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Trace of Thought Is Found in 'Vegetative' Patient

By **BENEDICT CAREY**
Published: February 3, 2010

He emerged from the car accident alive but alone, there and not there: a young man whose eyes opened yet whose brain seemed shut down. For five years he lay mute and immobile beneath a diagnosis — “vegetative state” — that all but ruled out the possibility of thought, much less recovery.

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Scans show brain activations in, above, a healthy person as he answers “yes” or “no” to a question and, below, in someone whom doctors have deemed to be in a vegetative state.

But in recent months at a clinic in Liège, Belgium, the patient, now 29, showed traces of brain activity in response to commands from doctors. Now, according to a new report, he has begun to communicate: in response to simple questions, like “Do you have any brothers?,” he showed distinct traces of activity on a brain imaging machine that represented either “yes” or “no.”

Experts said Wednesday that the finding could alter the way some severe head injuries were diagnosed — and could raise troubling ethical questions about whether to consult severely disabled patients on their care.

The new report, posted online by The [New England Journal of Medicine](#), does not suggest that most apparently unresponsive patients can communicate or are likely to recover. The hidden ability displayed by the young accident victim is rare, the study suggested.

Nor does the finding apply to victims of severe oxygen depletion, like [Terri Schiavo](#), the Florida woman who became unresponsive after her heart stopped and who was taken off life support in 2005 during an explosive controversy over patients’ rights.

Moreover, experts said the new test was not ready for wide use; serious technical challenges remain to be worked out.

Still, the experts agreed that the new study exposed the limits of the current bedside test for diagnosing mental state: checking whether patients’ eyes can track objects, and carefully looking for any signs — eye blinks, finger twitches — in response to questions or

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commands.

“I’m convinced as an observer that in these few cases, the [M.R.I.](#) technique, in these researchers’ hands, gives us a window into human consciousness that we have not had and that potentially adds to the clinical exam we currently use,” said Dr. James L. Bernat, a professor of neurology at Dartmouth

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Communicating with the Unconscious

David Corcoran of The Times discusses a new study by The New England Journal of Medicine that suggests it is possible to communicate thoughts while in a vegetative state.

Medical School.

In the new paper, researchers in Britain and Belgium studied 54 patients living in states of persistent [unconsciousness](#). Of these, 23 had a diagnosis of “vegetative state,” meaning they were not able to signal any response to commands or questions. (The others were termed “minimally conscious,” meaning they were intermittently able to respond to commands by moving or blinking.)

In 2006, [the same research group reported](#) that one of the 23 “vegetative” patients showed on imaging tests that her brain was responding to commands. When doctors asked her to think of playing tennis, areas of her motor cortex leapt to life. When asked to think of being in her house, spatial areas in the brain became active.

In the current experiment, the researchers found that three other patients identified as vegetative showed similar responses. To open a channel of communication, they instructed one of them, the 29-year-old man, to associate thoughts about tennis with “yes” and thoughts about being in his house with “no.”

They then asked questions, repeating the procedure numerous times, switching the associations — tennis with yes, then with no — to make sure the patient was in fact making conscious choices. The researchers had previously tested the technique in healthy volunteers.

“We asked basic biographical questions, like ‘Is your father’s name Thomas?’ and ‘Have you ever been to the United States?’ ” said Adrian M. Owen, a neuroscientist at the Medical Research Council in Cambridge, England, who developed the method and was a co-author of the paper. “We then checked whether the answers were correct. They were.”

Dr. Owen’s co-authors were Martin M. Monti, Martin R. Coleman and John D. Pickard in Cambridge; and Audrey Vanhauzenhuyse, Dr. Mélanie Boly, Dr. Jean-Flory L. Tshibanda and Dr. Steven Laureys of the University of Liège, where the patient was treated.

Over all, only 5 of the 54 patients — four identified as vegetative and one as minimally conscious — showed any meaningful brain activity on the M.R.I. when prompted, perhaps because it was too feeble to be picked up, because the timing was wrong or because the activity simply was not there.

In those rare cases where brain activity is detectable, doctors might be able to ask immobilized patient if they are feeling pain, for example, and, through a series of yes-or-no questions, where.

A two-way channel to an immobilized, severely brain-injured person also opens up a world of ethical challenges.

“If you ask a patient whether he or she wants to live or die, and the answer is die, would you be convinced that that answer was sufficient?” said Dr. Joseph J. Fins, chief of the medical ethics division at Weill Cornell Medical College in New York. “We don’t know that. We know they’re responding, but they may not understand the question. Their answer might be ‘Yes, but’ — and we haven’t given them the opportunity to say the ‘but.’

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“We’ve opened up a communication channel with this technique, but in some ways it’s like a very bad cellphone connection.”

In an editorial accompanying the article, Dr. Allan H. Ropper, a neurologist at [Brigham and Women’s Hospital](#) in Boston, similarly warned against equating neural activity and identity.

“Physicians and society are not ready for ‘I have brain activation, therefore I am,’” Dr. Ropper wrote. “That would seriously put Descartes before the horse.”

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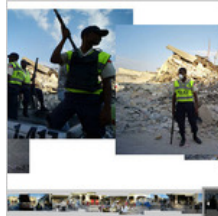
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