

The Science of Near-Death Experiences

Empirically investigating brushes with the afterlife

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NEAR-DEATH EXPERIENCES have gotten a lot of attention lately. The 2014 movie *Heaven Is for Real*, about a young boy who told his parents he had visited heaven while he was having emergency surgery, grossed a respectable \$91 million in the United States. The book it was based on, published in 2010, has sold some 10 million copies and spent 206 weeks on the *New York Times* best-seller list. Two recent books by doctors—*Proof of Heaven*, by Eben Alexander, who writes about a near-death experience he had while in a week-long coma brought on by meningitis, and *To Heaven and Back*, by Mary C. Neal, who had her NDE while submerged in a river after a kayaking accident—have spent 94 and 36 weeks, respectively, on the list. (The subject of *The Boy Who Came Back From Heaven*, published in 2010, recently admitted that he made it all up.)

Their stories are similar to those told in dozens if not hundreds of books and in thousands of interviews with “NDErs,” or “experiencers,” as they call themselves, in the past few decades. Though details and descriptions vary across cultures, the ***overall tenor of the experience is remarkably similar***. Western near-death experiences are the most studied. Many of these stories relate the ***sensation of floating up and viewing the scene around one’s unconscious body; spending time in a beautiful, otherworldly realm; meeting spiritual beings*** (some call them angels) ***and a loving presence that some call God; encountering long-lost relatives or friends; recalling scenes from one’s life; feeling a sense of connectedness to all creation*** as well as a ***sense of overwhelming, transcendent love***; and ***finally being called, reluctantly, away from the magical realm and back into one’s own body***. Many NDErs report that their experience did not feel like a dream or a hallucination but was, as they often describe it, ***“more real than real life.”*** They are ***profoundly changed afterward***, and tend to have ***trouble fitting back into everyday life***. Some embark on ***radical career shifts or leave their spouses***.

Over time, the ***scientific literature*** that attempts to explain NDEs as the result of physical changes in a stressed or dying brain ***has also, commensurately, grown***.

The *causes posited* include an *oxygen shortage, imperfect anesthesia*, and the *body's neurochemical responses to trauma*. NDErs dismiss these explanations as inadequate. The medical conditions under which NDEs happen, they say, are too varied to explain a phenomenon that seems so widespread and consistent.

Recent books by Sam Parnia and Pim van Lommel, both physicians, describe studies published in peer-reviewed journals that attempt to pin down what happens during NDEs under controlled experimental conditions. Parnia and his colleagues published results from the latest such study, involving more than 2,000 cardiac-arrest patients, in October. And the recent books by Mary Neal and Eben Alexander recounting their own NDEs have lent the *spiritual view of them a new outward respectability*. Mary Neal was, a few years before her NDE, the director of spinal surgery at the University of Southern California (she is now in private practice). Eben Alexander is a neurosurgeon who taught and practiced at several prestigious hospitals and medical schools, including Brigham and Women's and Harvard.

It was Alexander who really upped the scientific stakes. He studied his own medical charts and came to the conclusion that he was in such a deep coma during his NDE, and his brain was so completely shut down, that *the only way to explain what he felt and saw was that his soul had indeed detached from his body and gone on a trip to another world, and that angels, God, and the afterlife are all as real as can be*.

Alexander has not published his medical findings about himself in any peer-reviewed journal, and *a 2013 investigative article in Esquire questioned several details of his account*, among them the crucial claim that his experience took place while his brain was incapable of any activity. *To the skeptics*, his story and the recent recanting of *The Boy Who Came Back From Heaven* are just *further evidence that NDEs rank right up there with alien abductions, psychic powers, and poltergeists as fodder for charlatans looking to gull the ignorant and suggestible*.

Yet even these skeptics rarely accuse experiencers of inventing their stories from whole cloth. Though some of these stories may be fabrications, and more no doubt become embellished in the retelling, they're *too numerous and well documented to be dismissed altogether*. It's also hard to ignore the accounts by respected physicians with professional reputations to protect. *Even if the afterlife isn't real, the sensations of having been there certainly are*.

There is something about NDEs that makes them scientifically intriguing. While you can't rely on an alien abduction or a spiritual visitation taking place just when you've got recording instruments handy, *many NDEs happen when a person is surrounded by an arsenal of devices designed to measure every single thing about the body that human ingenuity has made us capable of measuring*.

What's more, as medical technology continues to improve, it's bringing people back from ever closer to the brink of death. A small, lucky handful of people have made full or nearly full recoveries after spending hours with no breath or pulse, buried in snow or submerged in very cold water. Surgeons sometimes create these conditions intentionally, chilling patients' bodies or stopping their hearts in order to perform complex, dangerous operations; recently they have begun trying out such techniques on severely injured trauma victims, keeping them between life and death until their wounds can be repaired.

All of this makes *NDEs perhaps the only spiritual experience that we have a chance of investigating in a truly thorough, scientific way*. It makes them a *vehicle for exploring the ancient human belief that we are more than meat*. And it makes them a *lens through which to peer at the workings of consciousness—one of the great mysteries of human existence, even for the most resolute materialist*.

Which is how I found myself last summer in Newport Beach, California, at the *annual conference of the International Association for Near-Death Studies (IANDS)*, which has been *a formal organization since 1981*. I wanted to know: *What makes a person start believing that he has truly seen the other side? Why does one person's other side look so similar to so many other people's? And is there a way for science to get at what's really going on?*

THE CONFERENCE HAD the joyous, clubby atmosphere of a reunion; many of the people had clearly known one another for years. Attendees wore strips of ribbon in different colors bearing legends such as SPEAKER, PANELIST, VOLUNTEER, and, for those who have had a near-death experience, EXPERIENCER. The program included *panels and workshops* on everything from *"What Medical Neuroscience Can Learn From NDEs"* to *"Sacred Geometry Dance: Creating a Vortex to Open to the Divine"* and *"Group Past-Life Regression."*

The opening talk, by Diane Corcoran, the association's president, was clearly for newbies; the main ballroom, which seats about 300 people, was almost empty. She began by outlining the wide variety of circumstances in which people have NDEs—"heart attack, near-drowning, electrocution, terminal illness, combat fatigue"—then moved on to the typical characteristics of the experience. She referred to *Bruce Greyson*, one of the first doctors to study NDEs seriously, who *developed a scale that rates the intensity of an experience on 16 separate counts, such as feelings of joy, encountering spiritual beings, and a sense of being separated from one's body*. The scale assigns a score of 0 to 2 for each count, allowing for a *maximum possible score of 32*. *A 7 or higher is classified as an NDE*, and according to one study, the *average score* among people who report such an experience is *about 15*.

However, Corcoran emphasized, *the long-term effects of an NDE are as important an indicator of whether you've had one as the experience itself*. Many people, she

said, ***don't realize for years that they've had an NDE, and piece it together only after they notice the effects.*** These include ***heightened sensitivity to light, sound, and certain chemicals; becoming more caring and generous, sometimes to a fault; having trouble with timekeeping and finances; feeling unconditional love for everyone, which can be taxing on relatives and friends; and having a strange influence on electrical equipment.*** At one conference of NDErs, Corcoran recounted, the hotel's computer system went down. ***"You put 400 experiencers in a hotel together, something's gonna happen,"*** she said. The scattered audience chuckled approvingly.

Corcoran herself wore two name badges. One said her name and trailed a multicolored strip of ribbons like an unrolled window blind reading 35 YEARS, LEGACY SOCIETY, ASK ME, and HERE TO SERVE. ("It started as a joke," she told me of adding ribbons at each conference, "and it became a tradition.") The other badge said THE COLONEL: her long career includes a series of senior nursing posts in the Army Nurse Corps (she has a doctorate in nursing management). She first encountered NDEs when, as a junior nurse, she served at Long Binh, the largest army base in Vietnam, in 1969.

"Nobody was talking about them," Corcoran said when we met over breakfast. "A young man told me about [an NDE] and I had no idea what he was talking about, but I could see the emotion and intensity of it for him." Since then, ***she has been trying to get the medical profession to take NDEs more seriously.*** "Death and dying is not something most physicians deal with very well to begin with," she noted drily. "So when you start to talk about phenomena where you leave your body and see and hear things, you're way out of their ballpark."

More recently, she had been trying, with difficulty, to find veterans of the Iraq and Afghanistan wars who were willing to talk about any NDEs they might have had. "I was always adamant in the Army that this is a medical issue. ***I tell [doctors] they have to make up their own minds, but there are lots of patients who've had this experience, and if you're going to take care of them, you have to have this information.***"

WRITTEN ACCOUNTS OF near-death experiences—or things that sound like them—***date back at least to the Middle Ages***, and some researchers say to ancient times. The medical journal *Resuscitation* recently published a brief account of the oldest known medical description of an NDE, written by an 18th-century French military doctor. But the ***modern era of research*** into near-death experiences is generally said to have ***begun in 1975***. That was the year ***Raymond A. Moody Jr.***, a philosopher turned psychiatrist, published ***Life After Life***, a book based on interviews with some 50 experiencers.

Moody's book set off a steady stream of memoirs, TV shows, and articles. Since then, ***a small community has emerged of psychiatrists, psychologists, cardiologists,***

and other specialists. They share Moody's belief that consciousness—*the mind, the soul, call it what you will—may exist in some nonmaterial form, independent of but closely connected to the brain, and that NDEs may be able to provide evidence of it.* The leading members of this coterie have distinguished careers at respectable universities and hospitals. They blurb one another's books and *give talks on spirituality and the nature of consciousness.*

Of those books, probably the *single best overview is The Handbook of Near-Death Experiences: Thirty Years of Investigation, an anthology published in 2009.* As *The Handbook* outlines, by 2005 dozens of studies involving nearly 3,500 subjects who reported having had NDEs had become material for some **600 scholarly articles.** *Many of these articles are in the Journal of Near-Death Studies, the IANDS house journal*—which, the association proudly notes, is peer-reviewed. But many others are in *mainstream medical publications.* A search in February on PubMed, a database that is maintained by the National Library of Medicine (and that doesn't include the IANDS journal in its index), turned up **240 papers mentioning near-death experiences.**

Most of the *NDE studies* have been *retrospective,* meaning the researchers looked for people who'd had such an experience to come forward and be interviewed. That poses a couple of problems, scientifically speaking. It means the subjects were self-selecting, so they might not be representative. For instance, people who'd had scary NDEs might have been less eager to tell their stories than people who'd had uplifting ones. (One of the arguments you hear for why NDEs are not hallucinations of the dying brain is that so many of the stories contain similar features; but it's notable that, while some studies indeed report only the well-known positive experiences, **unpleasant NDEs account for a combined 23 percent of reports across a dozen different studies.** They get far less attention, and certainly don't seem to sell nearly as many books.) Most of the interviews took place years after the fact, so memories might have been faulty. And most important, retrospective studies make it pretty much impossible to obtain reliable data on what was actually happening to the subjects' bodies and brains while they felt their souls were elsewhere.

About a dozen prospective studies have been published, several of them in recent years. In these, researchers typically arrange for every consenting patient who survives a specific medical emergency (such as a cardiac arrest) at a hospital to be interviewed as soon as possible thereafter. The patients are asked open-ended questions about what, if anything, they experienced while doctors were trying to revive them. If they report anything unusual, the researchers check their medical records and the accounts of people who treated them, looking for things that might explain the experience or show that their brain was shut down at the relevant time. All told, these studies have collected the near-death experiences of just under 300 people.

The goal for those who believe the mind really does leave the body is to find a verified case of what one prominent researcher has termed “**apparently nonphysical veridical perception**”—*in other words, having an experience during which you see or hear things you otherwise couldn't have perceived that are later confirmed to have actually happened. (Veridical means “not illusory.”)* An *out-of-body experience is only one of the 16 possible elements of a near-death experience on the Greyson scale*, and the proportion of experiencers who report having had one varies widely from one study to another.

As the only stage in an NDE that involves perceiving the physical rather than the spiritual world, an *out-of-body experience has the most potential to convince skeptics*. If you could prove that someone saw or heard things that brain science says they could not have seen or heard, you would have, at the very least, evidence that our understanding of the brain is even more incomplete than we thought, and at most, a sign that a conscious mind can exist apart from a living body.

As a result, reports of veridical perception have a totemic significance among NDErs. One of the *most celebrated is the story of “Maria,”* a migrant worker who had an NDE during a cardiac arrest at a hospital in Seattle in 1977. She later told her social worker that *while doctors were resuscitating her, she found herself floating outside the hospital building and saw a tennis shoe on a third-floor window ledge, which she described in some detail*. The social worker went to the window Maria had indicated, and not only found the shoe but said that the way it was placed meant there was no way Maria could have seen all the details she described from inside her hospital room.

That social worker, Kimberly Clark Sharp, is now a bubbly 60-something with a shock of frizzy hair who acted as my informal press officer during the conference. She and her story are an IANDS institution; I heard several people refer to “the case of Maria’s shoe” or just “the tennis-shoe case.”

But while Maria’s shoe certainly makes for a compelling story, it’s thin on the evidential side. A few years after being treated, Maria disappeared, and nobody was able to track her down to further confirm her story.

A case with a lot more evidence is that of Pam Reynolds, a singer-songwriter. In 1991 Reynolds, then 35, underwent surgery to remove a huge aneurysm at the base of her brain. Worried that the aneurysm might burst and kill her during the operation, her surgeon opted for the radical move of “hypothermic cardiac arrest”—chilling her body to 60 degrees Fahrenheit, stopping her heart, and draining the blood from her head. The cooling would prevent her cells from dying while deprived of oxygen. When the doctors restarted her heart and warmed her body back up, she would, in effect, be rebooted.

To make absolutely sure that Reynolds's brain was completely inactive during the operation, the medical team put small speakers into her ears that played rapid, continuous clicks at 100 decibels—a sound level described as equivalent to that produced by a lawn mower or a jackhammer. If any part of her mind was working, that insistent clicking would show up as electrical signals in the brain stem, which the surgeons were monitoring on an electroencephalogram.

The machine confirmed that for a number of minutes ***Reynolds was effectively dead in both brain and body. Yet after the surgery she reported having had a powerful NDE, including an out-of-body experience,*** and accurately recalled several details about what was going on in the operating room, such as the shape of the bone saw used on her skull, snatches of conversations between the medical staff, and the staff listening—rather inappropriately, she remembered thinking—to “Hotel California” (“You can check out any time you like, but you can never leave”). For the near-death-experience community, Reynolds is Exhibit A.

But none of Reynolds's reported veridical perceptions happened while her EEG recorded a flat line. They all took place before or after, when she was under anesthetic but very much alive. “Anesthesia awareness” is generally estimated to affect roughly one in 1,000 patients. (See “Awakening,” by Joshua Lang, in the January/February 2013 *Atlantic*.) Therefore, the skeptical argument goes, Reynolds could have heard snatches of conversation; she might have deduced some things about the bone saw from the noise it made or the vibration of it against her skull; and she might have reconstructed some false memories out of details she'd noticed before or after the operation.

In 2011, a year after Reynolds died (of heart failure), the *Journal of Near-Death Studies* devoted an entire issue to a debate about her case, in which a skeptic and two believers argued over such minutiae as the duration of the noise played by the speakers in her ears, the way bone conducts sound, and esoteric theories of how exactly a nonphysical mind might be able to perceive physical stimuli. Summing it up, Janice Miner Holden, the journal's editor, concluded that ***cases like Reynolds's “provide imperfect data that probably can never result in definitive evidence.”***

Other cases of apparent veridical perception are, at the very least, intriguing—but there are surprisingly few. For a chapter she wrote in *The Handbook of Near-Death Experiences*, Holden scoured the literature in search of such accounts. Leaving out sources like the personal memoirs published after Raymond Moody's 1975 book and focusing mostly on books published before 1975 and systematic studies by researchers and medics, she collected about 100 reports of veridical perception during a near-death experience. Only 35 included accounts of details that the authors were able to verify as fully accurate with a source other than the experiencer. ***There was not a single clincher—an absolutely inarguable case of someone seeing something that only a disembodied spirit could have seen.***

Which is why a few studies have tried to take advantage of the unique circumstances under which NDEs tend to happen, to create a foolproof method for testing veridical perception.

TO GET THE KIND OF EVIDENCE for a disembodied consciousness that would satisfy a scientist, you need a good study protocol. Turns out, it's not hard to devise one. In *The Handbook*, Janice Holden outlines it:

In a place where NDEs are likely to occur, plant some perceptual stimulus and then interview everyone who survives a near-death episode in the vicinity of that stimulus to determine whether they perceived it ... Place the stimulus so that it is perceivable by an NDEr but not by other people in the area; in fact, to rule out the possibility that an interviewer or others might intentionally or unintentionally convey the content of the stimulus to the NDEr through normal—or even paranormal—means, arrange it so that *the stimulus is not known even to the research team or associates.*

To date, six studies have tried some form of this method, mostly on cardiac-arrest patients, and ***all have failed to find an ironclad case of veridical perception.*** All involved placing some stimulus—a picture or a symbol on, say, a piece of paper or an electronic display—in a high location, visible only if you were floating near the ceiling. The research designers did their best to make sure that nobody—not the doctors or nurses, not the patient, and not whoever interviewed the patient afterward—would know what the stimulus was until after the interviews were over. (Getting the hospital staff to respect this protocol, Holden reports, wasn't always easy.)

The latest and largest such attempt was the so-called Aware study, led by Sam Parnia of the State University of New York at Stony Brook, published in *Resuscitation* last October. In it, 15 participating hospitals in the United States, the United Kingdom, and Austria installed shelves bearing a variety of images in rooms where cardiac-arrest patients were likely to need reviving.

The results of the Aware study immediately highlight the key problem with this kind of research: it's very hard to get enough data. Over four years, the study recorded a total of 2,060 cardiac arrests. (There were more than that, but the researchers weren't able to record them all.) Of those patients, 330 survived, 140 of whom were judged well enough to be interviewed and agreed to participate. Of those 140, 101 made it past a screening interview; the others were unable to continue, "predominantly due to fatigue." Of those 101, nine remembered experiences that counted as an NDE on the Greyson scale, and two remembered an out-of-body experience. Of those two, one became too ill to interview further. That left just one subject who could recount what he'd seen in detail.

That one case is tantalizing. The patient, a 57-year-old man, described floating up to a corner of the room, seeing medical staff work on him, and watching himself be defibrillated. According to Parnia's paper, several of the details he described checked out. What's more, after triangulating the patient's description with the workings of the defibrillator, the researchers think he may have seen things that happened for as long as three minutes after his heart stopped.

If true, that would be remarkable. On an EEG, the brain typically flatlines within about 20 seconds of the heart stopping. Cardiopulmonary resuscitation gets enough blood flowing to slow cell death, but not enough to fire up the brain. Unlike the brain of someone under anesthetic or in a coma, this patient's brain should have completely switched off until his heart started beating on its own again.

Still, the clinching evidence remains elusive. Even though the Aware study's hospitals collectively installed about 1,000 shelves with the special images at various locations, only 22 percent of the cardiac arrests happened somewhere with a shelf nearby. The star patient's wasn't one of them.

IT'S LITTLE WONDER that, next to transcendent NDE stories, experiencers find the explanations that science has to offer unsatisfying. There is no shortage of scientific theories about what causes near-death experiences—or at least, what might—but they are cold, unappealing, and incomplete by comparison with what NDErs say happened to them.

It's well established, for instance, that an oxygen shortage (hypoxia), which is a common result of a cardiac arrest, can lead to disorientation, confusion, or hallucinations. A glitch at the temporoparietal junction, a part of the brain that acts as a kind of integrator of data from all your senses and organs and plays an important role in assembling them into your overall perception of your body, can produce an out-of-body experience. It's been suggested that too much carbon dioxide (hypercarbia) may give people a feeling of separation from their body or of being in a tunnel (though there's not much evidence of this). Neurochemicals might play a part in triggering hallucinations or creating a sense of peace. And so on.

Doctors who are sympathetic to experiencers' claims have no shortage of rebuttals to these materialist explanations. Sam Parnia, Pim van Lommel, and others devote lengthy sections in their books to them. Ultimately, what the rebuttals boil down to is that while these explanations may look plausible, there's no evidence that they actually do explain what's going on. Many NDEs happen without one or another of the above scientifically measurable conditions. And those conditions often happen without an NDE. ***Enough data simply haven't been recorded to establish correlation, let alone causation.***

What's more, it's hard to see how there *can* be enough data, at least when the experimental method is to look at records of cardiac-arrest cases. Parnia's Aware

study turned up just nine patients with NDEs at 15 hospitals in four years. A Slovenian prospective study published in 2010, which did find a correlation between NDEs and hypercarbia in heart-attack patients—though no correlation with hypoxia—had only 52 patients in the sample, and only 11 of them reported NDEs.

There is one newish bit of research that the materialist camp has seized on. A study at the University of Michigan, published in 2013, took anesthetized rats and stopped their hearts. Within 30 seconds, the rats' EEG brain signals flatlined—but first they spiked, with an intensity that suggested that different parts of the brain were communicating with one another even more actively than when the rats were awake.

This sort of communication is thought to be a key step in perception; effectively, the brain's various areas are comparing notes on the stimuli they're getting. If humans experience the same death spike as rats, it may mean that the brain goes into a final, hyperactive spasm when its oxygen supply is cut as it tries to figure out what is happening. If so, that heightened activity might explain why people who say they had an NDE report that what they experienced seemed more real than the physical world.

But once again, ***the fact that the explanation is plausible doesn't make it true.*** If researchers like Parnia can convincingly show that a patient like the man in the Aware study can have flashes of conscious awareness minutes or more after the heart stops, the whole debate will flare up again. For now, ***the death spike remains just one more disjointed piece of the NDE puzzle, which we have not yet figured out how to assemble.***

So where next for the science of near-death experiences?, I asked ***Susan Blackmore***, a British psychologist who is perhaps the ***best-known scientific skeptic of the spiritualist explanations for NDEs. After having her own powerful out-of-body experience as a young woman, she started investigating paranormal claims, and devoted much of her career to scientifically explaining them.***

As far as Blackmore is concerned, the mystery has mostly been solved. We already know, she says, that a hyperactive brain under the stress of approaching death can trigger any or all of the above phenomena. The big remaining question, she wrote in an ***e-mail***, is this:

We see all of these aspects in isolation—spontaneously, with various drugs, in illness and so on—but in the NDE they tend to unfold in a specific order. Why is this? We might guess that it has something to do with a cascade of neurotransmitters or possibly the way hyperactivity spreads or ... ? I do not know the answer here but I guess we will soon find out.

I think that a scientific answer to Blackmore’s question—why so many NDEs follow a similar sequence—would do more than merely complete the puzzle of how they happen. It would also **help us understand why NDEs have such a profound effect on those who experience them.** One of the speakers at the conference, **Alana Karran, an executive coach who led a guided meditation that retraced the steps of a typical NDE, helped me understand the significance of that sequence.** It is, she pointed out, **similar to the hero’s journey**, or quest narrative, the structure that the American writer and mythologist **Joseph Campbell identified and named the “monomyth”** in 1949. The quest underlies just about every form of storytelling, from religious myth to Greek epic to Hollywood blockbuster to personal memoir. **In this structure, a protagonist is shaken out of his normal way of life by some disturbance and—often reluctantly at first, but at the urging of some kind of mentor or wise figure—strikes out on a journey to an unfamiliar realm. There he faces tests, battles enemies, questions the loyalty of friends and allies, withstands a climactic ordeal, teeters on the brink of failure or death, and ultimately returns to where he began, victorious but in some way transformed.**

Many of the NDEs people relate follow some version of this structure. In *Proof of Heaven*, Eben Alexander describes his experience as beginning with him trapped in a dark place, a kind of semitransparent mud or “dirty Jell-O,” filled with “grotesque animal faces,” that comes to feel progressively more claustrophobic and frightening. Eventually, something pulls him up into “the strangest, most beautiful world I’d ever seen”—an idyllic countryside. There he encounters a beautiful girl riding on a butterfly’s wing, who tells him he is “loved and cherished, dearly, forever,” and accompanies him on a trip to a light-filled void where he meets a divine being who unlocks for him many secrets about the universe. After spending some time going back and forth between the two realms, he descends one last time into the dark place where he began, only this time the grotesque creatures have been replaced by the faces of people praying for him.

The hero’s journey is so pervasive in storytelling (indeed, some would say Campbell ruined modern entertainment by identifying it) **because it is so aspirational. It offers the possibility of an escape from something that holds you back, and a transformation into something better.**

Nobody at the conference better personified **the hope for redemption and transformation** than **Jeff Olsen**, one of the two keynote speakers. Olsen’s story, which he has told in two books and in various videos on YouTube, is gut-wrenching: His car crashed after he fell asleep at the wheel while driving his family back from vacation. Lying in the wreckage with his back broken, one arm nearly torn off, and one leg destroyed, he was for a while conscious enough to register that his 7-year-old son was crying but his wife and infant son were silent. In *I Knew Their Hearts*, one of his books, he writes, “What do you say to a man who feels responsible for the death of half his family?”

The answer—at least if you are a spiritual being—is ***“You are perfect; you are my son as much as anyone ever was; and you are divine.”*** ***That is what Olsen recounts hearing—or feeling, or having somehow transmitted to him—as part of a “brain dump” during his near-death experience.*** He seemed to find himself in a room with a crib, holding the son who had been killed. When he picked him up, he in turn felt himself being enveloped by a loving presence that he understood to be his “divine creator.”

This is key to what makes near-death experiences so powerful, and why people cling so strongly to them regardless of the scientific evidence. ***Whether you actually saw a divine being or your brain was merely pumping out chemicals like never before, the experience is so intense and new that it forces you to rethink your place on Earth.*** If the NDE happened during a tragedy, it provides a way to make sense of that tragedy and rebuild your life. If your life has been a struggle with illness or doubt, an NDE sets you in a different direction: you nearly died, so something has to change.

And that brings us ***back to Susan Blackmore’s question: If NDEs are only the result of your brain going haywire, why do so many of them follow a sequence that just happens to track our most basic narrative structure of transformation and renewal?***

THERE APPEARED TO BE nobody at the conference who thought that near-death experiences are just a product of physical processes in the brain. But there were several people whose ***talks promised to address the science of NDEs.***

Alan Huguenot is a middle-aged mechanical engineer who walks and talks with a kinetic intensity, as if he can barely keep himself from ricocheting off the walls. His session was called ***“Leading-Edge Science of the Afterlife.”*** Taking the audience through a hodgepodge of advanced physics and mysticism, ***he concluded that the entire universe is conscious and that this explains both near-death experiences and certain paradoxes of quantum theory.***

As someone with a physics degree, I know that Huguenot’s theory is full of holes, but I also know that the basic idea of a conscious universe is neither crazy nor new. Erwin ***Schrödinger***, one of the ***fathers of quantum physics***, was an ***avid student of Hindu philosophy, and believed something similar.*** There’s a ***long tradition of leading scientists holding religious and mystical beliefs.***

But what makes them scientists is that they know and maintain the distinction between scientific theories, which must be testable against observable evidence, and mysticism or speculation. So ***at the end of Huguenot’s talk, I asked him to tell me how his theory is testable. He didn’t answer the question at first, but eventually said that there are experiments that could be designed.***

Had he designed them?, I asked.

“No, I haven’t had the chance to do that yet.”

More sedate was **Robert Mays**, a professorial figure with a Sigmund Freud beard who outlined a detailed theory he’d developed with his wife, Suzanne. Mays **proposed that a nonmaterial consciousness—a “mind entity”—could direct the physical brain, like the Wizard of Oz pulling levers behind a curtain.** This, Mays said, is the explanation that resolves both the problem of how a series of electrical impulses in the brain becomes the sensation of consciousness and the mystery of near-death experiences.

Mays, at least, was extremely specific about which brain cells he thinks the mind entity interacts with in order to control the brain. He even has some ideas about what the mind entity might be in physical terms: “a finely differentiated structure of minute oscillating electric or magnetic dipoles,” he and Suzanne have written. **When I asked him how his theory might be tested, he said that one could measure the influence of a person’s “energetic field” on “living neurons in vitro.” Which would be fine, except that his idea of the energetic field is something no physicist has ever seen.**

For all their differences in style and subject matter, Mays, Huguenot, and others are **offering similar visions: large, all-encompassing explanations that link things people know to be true with things they would like to be true and that bring a sense of order to the universe. It makes sense that NDErs would find such stuff compelling.**

But why was there so much resistance at the conference to real, solid science? At my breakfast with Diane Corcoran, I asked her why nobody at the conference seemed to be discussing the materialist position.

“Over the years, and with the research that’s been done, we’ve moved past that,” she said. “There’s always a skeptic or two, but we don’t bring them into this environment, because this is meant to be a supportive environment, not a questioning one.” She added, “We put out a call for papers, but we’ve never had a skeptic put in a paper.”

“They probably feel that they wouldn’t be welcomed,” I said.

“That’s probably true!” she replied. “But we’re trying to expand the field, and **there’s a lot of work in consciousness existing outside the brain.**” One prominent researcher, she said, argues that “when someone publishes a paper saying ‘This is *the* explanation,’ it’s not even worth responding to. Most people who do that have not investigated the field in any serious way.”

At some level, I find this reasonable. A lot of writing about NDEs does not merely question experiencers but ridicules them. And it's true that the scientific explanations, while plausible, aren't conclusive.

Nonetheless, at the conference I encountered ***not just resistance to but a great many misconceptions about science***. In the hotel corridors, I ran into Huguenot. The whole point of scientific theories, I said, is that they have to be testable. Testable means falsifiable: you have to be able in principle to do an experiment that might show a theory to be wrong. If I were to drop the cup of coffee I was holding, for instance, and it didn't go all over the floor but instead floated off down the corridor, that would falsify the theory of gravity. Every time the theory survives such a test, our confidence in it increases. But our belief in the theory always remains provisional: we're constantly on the lookout for situations in which it might not hold true. ***So how, I asked, is a conscious universe testable?***

He parried the question with sophistry [*a subtle, tricky, superficially plausible, but generally fallacious method of reasoning; a false argument*]: If you let the coffee cup go, you say it'll fall down. But which way is down? If you change perspective and imagine the ground above us, maybe down is up. I moved to hold the cup up over his head and offered to test that theory. He laughed loudly and nervously.

By the third day of the conference, I was starting to despair of finding a voice of reason. Everyone seemed to be on a spectrum ranging from pseudoscience to full-blown mysticism, with a lot of sheer ignorance in the middle. That's when I encountered Mitch Liester.

Liester, a tall, craggily handsome ***psychiatrist*** who trained at the University of Colorado and the University of California at Irvine, has a gentle, accepting manner that makes you want to tell him everything. ***His medical training made him skeptical about near-death experiences, he told me. But while he was in school his grandfather had one, and then he kept on meeting other experiencers—not always patients. “People just began talking to me.”***

Liester also allowed that he himself had had a “near-death-like experience”—something with the features of an NDE, though he wasn't near death or on any hallucinogens when it happened. So, I asked him, ***where does he himself stand on the idea that mind and body are separate?***

“My rational brain doesn't quite believe it but, having experienced it, I know it's true. So it's an ongoing discussion I'm having with myself.”

Is there a middle ground, I asked, between the spiritualists and the materialists? It's hard to find one, he conceded. ***“A lot of materialist scientists don't seem to think it's a serious field of scientific inquiry ... Meanwhile, many people who've had near-death experiences aren't that interested in the science.”***

Every Monday, Liester has breakfast with a small, eclectic group. It includes a physicist, a materials scientist, an artist, a chaplain with a philosophy degree, and a hospice counselor who is also a Native American sun dancer. They talk about how to take NDE research forward with a rigorous scientific attitude but an open mind. “I think there is a way to bridge the gap,” he said.

In our conversation and in a subsequent e-mail, Liester outlined ***a few areas that researchers might pursue more deeply.***

They could ***image the brains of people while they’re in trances or other “transcendental” states.***

They could ***study people who claim special spiritual powers, such as shamans.***

They could try to ***probe the nature of the memories formed during NDEs, and how they differ from ordinary memories*** (Liester is working on this).

They could devise experimentally sound ways to ***test the claims of people who say they have become sensitive to electromagnetic fields or can interfere with electronic devices.***

They could do more ***research into the death spike*** that the University of Michigan researchers found in rats, and perhaps even attempt to isolate it in human patients. And so on.

Above all, he said, ***no matter how you explain them, near-death experiences are pivotal events in people’s lives. “It’s a catalyst for growth on many different levels—psychologically, emotionally, maybe even physiologically.”***

EVEN IF RESEARCH ULTIMATELY SHOWS—as most scientists assume it will—that NDEs are nothing more than the product of spasms in a dying brain, there is a good reason to pursue the investigation, which is that they pose a challenge to our understanding of one of the most mysterious issues in science: consciousness.

The boundary between life and death, which used to be thought sharp, has grown ever fuzzier. In a recent overview paper titled “***Death and Consciousness,***” ***Sam Parnia*** acknowledged research confirming that, contrary to popular belief, what causes brain damage when you stop breathing for more than a few minutes isn’t only the lack of oxygen per se. Brain cells deprived of oxygen can take many hours to decay to the point of no return, especially if kept cold—hence the cases of people reviving after being buried in snowdrifts or falling into freezing lakes. ***What causes much of the damage, rather, is the sudden return of oxygen to brain cells in a rush of blood and chemicals, known as “post-resuscitation syndrome.”*** New

medical techniques are making it increasingly possible to prevent such damage and reanimate people who would once have been declared unequivocally dead.

To some people, this is simply further evidence that the mind must be able to exist independently of the body—or else where does it go when the brain is dead? To materialists, it is evidence of the opposite: the mind doesn't "go" anywhere, any more than the image from a slide projector goes somewhere when you switch the projector off. Rather, it ***shows that the mind and consciousness are emergent properties of the brain, knitted together somehow by all the physical and chemical processes in our nervous system.***

But if so, then ***how does that knitting occur?*** This is the ***crucial question for consciousness studies.*** George A. Mashour, one of the co-authors of the University of Michigan study on rats, is firmly in the materialist camp. He notes that if it's hard to explain how a healthy brain produces consciousness, it's even harder to explain how an impaired brain near death produces such vivid, "hyper-real" sensations. ***"Whether there can be a scientific explanation for NDEs is a critical flash point for the science of consciousness,"*** he told me.

If we could establish that spikes in neural activity occur in a dying human brain like the ones Mashour and his colleagues saw in rats, that could both help explain near-death experiences and give us some clues about the neurobiological nature of consciousness. Humans aren't rats, though. Mashour says it's unlikely that we can collect enough useful data on people who've had NDEs in the midst of a cardiac arrest and lived to tell the tale. ***But his study on rats, he says, at least "illuminated the possibility" that to explain near-death experiences you need not "abandon the connection between the brain and consciousness."***

The question of how consciousness emerges is in fact likely to be one of the defining problems of the 21st century, when we might first be able to create machines as complex as the human brain. Will those machines be conscious? How will we be able to tell? Will consciousness be for them anything like it is for us? And what will the implications be for us as their creators? These are questions we will be able to answer only by understanding intimately what our own consciousness consists of.

Finally, it's worth doing rigorous research on near-death experiences if for no other reason than to rule out at least some of the spiritual explanations. Those who believe fervently in an afterlife may never be swayed. There are, after all, plenty of beliefs that people hold despite overwhelming scientific evidence to the contrary (think vaccines, or global warming). But ***science advances only by acknowledging the limits of what it knows and slowly pushing them back.*** There are no grounds for sneering at people's beliefs about NDEs until the work has been done to debunk them.

Let's say experiments are done, and there is finally a comprehensive, scientifically rigorous, and materialist account of what causes an NDE. What then? Does it mean that all the stories people tell of seeing angels and meeting their deceased relatives are just fairy tales to be ignored?

I would say no. What I saw at the conference—even at its most bizarre—showed me that even a hard-core materialist can learn a great deal from NDEs about how people make sense of the things that happen to them—and above all, about the central role that the stories we tell play in shaping our sense of who we are.

On this, ***Susan Blackmore***, the arch-skeptic, feels similarly. She concluded her e-mail to me by ***scolding those who persist in***

the false and unhelpful black and white comparison between NDEs as “true, wonderful, spiritual etc. etc.” [versus] NDEs as “JUST a hallucination of no importance.” The truth, it seems to me, is that NDEs can be wonderful, life-changing experiences that shed light on the human condition and on questions of life and death.

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