Consciousness, Terri Schiavo, and the Persistent Vegetative State

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In the long and contentious history of the medical-moral dilemma regarding the persistent vegetative state (PVS), confidence in the belief that patients in the PVS are completely devoid of awareness of self or environment has been the basis for decisions about their treatment. Beginning in 1972 with the seminal article "Persistent Vegetative State after Brain Damage: A Syndrome in Search of a Name," Bryan Jennett, M.D., and Fred Plum, M.D., set the initial parameters for the PVS when they declared that the crucial aspect of this illness was the "absence of any adaptive response to the external environment" and "the absence of any evidence of a functioning mind … in a patient who has long periods of wakefulness."[1] Subsequent medical studies arrived at similar conclusions.[2] Bolstered as well by the rulings handed down in several landmark legal cases, the claim that patients in the PVS possessed no ca-

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[1]Bryan Jennett and Fred Plum, "Persistent Vegetative State after Brain Damage: A Syndrome in Search of a Name," *Lancet* 1.7753 (April 1, 1972): 736.

[2]For example, the 1983 President's Commission document *Deciding to Forgo Life-Sustaining Treatment* determined that the scientific claims indicating that patients in the PVS suffered a complete absence of all thought, feeling, experience, and awareness were, in fact, accurate. See the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Deciding to Forgo Life-Sustaining Treatment: A Report on the Ethical, Medical, and Legal Issues in Treatment Decisions* (Washington, D.C.: Government Printing Office, 1983), 174.

pacity for awareness appeared to be an increasingly credible assessment of the PVS condition.[3] Finally, in the aftermath of *Cruzan v. Director*, the 1994 Multi-Society Task Force on PVS promulgated conclusions on the nature of the PVS that secured this understanding as an all but undisputable medical fact.[4] Based on the authority of the five respected medical societies endorsing the study (and three purported lines of clinical evidence), the MSTF document definitively established the PVS as "a clinical condition of complete unawareness of the self and the environment, accompanied by sleep-wake cycles."[5] Over the past three decades, this determination evolved into an almost universally accepted medical dogma that has effectively overwhelmed and overshadowed arguments and opinions contrary to it.[6]

On the other side of the spectrum, a small minority of medical professionals remained unconvinced by the evidence for complete unconsciousness in patients in the PVS and questioned the accepted definition. To test its strength, critics chose to examine the evidentiary supports on which the popular understanding was based—an understanding that appeared to lie more in the realm of educated supposition than actual medical fact. In such a manner, one respected neurologist made an interesting discovery:

> What was the empirical evidence that in adults all content of consciousness resides in the cortex and that without the cortex there can be no consciousness of any sort? All major discoveries in medicine—such as the circulation of blood, the germ theory of infectious diseases, the role of the brain in epileptic seizures, etc. can be traced back to some seminal case, experiment, or observation. I therefore went to the literature on coma and PVS, expecting to trace the bibliographical tree back to its historical trunk, i.e., a key article or set of articles definitively establishing the cortical basis of consciousness. Surprisingly, I soon realized

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[3] See *Barber v. Superior Court*, 147 Cal. App. 3d 1006, 195 Cal. Rptr. 484 (1983); *In the Matter of Claire C. Conroy*, 98 N.J. 321, 486 A.2d 1209 (1985); *Brophy v. New England Sinai Hospital, Inc.*, 398 Mass. 417; 497 N.E.2d 626 (1986); and *Cruzan v. Director, Missouri Department of Health*, 497 U.S. 261, 110 S.Ct. (1990).

[4] Multi-Society Task Force on PVS, "Medical Aspects of the Persistent Vegetative State," *New England Journal of Medicine*: part 1, 330.21 (May 26, 1994): 1499–1508, and part 2, 330.22 (June 2, 1994): 1572–1579.

[5] Ibid., part 1, 1500. Sponsors of the MSTF document included the American Academy of Neurology, the Child Neurology Society, the American Neurological Association, the American Association of Neurological Surgeons, and the American Academy of Pediatrics. According to the task force, the incapability of awareness was based on three lines of evidence: (1) motor or eye movements and facial expressions in response to stimuli, which indicated only primitive reflex responses; (2) the results of positron-emission tomography (PET) studies, which showed cerebral glucose consumption to be significantly diminished in comparison with normal rates; and (3) the evidence gleaned from neuropathological examinations of the brains of patients in the PVS, and the current understanding of the anatomy and physiology of consciousness. See also James L. Bernat, *Ethical Issues in Neurology* (Newton, MA: Butterworth-Heinemann, 1994), 148–149.

[6] D. A. Shewmon, "Recovery from 'Brain Death': A Neurologist's Apologia," *Linacre Quarterly* 64.1 (February 1997): 59.

> that I was on a wild goose chase. No such case, study, or article existed. Rather, a variety of speculations on the neuroanatomical localization of consciousness were batted around during the mid-1900s, and then during the 1970s the cortical theory began to be repeated long enough and loudly enough by prestigious enough experts that it eventually came to be taken for granted by everyone else as an established fact. Upon critical examination, the "evidence" turned out to be of an exclusively negative nature: patients with diffuse cortical destruction do not manifest clinical signs of awareness of self or environment. But there was no positive evidence that such patients were not inwardly conscious.[7]

From this perspective, critics charged that the fundamental grounding for unawareness in the PVS flowed, not from measurable scientific evidence of unconsciousness, but solely from the lack of observable indications of consciousness. In other words, because a patient did not respond (or provide a purposeful-enough response) to somatic, auditory, or verbal stimuli, the accepted opinion was that such individuals were definitively and irrevocably incapable of awareness. This line of thought, correctly deemed a logical fallacy, basically equated the absence of measurable evidence of consciousness with definitive evidence that consciousness was absent.[8] Ultimately, critics contended that the claim of complete unawareness was in reality a calculated medical assumption rather than a medical fact basedpon positive scientific evidence.[9]

In the medical realm, therefore, two divergent viewpoints exist where the question of awareness in the PVS is concerned. On the one hand, despite the recognition of inherent (and currently insurmountable) uncertainties in medical knowledge regarding a patient's capacity for some level of awareness, the mainstream opinion contends that patients in the PVS remain incapable of awareness and similarly, completely unable to experience pain and suffering.[10] For example, while Dr. James

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[7] Ibid.

[8] Ibid., 60.

[9] Dr. Eugene Diamond remarked, "In all candor, we act mostly out of ignorance. We consign patients to hopelessness without research and investigation. In Israel combat soldiers in coma were placed in an upright position and their caloric intake doubled. Prognosis for recovery increased by 50 percent. A mother of a patient comatose for 19 years sensed that he was depressed. When the doctor gave him an antidepressant, Paxil, he woke up. A dentist working on a patient who had been in PVS for 20 years gave him Valium to abolish his grimace; he woke up and went home on Valium. Such occurrences emphasize our primitive ignorance and our need to explore fully the chemical and physiological milieu of the brain in PVS." In "Assisted Nutrition and Hydration in Persistent Vegetative State," *Linacre Quarterly* 71.3 (August 2004): 203.

[10] Bryan Jennett, *The Vegetative State: Medical Facts, Ethical and Legal Dilemmas* (Cambridge: Cambridge University Press, 2002), 18–19. Dr. Jennett remarks that "the theoretical possibility that a patient who is believed to be vegetative might retain some awareness without behavioural evidence of this can never be completely ruled out. … The question of what vegetative patients actually experience is likely to remain a matter of debate for some time." See also the American Academy of Neurology, "Position of the American Academy of Neurology on Certain Aspects of the Care and Management of the Persistent Vegetative State Patient," *Neurology* 39.1 (January 1989): 125.

Bernat conceded the lack of definitive proof of an absence of awareness in the PVS, he nonetheless affirmed that none existed. Thus he stated:

> There is a fundamental and irreducible biological limitation in knowing for certain whether any other person possesses a conscious life. No person can directly experience the consciousness of another. We can ascertain another's quality and quantity of consciousness solely by inference … *despite the irreducible biological limitation, I believe that it is reasonable to conclude that PVS patients are incapable of any conscious experience, including the experience of pain or suffering.*[11]

Conversely, critics concerned about the "rudimentary state of our knowledge about PVS"[12] were not so willing to accede to the conventional wisdom regarding a complete lack of awareness without further evidence to substantiate it. Several factors dominated their reluctance to agree with the majority opinion. First, they referred to instances in which patients (to the surprise of everyone) suddenly returned to consciousness for no discernable reason.[13] Granted, such incidents did not occur frequently; however, since no plausible explanation for the abrupt and unexpected recovery of consciousness was forthcoming, surprises of this nature were not dismissed as simple curiosities. Second, critics raised the possibility that patients in the PVS, unable to communicate effectively with the outside world, might retain a level of inner awareness at best barely discernible to observers.[14] One neurologist remarked that, considering the severity of the brain injury suffered by patients in the PVS, the production of consistent and convincing evidence of consciousness was nearly impossible to achieve—even from a person who wanted to provide it.[15] Third, critics pointed to the unexplained changes in the heart and respiratory rates of patients in the PVS, as well as other

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[11] Bernat, *Ethical Issues in Neurology*, 148 (emphasis added). See also Jennett, *Vegetative State*, 19.

[12] Eugene F. Diamond, "Medical Issues When Discontinuing AHN," *Ethics & Medics* 24.9 (September 1999): 2.

[13] S. Laureys, M. Boly, and P. Maquet, "Tracking the Recovery of Consciousness from Coma," *Journal of Clinical Investigations* 116.7 (July 2006): 1823–1825. See also Diamond, "Medical Issues," 2; and D. A. Shewmon, G. L. Holmes, and P. A. Byrne, "Consciousness in Congenitally Decorticate Children: 'Developmental Vegetative State' as Self-Fulfilling Prophecy," *Developmental Medicine and Child Neurology* 41 (1999): 364–374.

[14] For example, D. Alan Shewmon, M.D., proposed a "super locked-in" state in which patients who suffered severe cognitive defects due to brain trauma still retained primitive awareness of self and environment. See Shewmon, "A Critical Analysis of Conceptual Domains of the Vegetative State: Sorting Fact from Fancy," *NeuroRehabilitation* 19.4 (2004): 346.

[15] Shewmon, "Recovery from 'Brain Death,'" 59–60. He stated, "Moreover it occurred to me that in the context of such a lesion an empirical demonstration of absence of subjective consciousness is inherently impossible, even if that were the case. Diffuse cortical destruction results in spastic quadriplegia and pseudobulbar palsy, apraxia of whatever little motor control remains, global aphasia, dementia, cortical blindness, etc. How could anyone with such a disability possibly externally manifest inner consciousness convincingly, even if it were present? Furthermore, anyone aware of him- or herself being in such a state (and perhaps aware of being considered a "vegetable" by caregivers) would probably also be significantly depressed, impairing the motivation even to attempt to communicate."

physiological variations, when they were spoken to lovingly or when they received painful stimuli.[16] In the judgment of these medical professionals, clinical studies reported new information regarding unforeseen and unexplained cerebral activity in individuals thought to be vegetative regularly enough to warrant a dubious view of the dogma of complete unconsciousness.[17]

While the question of consciousness in the PVS remains a topic of professional debate in medicine and ethics, the recent case involving Florida resident Theresa Marie Schiavo brought national attention to the discussion with an intensity greater than previously observed in other cases. The events surrounding the life and death of Terri Schiavo thus provide a highly illustrative backdrop for the questions, conflicts, and uncertainties that were so tightly interwoven in her situation. This article, centered on the evidentiary hearing conducted October 11–22, 2002, before Judge George Greer of Pinellas-Pasco County, Florida, examines the testimony of the five board-certified physicians who examined Schiavo, and focuses attention on the divergent conclusions they reached in relation to her medical condition. For all intents and purposes the Schiavo case constituted a medical and ethical battleground in which adamant declarations of complete unconsciousness vied with definitive affirmations of at least minimal consciousness. Considering the significant degree of contention and disagreement surrounding her diagnosis, however, the truth about her condition and potential awareness (as with many patients in the PVS) was much less certain.

Terri Schiavo's Medical Condition

The diagnosis of a patient's medical condition is generally a straightforward and objective starting point from which an examination of a medical case can begin. In the Terri Schiavo case, however, diverse medical opinions and contradictory eyewitness testimonies regarding the true nature of the patient's physical condition precluded such a logical starting point. As the increasingly polarized struggle between Terri's family, the Schindlers, and her husband, Michael Schiavo, became better known outside the bounds of Pinellas County, Florida, it became clear that two divergent interpretations of Terri's medical condition were being reported.[18] From a disinter-

[16]Diamond, "Assisted Nutrition and Hydration in Persistent Vegetative State," 202–203. Dr. Diamond reported that "pain studies on PVS patients, however, indicate that their electroencephalographic response to painful stimuli is similar to that of a conscious patient." In "Medical Issues When Discontinuing AHN," 2.

[17] See, for example, N. D. Schiff et al., "Residual Cerebral Activity and Behavioural Fragments Can Remain in the Persistently Vegetative Brain," *Brain* 125.6 (June 2002): 1210–1234. See also H. U. Voss et al., "Possible Axonal Regrowth in Late Recovery from the Minimally Conscious State," *Journal of Clinical Investigations*, 116.7 (July 3, 2006), 2005–2011; and Susan Jeffrey, "Functional MRI Detects Residual Awareness in Vegetative Patients," *Medscape Medical News*, August 17, 2007, http://www.medscape.com/home.

[18]From the Schindler's perspective, the diagnosis of PVS was highly questionable. According to their testimony, Terri understood and responded to commands, and she interacted with visitors, particularly her family. See David Gibbs with Bob DeMoss, *Fighting for Dear Life: The Untold Story of Terri Schiavo and What it Means for All of Us* (Minneapolis:

ested perspective, it is striking that even the physicians asked by the Schindler family and Michael Schiavo to provide the court with an accurate diagnosis of Terri's medical condition produced results that were widely dissimilar, and even contrary to each other. The inability of these medical professionals to arrive at an accurate and mutually acknowledged diagnosis was disturbing, particularly since the decision to provide or withdraw artificial nutrition and hydration (ANH) from a seriously brain injured person depended heavily on the correctness of their conclusions.

One group of commentators asserted that "the Schiavo case rests critically on the concept of the persistent vegetative state and the certainty of the prediction that a patient in this state will have no meaningful recovery."[19] While on the surface this statement sounds authoritative and straightforward, in reality it contains assumptions that should not be taken at face value. On the one hand, the "concept of the PVS" was not a universally accepted medical fact, and on the other, not every medical professional was convinced that such a diagnosis necessarily applied to Terri.[20] Credible but conflicting opinions about Terri's medical condition were ubiquitous; they included (1) the eyewitness and videotaped accounts presented by the Schindler family that claimed some degree of awareness, (2) the matter-of-fact statements by Michael Schiavo that alleged the opposite, and (3) the contradictory diagnoses of the physicians who examined Terri. In the end, because the myriad of opinions and purported "facts" of the case often raised more questions than they answered, the truth about Terri's condition was nearly impossible to ascertain.

At the same time, despite the conflicting information regarding her condition, the hallmark characteristic of the Schiavo case in general was the definitive manner in which each side represented the "facts" of Terri's medical condition. Regardless

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Bethany House, 2006), 22–26. From the perspective of Michael Schiavo, Terri was definitively in a PVS and was, therefore, incapable of interaction or communication. See Michael Schiavo with Michael Hirsh, *Terri: The Truth* (New York: Dutton, 1996), 74.

[19] J.E. Perry, L.R. Churchill, and H.S. Kirshner, "The Terri Schiavo Case: Legal, Ethical, and Medical Perspectives," *Annals of Internal Medicine* 143.10 (November 15, 2005): 744.

[20] Dr. Diamond provides one of the best critiques of the PVS concept as it is presented in the 1994 Multi-Society Task Force document. He wrote, "Criteria 1–3 [of the MSTF criteria of the PVS] are negative and 4–7 are positive. Furthermore, criteria 2 and 3 are subservient to criterion 1. If a patient lacks awareness of self, he will not respond to stimuli or language. The diagnosis therefore really comes down to one central criterion, i.e., no evidence of awareness of self or environment. If this continues for a month, the patient is said to be in a persistent vegetative state. After a year of persistence without improvement, the patient is said to be in a permanent vegetative state. How reliable, then, is the diagnosis of PVS? Two distinct possibilities qualify the reliability of the diagnosis: (1) the patient does exhibit evidence of awareness, but the diagnostician has missed the relevant evidence, and (2) the patient does not exhibit any evidence of awareness but does, nevertheless, retain some measure of awareness. The evidence that some PVS patients may experience pain would imply that they are not devoid of awareness." "Definitions of Therapy, Treatment and Care," in *Life-Sustaining Treatment and Vegetative State: Scientific Advances and Ethical Dilemmas*, eds. E. Sgreccia and G.L. Gigli, *L'Arco di Giano*, Suppl., 39 (2004): 23–24.

of their assertions, however, neither side was able to successfully respond to the questions raised by their opponents in a manner that erased the doubts regarding her medical condition. The following examples provide a glimpse into the dilemma that faced those attempting to accurately assess Terri's medical condition.

First, Dr. Ronald E. Cranford, one of the neurologists retained by Michael Schiavo to examine his wife, argued that Terri was, without a doubt, in a PVS. He stated:

> The two most recent EEGs [electroencephalograms] have demonstrated no electrical activity—on July 8, 2002, "no evidence of cerebral activity;" and October 4, 2002, "does not have any definite brain activity." Thus, the [computed tomography] scans demonstrated massive atrophy of the cerebral hemispheres, indicating irreversibility (permanency) of the patient's clinical condition. … The clinical exams over the years were entirely consistent with diagnosis of permanent vegetative state secondary to hypoxic-ischemic encephalopathy.[21]

Conversely, from the perspective of the Schindler family, the medical data cited by physicians and neurologists to prove that Terri was in a PVS did not coincide with their experience of her. Their observations indicated that Terri had a certain degree of self-awareness and interacted with her environment on a minimal level. David Gibbs, an attorney representing the Schindler family, related the following incident to highlight the awareness Terri apparently possessed of her surroundings:

> Interestingly, Terri responded very differently to her dad. Bob had developed this playful routine he'd go through with her each time they were together. I watched Bob announce, "Here comes the hug" as he wrapped her in a bearlike embrace. Then Bob said, "You know what's coming next—the kiss!" He then moved in close for a smooch. Keep in mind that Bob sports a scratchy mustache. His chin was often unshaved too, which caused his facial hair to tickle Terri's face. Over the years, as she did during our visit, Terri would scrunch up her whole face in preparation for the assault on her cheeks that she knew was coming with Bob's scratchy kiss. Her family called this Terri's "lemon face." With a giggle, she'd turn her head away as if toying with her dad. In the end she'd laugh as his lips made contact with her cheek. She responded the exact same way every time to her father's auditory cues as he consistently initiated this playful routine.[22]

Beyond the confident, but ultimately contradictory, assertions made by individual physicians and family members regarding Terri's medical condition, the one genuine contribution the Schiavo case provided to the larger PVS debate was a clear demonstration of the difficulties inherent in accurately assessing the condition of a seriously brain-injured patient. At a minimum, the Schiavo case showed that achieving a correct diagnosis of the severity of brain injury was no easy task, and that incorrect conclusions could be, and frequently were, reached. More than anything else, the Schiavo case has come to be the clearest example to date of the difficulties inherent in accurately diagnosing a patient with persistent unconsciousness. In some quarters, it has also called into question the very foundation on which the PVS is

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[21] Ronald E. Cranford, "Facts, Lies, and Videotapes: The Permanent Vegetative State and the Sad Case of Terri Schiavo," *Journal of Law, Medicine & Ethics* 33.2 (Summer 2005): 365.

[22] Gibbs and DeMoss, *Fighting for Dear Life*, 22–23.

diagnosed. Because the current state of medical science remains, as yet, incapable of definitively determining the presence or absence of consciousness in patients suffering persistent unconsciousness, scientific theories collide with eyewitness accounts and vice versa. Such an environment made discerning the truth of Terri's medical condition challenging, if not impossible.

Contradictory Diagnostic Conclusions

The divergent interpretations of Terri Schiavo's medical condition, produced by the physicians who directly examined her, provide an excellent perspective from which to review the difficulties inherent in this case. At the evidentiary hearing conducted from October 11 to 22, 2002, five board-certified physicians (two selected by the Schindler family, two selected by Michael Schiavo, and one selected by Judge George Greer) were chosen to examine Terri and provide expert testimony regarding her physical condition. The experts chosen by the Schindlers were William Hammesfahr, M.D., and William Maxfield, M.D. Michael Schiavo chose Ronald E. Cranford, M.D., and Melvin Greer, M.D. (no relation to the presiding judge), and Judge George Greer selected Peter Bambakidis, M.D. While all of the examining physicians agreed that Terri suffered serious brain injury, their testimony, even after viewing videotaped evidence of her apparent ability to follow commands, varied significantly regarding her capacity for awareness and her potential for a certain degree of improvement. To provide a glimpse into how wide the diagnostic conclusions of Terri's medical condition actually were, the following paragraphs briefly cover the testimony given by the five physicians.

The first expert witness, Dr. William Hammesfahr, a resident of Clearwater, Florida, and a board-certified neurologist, conducted a two-hour-and-fifty-minute videotaped examination of Terri, which was by far the longest single test administered by the five physicians.[23] Using the videotaped examination to confirm Terri's capabilities, Dr. Hammesfahr described to the court the behaviors that distinguished Terri's various reflex actions from those that were voluntary.[24] He pointed out Terri's ability to differentiate background noises from specific, meaningful sounds,[25] to smile in relation to certain stimuli, such as her mother's nearness or music,[26] and her propensity

[23] When asked by the Schindler's attorney about the extended length of his examination, Dr. Hammesfahr responded, "Examining patients with brain injuries takes a long time. … There are a lot of reasons it takes a long time. One of them is that you have to observe them … with respect to people around them. Second, they don't process the way the rest of us do. So you can't go through examinations very rapidly. You have to give them time and do different parts of the exam very slowly, and very frequently, repetitively while you try to identify how their body is working and what can be done about it." *In Re the Guardianship of Theresa Marie Schiavo, Incapacitated*, file no. 90-2908-GB-003, hearing transcript, part 1 (October 11, 2002), 239–240; available at http://www.northcountrygazette.org/documents/2002trialpart1.txt.

[24] Ibid., 243.

[25] Ibid., 249 and 256.

[26] Ibid., 252 and 255.

to respond better to a gentle tone of voice than to tones that were harsh.[27] He further testified that Terri responded to commands to open and close her eyes, to squeeze his hand, and to lift her leg against the pressure of his hand.[28] In Dr. Hammesfahr's opinion, Terri was not merely aware of her surroundings; she was able to interact with them in a minimal fashion. He stated that "she is communicating already. She is communicating through following instructions. She is communicating through gaze preferences towards people … She is clearly, as you saw earlier, listening to music or responding to music. She responds to specific voices. She responds to specific tones of voice from specific voices."[29] In his judgment there was no doubt that, although Terri was a severely injured person, she was most certainly not in a PVS and with therapy could benefit significantly.[30]

The second expert chosen by the Schindler family was Dr. William Maxfield from Tampa Bay, Florida. Dr. Maxfield, a board-certified physician in radiology and nuclear medicine, personally observed Terri three separate times in 2002, and conducted a videotaped examination on a separate occasion.[31] According to Dr. Maxfield's testimony, Terri obviously suffered a serious brain injury; however, on the basis of his interpretation of the CT (computed tomography) and SPECT (single-photon emission computed tomography) scans of her brain, he did not consider the severity of the insult to be so grievous that she would be incapable of some degree of awareness or the ability to see and track objects as they moved across a room.[32] He further reported that Terri not only visibly reacted to the presence of her mother when she came into the room, but that she turned toward her mother, smiled, and made sounds as if she were trying to communicate with her.[33] He firmly believed that Terri was not in a PVS because, among other things, she possessed the ability to interact with her environment and she recognized people familiar to her. On the basis of his examination of Terri, his numerous observations, and the scans of her brain,

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[27] Ibid., 256–257, and 261–262. According to Dr. Hammesfahr, Terri responded better to her mother than her father in this regard. He specifically stated that this kind of discrimination was not an involuntary reflex, but a sign of cognitive awareness. Later in his testimony, he commented that Terri responded positively to her father's voice as he attempted to ease the contraction in one of her arms (277).

[28] Ibid., 293–296 (eyes), 288 and 302 (hand squeeze), 296 and 317–321 (leg movements).

[29] Ibid., 297–298. Dr. Hammesfahr pointed out that the severity of Terri's brain injury affected her ability to respond to stimuli. Thus, while a normal person would respond to a specific stimulus almost instantaneously, for Terri, the response to specific stimuli would be noticeably longer (311).

[30] Ibid., 306–307. Also, Dr. Hammesfahr was reasonably convinced that vasodilation and hyperbaric oxygen therapy would deliver greater supplies of oxygen to the brain (333–334).

[31] *In Re Schiavo*, hearing transcript, part 2 (October 15, 16, 17, 21, and 22), 32–33; available at http://northcountrygazette.org/documents/2002trialpart2.txt, 32–33.

[32] Ibid., 85, 89, 113–114, and 117.

[33] Ibid., 33–34.

Dr. Maxfield concluded that the therapy he recommended could produce significant improvement in her condition.[34] Ultimately, Dr. Maxfield and Dr. Hammesfahr concurred in the belief that Terri possessed a degree of awareness and ability to interact with her environment that could be expanded by the treatments they offered.[35]

The late Dr. Ronald E. Cranford was the first physician selected by Michael Schiavo to testify about his wife's medical condition. Although he was undoubtedly the most renowned physician asked to examine Terri, his selection was not without controversy.[36] On the one hand, Dr. Cranford's credentials were undeniably impressive. He was a board-certified neurologist and head of the neurology clinic at Hennepin County Medical Center in Minneapolis, Minnesota. In addition, he was the second chairman of the Ethics and Humanities Subcommittee of the American Academy of Neurology, the co-chairman of the Multi-Society Task Force on the PVS, and author of hundreds of peer-reviewed articles in prestigious medical journals.[37] Conversely, Dr. Cranford was also well-known as a serious advocate for the "right to die" and often argued against providing food and fluids to patients in the PVS.[38] Like Drs. Hammesfahr and Maxfield, Dr. Cranford conducted a videotaped examination of Terri. On the basis of the CT and SPECT scans of her brain, Dr. Cranford concluded that Terri had suffered severe cortical damage, which ultimately led to massive atrophy and shrinkage of the cerebral cortex and thalamus over the

[34] Ibid., 12 and 105. Dr. Maxfield recommended hyperbaric oxygen therapy for Terri Schiavo. Hyperbaric oxygen therapy involves the use of an oxygen chamber, which increases oxygen pressure and subsequently increases the amount of oxygen that reaches the brain.

[35] *In Re Schiavo*, hearing transcript, part 1, 216 and 333. Dr. Hammesfahr recommended vasodilation and hyperbaric oxygen therapy to help improve Terri Schiavo's condition. Basically, vasodilators are medications that help increase the blood flow, and thus oxygen, to (in this case) the brain.

[36] Rita L. Marker, "Terri Schiavo and the Catholic Connection," *National Catholic Bioethics Quarterly* 4.3 (Autumn 2004): 561. The author commented that even George Felos, the attorney for Michael Schiavo, referred to him as a "gadfly in this area." See also J. P. Hubert, Jr., "Fr. Richard McBrien and Others Mislead Catholic Public: Allege Schiavo Feeding Tube Removal OK," *Catholic Online*, March 8, 2006, 6, http://www.catholic.org/featured/headline.php?ID=3066.

[37] *In Re Schiavo*, hearing transcript, part 2, 572, 574, 584, and 589.

[38] For examples of the author's position, see James S. Ganther and Rita L. Marker, "Brief *Amicus Curiae* of International Task Force on Euthanasia and Assisted Suicide in Support of Appellant/Petitioners," http://www.internationaltaskforce.org/pdf/schiavo.pdf. See also Ronald E. Cranford, M.D., "Cruzan: A Hostage to Technology," *Hastings Center Report* 20.5 (September–October 1990): 9–10; Rita L. Marker, "Mental Disability and Death by Dehydration," *National Catholic Bioethics Quarterly* 2.1 (Spring 2002): 127; and Ronald E. Cranford and David Randolph Smith, "Consciousness: The Most Critical Moral (Constitutional) Standard for Human Personhood," *American Journal of Law & Medicine* 13.2 and 3 (1987): 242. The authors wrote, "Thus, the essential arguments for determining whether treatment should be continued or discontinued in the permanently unconscious patient become the same as those used to decide on the appropriate treatment of a person who is dead. In this respect, permanently unconscious patients are more like the dead than the living."

course of her fifteen-year illness.[39] Although he frequently acknowledged during his testimony that the interpretation of a patient's neurological scans, movements, and responses to stimuli were often difficult to analyze,[40] Dr. Cranford unequivocally concluded that Terri was in a PVS and that her condition was completely beyond the capacity of any therapy to correct.[41] In his judgment, Terri exhibited only reflex motions and reactions, and she produced no consistent or sustainable responses to stimuli to indicate a degree of awareness.[42] He further testified that Terri could not hear sounds, did not consistently focus on specific objects or track them across the room, and did not voluntarily smile.[43] Dr. Cranford rejected any individual moment in which it appeared that Terri consciously responded to a specific stimulus. He asserted that a valid medical assessment was founded on the whole body of evidence regarding her condition and not merely a specific incident or two. Basically he argued that "it's not the few seconds that counts, but it's the overall film and the overall observation of others to find consistent reproducible responses over a period of time, not just a few seconds."[44] Thus he determined that what many people, including trained medical professionals, believed to be evidence of awareness and consciously chosen actions, was in reality simply the result of a functioning brain stem and not higher cortical activity.[45]

The second physician chosen by Michael Schiavo was Dr. Melvin Greer, board-certified in psychiatry and child neurology, professor of neurology at the University of Florida College of Medicine in Gainesville, and former president of the American Academy of Neurology.[46] After reviewing the assessments of the other four physicians asked to evaluate her and the results of several neurological diagnostic tests (CT, EEG, and SPECT studies), and after conducting his own brief examination, Dr. Greer testified that the evidence clearly indicated that Terri was in a PVS.[47] He determined that the CT scans taken of Terri's brain in 1996 and 2002 indicated

[39] *In Re Schiavo*, hearing transcript, part 2, 631–634. See also Cranford, "Facts, Lies and Videotapes," 364. The author stated, "The initial CT scan on the day of admission, February 25, 1990, was normal, but further CT scans documented a progression of widespread cerebral hemisphere atrophy, eventually resulting in CT scans of 1996 and 2002 showing extreme atrophy."

[40] *In Re Schiavo*, hearing transcript, part 2, 610, 645, 652, and 655.

[41] Ibid., 669–670. In response to the questions about the possible application and success of vasodilation or hyperbaric oxygen therapy, Dr. Cranford responded, "My opinion is it's beyond bizarre. It's incredibly strange and boggles the imagination that anyone can come along after being in a vegetative state after 12 years and say with any treatment—it has to be totally bogus, completely bogus."

[42] Ibid., 642–644, 654, and 663.

[43] Ibid., 644, 647–648.

[44] Ibid., 649–650.

[45] Ibid., 645 and 667.

[46] Ibid., 392, 397, and 402.

[47] Ibid., 404–406.

that profound atrophy and shrinkage of her brain had occurred and that no form of treatment could ever produce a tangible benefit for her.[48] Consequently, Dr. Greer concluded that any apparently cognitive reactions to stimuli were, in fact, merely reflex actions that were consistent with his diagnosis of the PVS.[49]

The last of the physicians to examine Terri was Dr. Peter Bambakidis, board-certified in adult neurology and clinical physiology, from the Cleveland Clinic Foundation in Cleveland, Ohio. Chosen by Judge Greer to provide an impartial perspective from which to gauge the conclusions of the experts selected by the Schindler family and Michael Schiavo, Dr. Bambakidis's testimony was not completely free of controversy.[50] After a delayed flight from Ohio, Dr. Bambakidis finally arrived to perform his examination of Terri more than three hours after it had originally been scheduled. He reviewed Terri's medical history and then conducted a brief, non-videotaped examination in the presence of her husband and his attorney alone.[51] During his testimony, Dr. Bambakidis stated that, while he was no expert at the interpretation of CT or SPECT scans, the images of Terri's brain clearly showed that the cerebral cortex was no longer present and that the tissue had been replaced by fluid.[52] Despite the fact that he noted the presence of some brain activity recorded by her EEG,[53] Dr. Bambakidis further suggested that, because the cerebral cortex was no longer present, Terri had consequently lost the crucial physiological foundation for awareness and perhaps a great deal more. Regarding the importance of the cerebral cortex, he remarked:

> Oh, it's very, very vital. Those aspects of human existence involving awareness of one's self, awareness of those around us, our ability to communicate, our ability to experience pleasure on a conscious level and our ability to suffer as well is a function of the cerebral cortex. And it's frightening to think that such a relatively small area of the brain has such an important role in what makes us—I don't

[48] Ibid., 410–417.

[49] Ibid., 541, 543, 545, and 547.

[50] Ibid., 269–276. During the cross-examination it was revealed that Dr. Bambakidis had a significantly greater degree of contact with the petitioner and his lawyer (Michael Schiavo and George Felos, respectively) than he did with the respondents and their attorney (the Schindler family and Patricia Anderson, respectively). Dr. Bambakidis was in contact with George Felos on approximately ten occasions from May 2002 through the evidentiary hearing in October 2002. See also Robert and Mary Schindler, *A Life That Matters: A Lesson for Us All* (New York: Grand Central, 2006), 124–125; and Diana Lynne, *Terri's Story: The Court-Ordered Death of an American Woman* (Nashville, TN: WND Books, 2005), 150–151.

[51] Diana Lynne commented that "the prior arrangement was for the Schindlers to also be there for his examination. Due to Bambakidis's flight delay, however, they were not present when he arrived. He testified he made no attempt to contact them to supplement his understanding of Terri's history that evening or anytime thereafter. In *Terri's Story*, 151.

[52] *In Re Schiavo*, hearing transcript, part 2, 234–236, and 247–248.

[53] Ibid., 243–244. Dr. Bambakidis stated that the brain wave amplitude measured by the electroencephalogram was low and showed little in the way of spontaneous variability.

> mean pejorative I was going to say totally human, to have those experiences as well as those trials and tribulations that come with being human.[54]

On the basis of his examination and the body of medical information available to him, Dr. Bambakidis concluded that Terri produced only responses that were consistent with a diagnosis of PVS. He considered every piece of evidence, from the scans of her brain to her reflexive stimulus responses and her posture, to confirm the severely abnormal nature of her condition.[55] Rather than object to an attempt by George Felos, Michael Schiavo's lawyer, to equate Terri with a plant on a windowsill, Dr. Bambakidis testified that, in an analogous manner, a patient in a PVS could produce involuntary movements, sounds, and responses, but could have no degree of awareness.[56] Dr. Bambakidis concluded that the evidence overwhelmingly supported his diagnosis that Terri was in a PVS.[57]

Exactly one month after the conclusion of the hearing, Judge Greer finally delivered his ruling. Despite the fact that three of the five physicians who examined Terri testified that she was in a PVS, the judge insisted that his decision rested not on that numerical basis alone, but on all the relevant factors in the case.[58] First and foremost he referred to the mandate accepted by the court at the beginning of the hearing that intended to determine Terri's "current medical condition, the nature of the new medical treatment and their acceptance in the relevant scientific community, the probable efficacy of these new treatments and any other factors the trial court deems relevant."[59] On the basis of the parameters set by his mandate, the judge ultimately determined

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[54] Ibid., 237–238. Arguing against the 1989 American Academy of Neurology statement on the PVS, and specifically what he considered to be the unproved establishment of conscious awareness in the cerebral cortex, Shewmon stated, "First, they do not simply refer to 'cognitive function,' but specifically to '*cerebral* cognitive function.' Why? The final phrase seems to suggest that all cognitive function is *ipso facto* cerebral, gratuitously taking for granted as established fact what is a mere hypothesis. Second, there may be forms of subjective consciousness other than 'cognitive function' or 'thinking," e.g., self-awareness, basic awareness of body and environment; nor is 'experiencing pain' a 'cognitive function' in any usual sense of the term." He further asserted that, "in the final analysis, the dogmatic assertions of VSc [vegetative state—consciousness] in official position statements were based not on scientific evidence but on an unproved and philosophically biased assumption that consciousness is an 'emergent property' of cortical neurons, at a time of intense socio-political pressure to provide courts with the medical 'facts' about PVS. It is not the first time in history, and no doubt not the last, that one generation's medical 'facts' become future generations' medical myths." In "A Critical Analysis of Conceptual Domains," 345 and 346.

[55] *In Re Schiavo*, hearing transcript, part 2, 234–236, 248, and 257.

[56] Ibid., 258–260. Mr. Felos commented that just because a plant grows toward the light does not mean it exhibits consciousness, and he compared this to Terri Schiavo's ability to move, see, and respond without awareness.

[57] Ibid., 261–262.

[58] *In Re Schiavo*, 2002 WL 31817960 (Fla. Cir. Ct. Nov. 22, 2002); available at http://abstractappeal.com/schiavo/trialctorder11-02.txt.

[59] Ibid.

that the Schindlers' experts were significantly less convincing than the other three physicians who testified that Terri was in a PVS. In the judge's estimation, Terri's responses to stimuli, regardless of the testimony offered by Hammesfahr and Maxfield, were not consistent and reproducible. Judge Greer was particularly critical of Dr. Hammesfahr's videotaped examination, in which the doctor and Mrs. Schindler issued to Terri over one hundred commands and asked her over seventy questions without eliciting responses that he considered to be indicative of conscious understanding on her part.[60] He was similarly skeptical of the fact that neither physician provided the court with documented evidence to confirm his generalized claims of successfully treating patients in the PVS. In this regard Judge Greer contended that

> it is clear from the evidence that these therapies are experimental insofar as the medical community is concerned with regard to patients like Terri Schiavo which is borne out by the total absence of supporting case studies or medical literature. The Mandate requires something more than a belief, hope or "some" improvement. It requires this court to find, by a preponderance of evidence, that the treatment offers such sufficient promise of increased cognitive function in Mrs. Schiavo's cerebral cortex so as to significantly improve her quality of life. There is no such testimony, much less a preponderance of evidence to that effect.[61]

Ultimately, despite the fact that Hammesfahr and Maxfield testified that vasodilation and hyperbaric oxygen therapy offered the potential for substantial improvement in Terri's cognitive abilities, their credibility was seriously hampered by the fact that they offered insufficient corroborating evidence to confirm their claims.

By contrast, although the judge acknowledged the fine credentials of all five physicians, he was greatly influenced by the unified testimony given by the three physicians who believed Terri to be in a PVS. He also found their testimony credible that Terri was beyond any effort to improve her condition. Interestingly, Judge Greer professed to be deeply affected by the agony and soul-searching that Dr. Bambakidis experienced while reaching the conclusion that Terri was in a PVS.[62] The doctor's emotional wrestling notwithstanding, however, it seemed to be the judge's contention that the testimony of Cranford, Greer, and Bambakidis more consistently reflected the accepted body of medical knowledge on the PVS that actually swung his decision in favor of Michael Schiavo. Thus, it was his ruling that the motion filed by Robert and Mary Schindler be denied, and a new date was set for the removal of the food

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[60] Ibid. According to the judge, the total number of commands issued was 111: Dr. Hammesfahr issued 105 and Mrs. Schindler gave 6. The total number of questions was 72: Dr. Hammesfahr asked 61 and Mrs. Schindler asked 11. Furthermore, in his statement Judge Greer appeared very skeptical of the claims made by Dr. Hammesfahr and Dr. Maxfield. The judge labeled Dr. Hammesfahr a "self-promoter" and appeared very skeptical of his claims regarding Terri's responses to stimuli. At one point the judge commented: "The videographer focused on her hands when Dr. Hammesfahr was asking her to squeeze. While Dr. Hammesfahr testified that she squeezed his finger on command, the video would not appear to support that and his reaction on the video likewise would not appear to support that testimony."

[61] Ibid. See also Perry, Churchill, and Kirshner, "Terri Schiavo Case," 746.

[62] Ibid.

and fluids sustaining Terri's life.[63] After a protracted legal battle, Terri died from dehydration and malnutrition on March 31, 2005, thirteen days after the food and fluids sustaining her life were removed.

A Lack of Certitude

In the end Judge Greer's ruling was swayed more by the physicians who determined that Terri Schiavo's medical condition was consistent with the PVS than by those who argued otherwise. At the same time, his decision did not resolve the unanswered questions surrounding Terri's case, nor did the case itself present definitive evidence to negate the possibility of some level of inner awareness of patients in the PVS. While medical professionals on both sides continue to debate the subject of consciousness in the PVS, conclusive evidence one way or the other does not appear to be available. In any event, the testimony regarding Terri's medical condition contained enough anomalies to be interesting to a critical eye. First, the lack of diagnostic uniformity with regard to Terri's medical condition constituted a problematic aspect of the case. Second, although some medical professionals adamantly declared that Terri was completely unaware of herself or her environment, the Schindler family received the unsolicited and sworn affidavits of more than thirty physicians who disputed the diagnosis of the PVS and offered their assistance in evaluating Terri's medical condition.[64] Even the autopsy report (often held up to support the diagnosis of PVS) did not produce conclusive and incontrovertible proof that Terri lacked awareness.[65] In his report, Dr. Jon Thogmartin noted that Terri's brain weighed only 615 grams (less than half its expected weight) and exhibited, among other injuries, significant damage to the occipital lobes. However, critics of the autopsy report contended that the condition of her brain should have been assessed in light of the thirteen-day dehydration process that ultimately led to her death, rather than merely taken at face value.[66]

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[63] Ibid. Judge Greer set the date for the removal of Terri's ANH at 3 p.m. on January 3, 2003.

[64] See the list of physicians on the Terri Schinder Schiavo Foundation Web site, http://www.terrisfight.org/pages.php?page.id=17. Diana Lynne quoted Heidi Law, a certified nursing assistant who cared for Terri Schiavo: "I personally saw her swallow the ice water and never saw her gag. … On three or four occasions I personally fed Terri small mouthfuls of Jello, which she was able to swallow and enjoyed immensely. … Law similarly reported hearing Terri say 'mommy,' 'momma,' and 'help me,' a number of times." *Terri's Story*, 131, 154–157.

[65] Medical Examiner, District 6, Florida, Report of Autopsy, Theresa Marie Schiavo, case no. 5050439, April 1, 2005, http://www.abstractappeal.com/schiavo/autopsyreport.pdf.

[66] Diana Lynne, *Terri's Story*, 161–162. See also T. Duning et al., "Dehydration Confounds the Assessment of Brain Atrophy," *Neurology* 64.3 (February 8, 2005): 548–550; Sherry and Steven Eros, "Terri Schiavo's Autopsy: The Blind Spot," *Eros Colored Glasses* blog, June 21, 2005, http://eroscoloredglasses.blogspot.com/2005/06/terri-schiavos-autopsy-blind-spot.html; "Forensic Analyst Questions Schiavo Autopsy, PVS Diagnosis," *North Country Gazette*, July 5, 2006, http://www.northcountrygazette.org/articles/070506QuestionsAutopsy.html; F. Charatan, "Autopsy Supports Claim That Schiavo Was in a Persistent Vegetative State," *British Journal of Medicine* 330.7506 (June 25, 2005), 1467; and Perry, Churchill, and Kirshner, "Terri Schiavo Case," 746.

Beyond the arena of the Schiavo case, questions regarding diagnostic errors and instances of patients' unexpected return to consciousness should not be overlooked. For example, the incidence of mistaken diagnosis (noted in one study to be as high as 43 percent) was a recurring theme raised by physicians and neurologists at the 2004 International Congress in Rome.[67] Thus, even though the 1994 Multi-Society Task Force claimed a complete absence of awareness of self and environment in the PVS, other commentators have not been so confident.[68] In an article on the PVS, one neurologist commented on a common practice of physicians who conduct neurological examinations of seriously brain-injured patients:

> What often happens in these cases is that a neurologist will spend ten or fifteen minutes examining the patient, elicit some brain-stem and spinal cord reflexes, not observe any evidence of consciousness, and declare the patient to be in a [vegetative state]. But nurses or family members, who spend all day with the patient, may notice subtle signs of adaptive interaction with the environment, perhaps only intermittently. Too often their observations are dismissed as "subjective," "denial," or "projection." Sometimes that is the case, but other times the one in denial is a proud physician who refuses to be diagnostically contradicted by non-physicians. Whose "evidence" counts?[69]

The recent example of Terry Wallis, an Arkansas man who suddenly and unexpectedly recovered consciousness after nineteen years in a PVS, highlights a situation that cannot be adequately explained by medical science.[70] Scientific discoveries that describe the ability of the brain to repair itself, as well as a surprising case of ap-

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[67] At the 2004 International Congress in Rome, *Life-Sustaining Treatments and the Vegetative State: Scientific Advances and Ethical Dilemmas*, specific clinical studies on the PVS were mentioned to demonstrate the incidence of false diagnosis of the PVS in particular patients. These studies were cited for reports of a misdiagnosis rate as high as 43 percent: D. D. Tresch et al., "Clinical Characteristics of Patients in the Persistent Vegetative State," *Archives of Internal Medicine* 151.5 (May 1, 1991): 930–932; N. L. Childs, W. N. Mercer, and H. W. Childs, "Accuracy of Diagnosis of the Persistent Vegetative State," *Neurology* 43.8 (August 1993): 1465–1467; and K. Andrews et al., "Misdiagnosis of the Vegetative State: Retrospective Study in a Rehabilitation Unit," *British Medical Journal* 313.7048 (July 6, 1996): 13–16.

[68] MSTF, "Medical Aspects of the Persistent Vegetative State," part 2, 1575. See also Shewmon, "A Critical Analysis of Conceptual Domains," 345; and Joseph T. Giacino, "Diagnostic and Prognostic Assessment of Patients in the Vegetative and Minimally Conscious States," in *Life-Sustaining Treatments and the Vegetative State: Scientific Advances and Ethical Dilemmas*, eds. Sgreccia and Gigli, 73.

[69] D. A. Shewmon, "The ABC of PVS: Problems of Definition," *Advances in Experimental Medicine and Biology* 550 (2004): 220. The neurological examinations of Terri Schiavo by Bambakidis, Greer, and Cranford lasted between thirty minutes and one hour. Dr. Hammesfahr's examination was conducted over a three-hour period. In Ronald E. Cranford, "Facts, Lies and Videotapes," 370. See also William H. Colby, *Long Goodbye: The Deaths of Nancy Cruzan* (Carlsbad, CA: Hay House, 2002), 209–212.

[70] Another example includes a recent case reported in a leading neurological publication, in which a woman diagnosed as vegetative displayed a possible level of awareness when asked to imagine various scenarios in which she engaged in various tasks or activities. See

parent inner awareness in a patient diagnosed as vegetative, have been periodically reported in medical journals and the popular press.[71] Even medical professionals have shown themselves to be not fully convinced of the nearly universal claim that patients in the PVS remain incapable of experiencing pain and suffering. One well-known survey of neurologists and medical administrators reported that 13 percent of responders believed such patients to possess some degree of awareness, and 30 percent believed that it was possible for them to experience pain.[72]

Finally, the more cautious language used by Pope John Paul II to describe patients in the PVS more accurately describes the capacities of such persons. The Holy Father stated that "the person in a vegetative state, in fact, shows no evident sign of self-awareness or of awareness of the environment, and seems unable to interact with others or to react to specific stimuli."[73] It is often true that patients in the PVS display no outward signs of awareness, but an apparent lack of awareness does not constitute certain evidence. Language of certainty in this regard appears to overstep the bounds of medical knowledge in favor of educated supposition.

A. M. Owen et al., "Detecting Awareness in the Vegetative State," *Science* 313.5792 (September 8, 2006): 1402. See also A. M. Owen et al., "Using Functional Magnetic Resonance Imaging to Detect Covert Awareness in the Vegetative State," *Archives of Neurology* 64.8 (August 2007): 1098–1102.

[71] Laureys, Boly, and Maquet, "Tracking the Recovery of Consciousness from Coma," 1823–1825. See also Voss, "Possible Axonal Regrowth," 2005–2011; G. P. Ford and D. C. Reardon, "Prolonged Unintended Brain Cooling May Inhibit Recovery from Brain Injuries: Case Study and Literature Review," *Medical Science Monitor* 12.8 (August 2006): CS74–79; Schiff et al., "Residual Cerebral Activity," 1210–1234; and Ansgar Herkenrath, "Encounter with the Conscious Being of People in Persistent Vegetative State," in David Aldridge, ed., *Music Therapy and Neurological Rehabilitation: Performing Health* (Philadelphia: Jessica Kingsley, 2005), 139–160; and Carolyn Thompson, "Progress Fuels Hope for Recovery of Brain-Damaged Firefighter," *Newsday*, May 2, 2005, 1–2.

[72] Kirk Payne et al., "'Physicians' Attitudes about the Care of Patients in the Persistent Vegetative State: A National Survey," *Annals of Internal Medicine* 125.2 (July 15, 1996), 104–110.

[73] John Paul II, Address to the Participants in the International Congress on "Life-Sustaining Treatments and Vegetative State: Scientific Advances and Ethical Dilemmas" (March 20, 2004), n. 2.