

The Science of Miracles

Is God all in our heads—a product of brain chemistry? Or is the human brain like a radio that can tune into the divine?

by Barbara Bradley Hagerty | Medium Digest | Feb 7, 2019

The line between faith and science has always figured prominently in my life. Long before my decade as a religion correspondent for NPR, I was raised in Christian Science, the religion that privileges prayer over medicine. I reached adulthood without ever going to the doctor, getting a shot, or taking a vitamin, much less antibiotics. In my early thirties, I left the religion after a happy encounter with Tylenol: A single pill eviscerated my three-day fever within the space of 10 minutes. But I never lost respect for the Christian Science belief that how you think and pray can have a physical effect on your body.

Still, I was often surprised when other people expressed the same openness to prayer. On an April day in 2011, I walked into the production area of “Morning Edition” to find my young, hip colleagues debating a story I had written about a boy who’d made a seemingly miraculous recovery from a horrible disease. I, who was neither young nor hip, was on the fence about whether luck, medical treatment, or divine intervention had saved the boy. I was surprised that these well-educated, coastal, twentysomething journalists would even entertain the possibility of miracles.

The boy at the center of this debate was Jake Finkbonner, who had cut his lip playing basketball when he was six years old. Overnight, he developed a raging fever, his entire face swelling up. He was taken to Seattle Children’s Hospital, where Craig Rubens, a pediatric disease specialist, suspected the flesh-eating bacteria Strep A. He said the infection moved across Jake’s face like fire across parchment paper. “You just watch it spread from that corner very fast, and you’re stamping it on one side, and it’s flaming up on another.” It raced from Jake’s lip to his cheeks to his forehead to his scalp. “The infection had a life of its own,” added Richard Hopper, chief of plastic surgery. “The redness and the swelling — we would mark it and within the hour it would have spread another half-inch.”

The doctors told Jake’s parents it was time to call their priest. Father Tim Sauer gave the boy his last rites, and then urged the family to pray for a miracle — and not just to God, but through an intercessory named Kateri who was up for sainthood.

Kateri Tekakwitha was a Mohawk who had converted to Catholicism 350 years earlier. Her face was scarred by smallpox, and legend has it that when she died, her scars vanished. In 1980, she was beatified — the step before sainthood in the Catholic Church. Father Sauer believed Kateri was the perfect “intercessor” for Jake, who was half Lummi Indian and whose face, if he lived, would be scarred. Their church asked people to pray, and soon the request went viral: prayers came in from Denver, London, Israel, Japan, and Belgium.

After two weeks and a dozen surgeries, when Jake was hovering between life and death, his mother Elsa was given a pendant with Kateri’s image on it. She placed it on Jake’s pillow. The next morning, as the doctors prepped him for surgery, they realized the infection had halted. “It was almost like a geyser

coming out of the earth with this great roar — and all of a sudden it just stops,” Dr. Hopper said. “And there’s silence. And everybody’s just a little bit stunned by it being over.”

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“There’s no question in my mind that it was, in fact, a miracle,” Jake’s mother told me. His dad was more circumspect, noting, “God works through the hands of doctors.” As for the doctors, Craig Rubens speculated that the faith of the family played a role in Jake’s desire to live. “What Jake survived was truly remarkable, and I can’t explain why he would survive over someone else,” he said. Of course, “there’s always a scientific or medical explanation looking backwards,” Richard Hopper observed. Jake was young, strong, and the surgeons succeeded in removing tissue before the infection spread to his brain. Was it a miracle? Dr. Hopper laughed. “I’m glad I don’t have to make that decision.”

But the Catholic Church did; in 2012, Kateri was canonized by Pope Benedict XVI, becoming the first Native American saint. All saints must have worked a “verified” miracle (or died as a martyr for the faith); Jake’s recovery was presented as proof for Kateri’s canonization.

Writing *Fingerprints of God*, my 2009 book about the science of spirituality, gave me an excuse to ask a question that I never openly considered before leaving Christian Science, one that was unusually freighted: Is there any scientific evidence, anything beyond the realm of anecdote, that prayer heals?

It turns out, the evidence is mixed. Beginning in the 1980s, we’ve seen a rash of prayer studies. Some seemed to show that patients who were prayed for recovered more quickly from heart attacks. Another study found that prayer physically helped people living with AIDS. Even monkeys had something to celebrate: Bush babies (*Otolemur garnettii*) who received prayer healed more quickly from wounds than those who received no prayer.

But for every study suggesting that prayer heals a person’s body, there is another one showing that prayer has no effect — or even makes you worse. Does prayer help people with heart problems in a coronary care unit? Researchers at the Mayo Clinic found no effect. Does it benefit people who needed to clear their arteries using angioplasty? Not according to researchers at Duke. In another study, prayer did not ease the plight of those on kidney dialysis machines. And don’t even mention skin warts: Researchers found that people who received prayer saw the number of warts actually increase slightly, compared with those who received no prayer.

The most famous study, and probably the most damaging for advocates of healing prayer, was conducted by Harvard researcher Herbert Benson in 2006. He looked at the recovery rates of patients undergoing cardiac bypass surgery. Those patients who knew they were receiving prayer actually did worse than those who did not know they were receiving prayer. One possible explanation was that the people who knew they were getting prayer may have thought, “Oh my goodness, they’re praying for me — I must be really sick,” and there was a psychological backlash. Perhaps. But in the end, there is no conclusive evidence from double-blind, randomized studies that suggests that intercessory prayer works.

Prayer studies are a “wild goose chase that violate everything we know about the universe,” Richard Sloan, professor of behavioral medicine at Columbia University Medical Center and author of *Blind Faith*, told me: “There are *no* plausible mechanisms that account for how somebody’s thoughts or prayers can influence the health of another person. None.”

And yet, science has embraced a sliver of my childhood faith, a century after Mary Baker Eddy “discovered” Christian Science in the late 1800s. If scientists don’t buy intercessory prayer, most do agree that there is a mind-body connection; that the state of your own emotions or thoughts can alter your own stress level, your ability to stave off the flu, or influence the progression of a variety of diseases. There’s even a characteristically infelicitous name for it: Psychoneuroimmunology. Your thoughts and feelings (psycho) affect the chemicals in your brain (neuro), which affect the hormones that fight disease or replicate viruses (immunology). The folks at the psychoneuroimmunology research centers at Harvard, Ohio State, University of Miami, or UCLA might balk at the notion that Christian Science or other prayer-centered religions beat them to this insight by 100 years. But they still embrace the mind-body connection. Anyway, what is the placebo effect, if not the happy result of one’s belief about the efficacy of a certain treatment? Many spiritual practices, such as meditation, now fit nicely within the medical approach. In this sense, what looked like a miracle to Christian Scientists in the late 1800s is now accepted as the mind-body connection at Harvard.

In the past few years, another new “science,” called “neurotheology,” has drawn some interest. Neurotheologists look at how religious experience plays out in the brain, and then changes the brain. Like most brain processes, meditation or contemplative prayer involves many areas of the brain, from the brain stem to the prefrontal cortex. But researchers like Andrew Newberg, the director of research at the Marcus Institute of Integrative Health at Thomas Jefferson University and Hospital in Pennsylvania, have noticed a peculiar response by the parietal lobe. After scanning the brains of Tibetan Buddhists as they meditated, he found that the parietal lobe, which orients your body in time and space, went quiet. But that “orientation” area, conscientious little beaver that it is, is still trying to do its job. “It’s still trying to create for you a sense of yourself and a spatial relation between you and the rest of the world. But it has been deprived of the information that normally has to do that, so you wind up with this sense of no self, no space, no time.” Newberg spotted the same physiological quirk when he imaged the brains of Franciscan nuns praying: They, too, said they felt timelessness and oneness with, in this case, God.

Is the brain wired to connect with a dimension of reality that our physical senses cannot perceive?

This raises the question: Is spiritual experience nothing more than brain activity? Other researchers have found that psychedelic drugs like psilocybin (mushrooms) and LSD trigger mystical experiences worthy of Joan of Arc. Does that mean that God is merely brain chemistry?

Still other researchers believe that the temporal lobe mediates spiritual experience, because it is involved with memory, emotion, sound, smell, and some vision. When someone suffers a temporal lobe seizure, it’s as if the normal emotions have an exclamation point after them, because so many nerve cells are firing in rhythm. People who have “ecstatic seizures” may hear snatches of music, drawn from

their memory, and interpret it as music from heavenly spheres. They may see a glimpse of light and think it's an angel. Orrin Devinsky, who directs the epilepsy center at New York University, told me that many neurologists suspect some of history's religious giants suffered from epilepsy. Did Paul hear Jesus on the road to Damascus, or was he experiencing an auditory hallucination? How about Moses and that burning bush? "Assuming, for now, a more rational scientific view, [Moses] was having a visual hallucination and he heard God's voice," Devinsky observed. It could have been God; it could have been a seizure. But one thing Devinsky does believe is this: "Whatever happened back there in Sinai, Moses' experience was mediated by his temporal lobe."

But does that mean transcendent experiences are only a physiological event? Or, is this how the brain is wired to connect with a dimension of reality that our physical senses cannot perceive — in other words, does the brain activity *reflect an encounter* with the divine?

I want to propose that how you come down on this issue depends on whether you think of the brain as a CD player or a radio. Most people who believe everything is explainable through material processes believe the brain is like a CD player. The content — the song, for example — is playing in a closed system. If you take a hammer to the machine, then the song won't play. In other words, there is no song — or God — that exists *outside* the brain trying to communicate. All spiritual experience resides *inside* the brain, and when you alter the brain, God and spirituality disappear.

But suppose the brain is not a CD player. Suppose it's a radio. In this analogy, the sender is separate from the receiver. The content of the transmission does not originate in the brain, any more than the hosts of "All Things Considered" are sitting inside of your radio. If you destroy the radio, you won't hear the show, but the show is still being transmitted across the airwaves. If the brain is a receiver, then theoretically "God's" communications never stop — even when the brain is altered, even when it stops functioning well, or at all. In this analogy, everyone possesses the neural equipment to receive the radio program in varying degrees. Some have the volume turned low. Perhaps Richard Dawkins and Sam Harris have hit the mute button. Other people hear their favorite programs every now and again, like those who have brief transcendent moments.

Which brings us to Pam Reynolds and the nature of reality. In 1991, Reynolds, a successful music producer and singer-songwriter, began experiencing excruciating headaches. One day, she forgot how to talk. A brain scan revealed a basilar artery aneurysm in the middle of her brain stem; it had begun to leak. With "a bomb in my brain that had already begun to explode," Reynolds told me she decided to undergo a new type of surgery called a standstill operation. The doctors taped her eyes shut. Then, the surgeons cooled her body and stopped her heart with potassium chloride. They ensured that she had no brain activity — that is, her brain did not respond to loud clicks from molded speakers in her ears — and proceeded to drain the blood from her head like oil from a car engine. Then they clipped the aneurysm, warmed her blood, reintroduced it into her body, and brought her back to consciousness.

"She [was] as deeply comatose as you can be and still be alive," Robert Spetzler, the chief neurosurgeon, told me. And yet Reynolds recalled seeing the operation from above, as if she were perched on Spetzler's shoulder. She could describe the conversations she heard, she could count how many surgeons were around the table, she could describe the Midas Rex bone saw and its container. "My hearing was better

than it is now," she recalled. "My vision better than it ever was, colors were brighter, the sounds were more intense. It was as if every sense that I had ever known — and add on a few — was perfect."

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When she reported all this to Spetzler, he was rattled. In that condition, Reynolds should not have been able to see or hear anything, nor should her brain have been able to form or retain memories. She was not technically dead, he conceded, but "if she were awake, and she had no pulse, no blood pressure, no respiration, we would call her dead." I asked how he could explain her accurate account of the surgery. "From a scientific perspective, I have absolutely no explanation."

Others do. Gerald Woerlee, an Australian anesthesiologist and author of *Mortal Minds*, called the suggestion that Reynolds' mind was working while her brain was off-line "a total load of rubbish." Her experience is entirely explainable: She could have had "anesthesia awareness," in which the patient is conscious but unable to move. Since hearing is the last sense to go, he said, she could have heard the conversations, and recreated the scene in the operating room from previous memories, such as watching television shows like *ER*. As to not having the blood and oxygen in her brain to form memories, Woerlee insisted that was wrong: "Consciousness is a product of brain function. Period."

Researchers have tried to replicate such out-of-body experiences, which are always after-the-fact anecdotes that cannot be tested. These experiences, they say, suggest that consciousness can exist separate from the brain — in other words, that there may be a transcendent reality that we tap into when brain functioning ceases. It would be the most powerful evidence yet that each person has a soul. To this end, researchers have hung "targets" — a laminated piece of cardboard with a word on it, or a computer with rotating pastoral scenes — near the ceiling in operating rooms. If a patient has a cardiac arrest during the operation, the researchers later interview her to see if she had an out-of-body experience, had hovered near the ceiling, and had seen the target. Out of the handful of studies conducted in the U.S. or Europe, not one person has spotted the target.

After interviewing scores of scientists about miracles, healing, and the possibility that there is more than this material existence of God, I have concluded this: *I don't know*. I am not asking you to believe that consciousness can continue when the brain is not functioning, that there is a God who answers prayer, or that people who pray or meditate connect with another reality. I'm not asking you to believe that all mystical or inexplicable experiences are simply the interaction of chemicals in the brain or firings of the temporal lobe. That's the point: You don't have to choose. Because neither side possesses the slam-dunk argument, the dispositive evidence that proves that there is a God, or there isn't. It's entirely possible that Moses and Paul were suffering seizures when they saw that burning bush or heard the voice of Jesus. Then again, perhaps people who enjoy transcendent moments are able to tune into another dimension of reality that many of us ignore. Maybe Moses and Paul were not hallucinating. Maybe they just had better antennae.

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