

“Out of body” research attacks philosophical questions

Aug. 24, 2007

Courtesy American Association
for the Advancement of Science and [World Science](#) staff

Using virtual reality goggles to mix up sensory signals reaching the brain, scientists say they've induced “out-of-body”-like experiences in healthy people, suggesting a possible explanation for a phenomenon often thought to be a figment of the imagination.



Through the goggles, a volunteer views the back of his body, as seen from behind by the camera. He also watches a plastic rod moving toward a location just below the camera, while his real chest is simultaneously touched in the corresponding spot. (Image courtesy Henrik Ehrsson)

Volunteer participants in the research had the illusion of moving outside of their own bodies—thanks to the goggles plus the sensation of their real bodies being touched simultaneously. A pair of studies in the 24 August 2007 issue of the research journal *Science* describe the findings.

Although scientists were partly interested in the tour de force of aspect of inducing an illusion in healthy people, the study had a deeper purpose, one of the scientists insisted.

“I’m interested in why we feel that our selves are inside our bodies—why we have an ‘in-body experience,’ if you like,” Henrik Ehrsson of University College London in the U.K. and the Karolinska Institute in Stockholm, Sweden, author of one of the studies.

“This has been discussed for centuries in philosophy, but it’s hard to tackle experimentally.”

Both Ehrsson and the second study’s authors used video cameras and virtual reality goggles to show volunteers images of their own bodies from the perspective of someone behind them. The researchers also touched the volunteers’ bodies, both physically and virtually.

“This experiment suggests that the first-person visual perspective is critically important for the in-body experience. In other words, we feel that our self is located where the eyes are,” Ehrsson said.

A disconnect between the brain circuits that process both these types of sensory information may thus be responsible for some out-of-body experiences, both studies’ authors say. These sensations, which generally involve the feeling of disembodiment and seeing one’s own body from a location outside the body, can occur in part through drug use, epileptic seizures and other types of brain disturbances. They’re also reported to occur in some near-death experiences.

“Brain dysfunctions that interfere with interpreting sensory signals may be responsible for some clinical cases of out-of-body experiences,” Ehrsson said. “Though whether all out-of-body experiences arise from the same causes is still an open question.”

Both studies used similar setups. The second research team, including Olaf Blanke of the Ecole Polytechnique Fédéral de Lausanne and the University Hospital in Geneva, Switzerland, also blindfolded volunteers and guided them backward after the virtual reality exercise. When the volunteers were asked to return to their original position, they tended to drift toward where they had seen their virtual bodies standing.

But in addition to sensory signals, bodily self-consciousness may also involve a cognitive dimension: the ability to distinguish between one's own body and other objects, Blanke's team proposed. They noted that when volunteers viewed a human-sized block instead of an image of a human body in the virtual reality, they successfully returned to their starting place in the blindfold test, showing no out-of-body illusion had occurred.

"Full-body consciousness seems to require not just the 'bottom up' process of correlating sensory information but also the 'top down' knowledge about human bodies," Blanke said.

"We have decades of intense research on visual perception, but not very much yet on body perception," he added. "But that may change, now virtual reality offers a way to manipulate full body perception more systematically and probe out-of-body experiences and bodily self consciousness in a new way."