratives from them, hallucinations cannot provide evidence for the existence of any metaphysical beings or places. They provide evidence only of the brain's power to create them.

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