

Out of the Body and Into the Lab

Laboratory studies, old and new, may reveal some intriguing hints about the psychological workings behind some aspects of the out-of-body experience.

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For as long as she could remember, Miss Z. had experienced brief moments during the night in which she would wake up and find herself floating near her bedroom ceiling, looking down upon her still sleeping body. And on this night, for the sake of science, she was apparently determined to try and have this same kind of out-of-body experience (OBE) again.

In the Sleep Lab

It was to be her fourth and last overnight stay in the sleep laboratory of her friend Dr. Charles Tart, who was interested in her reported OBEs and wanted to study their possible

physiological components. To do that, Tart had carefully monitored Miss Z.'s brainwave activity using an EEG machine on each of the three previous nights while she slept, looking for any notable patterns in her activity that might coincide with her having an OBE.

In addition, to test her perceptual ability while out of body, Tart had selected a five-digit number from a table of random numbers and had written it down in large print on a sheet of paper. Then, he quietly slipped into the adjacent room where Miss Z. was sleeping and placed the sheet (with the number face up) on a small shelf hanging on the wall next to the door, about five and a half feet above the bed Miss Z. was lying in. Whenever she had an OBE, Miss Z. was to try and float up high enough to look down and read the number. She would then try to wake up as quickly as possible and recall as much of the number as she could.

Over the course of the three previous nights, Miss Z. reported several instances in which she felt that she had left her sleeping body, but apparently she was not able to float herself high enough to see the number. These instances were very fleeting; Miss Z. usually woke up within a minute or two. This allowed Tart to mark when they had occurred on her EEG readings, but it complicated her attempts to succeed. Although Tart assured her that he was satisfied with her attempts up to that point, Miss Z. became angry with herself over not being able to see the number.

100,000 to 1

Finally, Miss Z. went to sleep on her final night in the sleep lab. Most of it had passed uneventfully. But then, at 6:04 in the morning, Miss Z. suddenly awoke and stated that she had been able to see the number.

"I woke up; it was stifling in the room. Awake for about five minutes, I kept waking up and drifting off, having floating feelings over and over. I needed to go higher because the number was lying down. Between 5:50 and 6:00 A.M., that did it."

The number that Miss Z. recalled seeing was 25132, which turned out to be the correct one. The odds of her guessing this number by chance are about 100,000 to 1. It is also unlikely that she learned the number by standing up on the bed to look onto the shelf because the electrode wires sending her brainwave signals to the EEG restricted her movement.

Analysis of Miss Z.'s EEG data later indicated that her OBEs tended to coincide with a unique, slow brainwave pattern that falls within the alpha range (8 to 12 cycles per second), with a lack of rapid eye movement (REM). Typically, alpha waves occur when we are awake and relaxed, but they can also occur in the transition between wakefulness and sleep. REM is most often associated with the dream state, and the lack of it suggests that Miss Z.'s OBEs were not likely to be dream-related.

This intriguing study by Tart, an emeritus professor of psychology at the University of California, Davis, was first reported in the January 1968 issue of the *Journal of the American Society for Psychical Research*.¹ It represents one of the earliest experimental attempts to shed light on the puzzling nature of OBEs and the human brain's role in them. Four decades later, with the advent of brain-imaging technology, such attempts are continuing with greater promise for knowledge. This promise seems to have drawn the attention of the mainstream scientific community, as several psychological studies relating to OBEs have been published in prominent mainstream journals over the past few years. Aside from what they may tell us about certain aspects of the OBE, these studies may also tell us something about our sense of self.

The Astral Brain

Mainstream attention to OBEs was first drawn by the work of neurologist Olaf Blanke and his associates at the University Hospital of Geneva, Switzerland. They were studying inpatients diagnosed with epilepsy in the temporal lobe region of their brains, and they noticed that some of these patients were reporting experiences similar to an OBE.

One female epileptic patient said that when she woke up one night, she "...had the impression that I was dreaming that I would float above (under the ceiling) of the room," and that she had seen herself in bed from above. Unlike Miss Z.'s experience, however, she also reported seeing the figure of a man in her room, and that this frightened her. Her experience had apparently occurred during a seizure in the temporal area on the left side of her brain.

Blanke and his associates noticed that other epileptic patients were reporting experiences of autoscopia, a phenomenon similar to the OBE where one sees an image of oneself from a distance while still inside one's own body. (Autoscopia has sometimes been called the *doppelgänger*, or "double," experience.) One patient who experienced autoscopia in association with seizures said that she would suddenly have the impression of looking at an "image of herself in front of her eyes," from her face to her upper chest. She often described the image of herself as flat and two-dimensional, almost like a cardboard cutout, which never moved nor spoke.

In an attempt to locate a brain area associated with their patients' experiences, Blanke's team focused their experimental studies on a patient who reported having OBEs while being treated for her epilepsy. Electrodes had been implanted in the right side of her brain in the area where her temporal and parietal lobes meet, known as the temporal-parietal junction (TPJ), to record her seizure activity. When Blanke's team stimulated this same area with electric pulses while she was lying down in bed, the patient stated: "I see myself lying in bed, from above, but I only see my legs and lower trunk." When she was stimulated further, she had feelings of "floating" and "lightness" to her body, and saw visual illusions of her arms and legs being distorted while she watched them, as though they were growing shorter and longer. Blanke's team reported these findings with the patient in the September 19, 2002 issue of the prominent mainstream science journal *Nature*.²

Blanke and his team think that the TPJ may aid in processing information relating to the way we perceive and orient our own body, and that disrupting its processes through electrical stimulation may produce perceptual illusions of the body. Other studies they conducted found that the TPJ became active in healthy peoples' brains when they imagined themselves examining another person's body from the visual perspective of that other person.³ They also determined that most epileptic patients who reported OBE-like experiences and/or autoscopia tended to have lesions in the TPJ area along the right side of their brain, adding some support to this view.⁴

Most recently, a team of European neurosurgeons led by Dr. Dirk De Ridder of the University Hospital of Antwerp, Belgium, reported findings very similar to Blanke's team in the November 1, 2007 issue of the prestigious *New England Journal of Medicine*.⁵ Their study focused on a middle-aged man who was being treated for chronic tinnitus, a condition where ringing or buzzing sounds are frequently heard in the ear. It was suspected that the man's condition was due to an abnormality in the areas of his brain that are involved in hearing, most of which can be found in the parietal lobe and parts of the temporal lobe. His doctors had implanted electrodes in these areas to see if his condition could be eased through electrical pulse stimulation. The electrodes also overlapped the TPJ area on the right side of his brain, and whenever he received the electrical stimulation in that area, the man reported the impression that his sense of

self had gone out of his body, moving to an area behind his left shoulder. The man apparently didn't see himself from this out of body perspective, however. His experience was just an eerie sensation, and not a full-blown OBE.

A Virtual OBE?

The findings of both Blanke's team and De Ridder's team hint at a brain area, active in the way we perceive our body and sense of self, that may produce perceptual illusions of the body similar to OBEs when disturbed. So far these findings have been limited to epileptic patients. The question remains of how, and to what degree, they may apply to healthy people. To investigate that question, Blanke and his team invited healthy volunteers to experience an OBE within the controlled confines of the laboratory. But instead of poking around with their brains, Blanke's team tried to simulate an OBE-like experience in these volunteers through the emerging technological wonders of virtual reality.

In this "virtual OBE" study, the volunteers wore a pair of virtual reality goggles that were fitted with tiny video displays. The displays were connected to a video camera situated several feet behind the volunteer, and they projected the camera image of the volunteer's own body into the goggles to give the volunteers the illusion that they were seeing their own body from an outside perspective. (For simplicity, let's call this camera image of their own body that the volunteers are seeing through the goggle displays the "virtual body").

To further enhance the illusion, Blanke's team utilized the sense of touch by having one researcher stand next to the volunteer and lightly stroke the volunteer's back with the end of a pen. At the same time, the volunteer watched their back being stroked through the goggle displays, making it seem as though they were actually feeling their body being touched while they were still out of body, and thus creating the illusionary impression that the virtual body they were seeing in the goggles was indeed their own physical body.

When the illusion finally hit them, some of the volunteers commented on how "weird" and "strange" it felt to be seeing their own body from behind, which seemed akin to the strangeness that some people report in natural OBEs.

To further test the effects of the virtual OBE illusion, the researcher turned off the goggle displays toward the end of the session and gently guided the volunteer, still wearing the goggles, as they took several steps backward. The researcher then asked the volunteer to return to the place where they had been standing initially; when the volunteers did so, they tended to overshoot the place by a significant distance, moving towards the area where they thought they had seen their virtual body standing.

Blanke and his team reported these findings in the August 24, 2007 issue of the prominent mainstream journal *Science*.⁶ In that same issue was a remarkably similar study conducted by H. Henrik Ehrsson of the Karolinska Institute in Stockholm, Sweden.⁷ Like Blanke's team, Ehrsson had used virtual reality to create an OBE illusion in each of his volunteers, having them wear a goggle display that projected a stereoscopic image of their back being filmed by two video cameras set next to each other several feet behind the volunteers. Ehrsson also used the touch sense to enhance the visual illusion, stroking the front of the volunteer's chest with a plastic rod while pretending to stroke the lower back of the virtual body with another rod as the volunteers watched through the goggles.

Once again, as the vividness of the illusion began to hit them, several of Ehrsson's volunteers giggled and said such things as, "Wow! I felt as though I was outside my body and looking at myself from the back," and "I was sitting over there, behind myself."

To test the illusion, Ehrsson picked up a hammer and brought it into the view of the cameras, then pretended to swing it toward the virtual body as though he was going to strike it in the same area where he had pretended to stroke it. Watching his threatening actions through the goggles, many of his volunteers had flinched. They also showed a significantly high level of skin conductance, suggesting that many had felt a great deal of fear or anxiety at the level of their autonomic nervous system while witnessing the threat.

Is That All There Is?

Ehrsson's findings and those of Blanke's team suggest that an illusionary out-of-body episode can be produced in the lab with healthy people. Combined with the brain studies, they also suggest a preliminary psychological basis for OBEs. But is that really all there is to the OBE?

Other studies suggest that the OBE puzzle may not be so easy to solve. In the late 1970s and early 1980s, some remarkable research was conducted by the Psychical Research Foundation (PRF) in North Carolina and by the American Society for Psychical Research (ASPR) in New York, focusing on attempts to objectively detect some aspect of the OBE "astral body." In the PRF studies, a kitten owned by psychology student and OBE subject Keith "Blue" Harary was observed to be less mobile and less vocal at times when Harary was attempting to "astrally project" himself to the room where the kitten was located, a statistically significant finding that so far has not been easily explained away.⁸

In the ASPR studies, a series of strain gauge sensors were attached to a viewing box holding an ESP target inside, which OBE subject Alexander Tanous attempted to look at while he was out of body. The study findings indicated that the sensors were more active at times when Tanous had correctly described the target inside the viewing box than at times when he was incorrect, to a statistically significant degree. One interpretation of this finding offered by the ASPR researchers was that the sensors may have been sensitive to some aspect of Tanous' out-of-body presence, whatever it may have been composed of.⁹

Together with the successful number recall by Miss Z. in Tart's study, these findings are suggestive of a psychic or parapsychological aspect to some natural OBEs that are not easily accounted for by the purely psychological studies we have looked at here. Still, these studies may give us some insight into certain kinds of OBE-like experiences, and how they may relate to the way we experience our sense of self.

While we may still be far from fully solving the riddle of how OBEs work, science has at least given us a head start through attempts to bring the OBE into the laboratory setting. If such work continues, it may provide us with a better way to judge whether OBEs really are a case of being out of one's body, rather than a case of being out of one's mind, as some skeptics have claimed.

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