

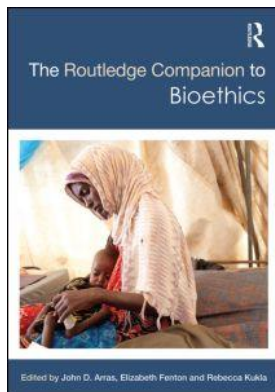
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FROM THE PERSISTENT VEGETATIVE STATE TO THE MINIMALLY CONSCIOUS STATE

Ethical Implications of Disorders of Consciousness

Joseph J. Fins

Introduction

The editors of this volume invited me to write a chapter about the “persistent vegetative state.” It was an understandable request, but only when we consider the diagnosis as part of a larger story involving the relationship between brain injury and the evolution of American bioethics. Seldom has a clinical category done more to transform medical practice than the vegetative state and its related conditions. The debate over these brain states helped to transform the discussion of death and dying in America and to launch the place of bioethics in our society. Indeed, it would not be hyperbole to assert that this discourse played a key role in the birth of bioethics (Jonsen 1998).

In this chapter I will trace the origins of the vegetative state, its importance to prominent right-to-die cases, and differentiate its characteristics from brain death and related disorders of consciousness, such as coma and the more recently named minimally conscious state (MCS) (Giacino 2005). I will then discuss the diagnostic challenges and therapeutic opportunities presented by these conditions and how technologies like neuroimaging and neuromodulation are refining our understanding of this population and our ethical obligations to them (Fins Under Contract).

Jennett, Plum, and the Vegetative State

The persistent vegetative state was first described by the Scottish neurosurgeon Bryan Jennett and American neurologist Fred Plum in a landmark 1972 *Lancet* article (Jennett and Plum 1972). In a most elegant phrase, Jennett and Plum described the vegetative

state as a state of “wakeful unresponsiveness.” By that they meant a condition in which the patient appeared awake but was unresponsive and unconscious.

The vegetative state contrasts with a coma, which is an eyes-closed state of unresponsiveness and represents the recovery of the lowest part of the brain, just above the spine, called the brain stem. The brain stem is responsible for autonomic functions that do not require consciousness, for example causing one to breathe or maintaining the rhythmic neural input to the heart. These “lower” functions are in the brain stem which, when recovered, causes the eyes to open and sleep–wake cycles to resume out of the unbreachable “sleep” of coma. The vegetative state thus represents the recovery of the non-sentient, non-cognitive parts of the brain. And because the brain stem functions without the involvement of “higher” cortical areas, the brain is wakeful but unresponsive (Posner et al. 2007).

This wakeful unresponsiveness makes for a paradoxical and confusing state. We are accustomed, even acculturated, to equate an eyes-open state with awareness and a capability for engagement and awareness. Yes, the eyes are the windows to the soul, but not in the case of the vegetative state, wherein the patient stares blankly, though her eyes can move about randomly and autonomically without purposeful intent. Families can be devastated when their loved one’s eyes open and they expect recovery only to be told that the patient is not aware but vegetative, nomenclature that Plum has been said to have obtained from Aristotle’s *De Anima* (Aristotle 1986).

By the time they described the vegetative state, Jennett and Plum were prominent physicians. Jennett would be known for the Glasgow Coma (Teasdale and Jennett 1974) and Glasgow Outcome Scales (Jennett and Bond 1975) assessment measures to describe the severity of brain injury and predict the likelihood of recovery. Plum in 1966 had already described the Locked-In Syndrome (LIS) (Plum and Posner 1972), a condition of normal consciousness in which the spine or brain stem is injured so that there is no motor output below the lesion. These patients typically can only move their eyes whose muscles are enervated higher up in the brain stem than is generally affected in the LIS.

Although patients with LIS have a paucity of motor output and can easily be confused with vegetative patients, unlike vegetative patients those who are locked in have normal cognition, as anyone who has read Jean-Dominique Bauby’s *The Diving Bell and the Butterfly* can attest (1997). Bauby, the former editor of French *Elle*, wrote a brief but eloquent memoir by blinking the alphabet with his one functioning eye. Seldom has so much been said with so tenuous a communication vector. The point of the differential diagnosis is critical here lest LIS and the vegetative state be confused by errors in assessment.

Jennett’s work as a neurosurgeon and Plum’s practice as a neurologist positioned them to recognize the vegetative state as what they described as “a syndrome without a name” (Jennett and Plum 1972). They had seen cases like it before and they needed to name it. But they did not describe it as a diagnosis without a name. They considered it a syndrome and not a proper diagnosis. The former is less precise than the latter, whose cause, nature, and duration are fully described. Consider the diagnosis of pneumococcal pneumonia, an infection of the lung by the bacterium *Streptococcus pneumoniae*. The condition is stereotypic and can be induced by a known causative agent, which itself can be precisely distinguished from other pathogens, satisfying *Koch’s Postulate*, an important criterion for ascribing an infection to a particular etiology (Fins Under Contract).

No such precision exists for the syndromic vegetative state. Its etiology is diverse: It can be caused by anoxia (prolonged oxygen deprivation), trauma, stroke, or metabolic

derangements (hypoglycemia). While patients in the vegetative state share a behavioral profile of “wakeful unresponsiveness,” once we look under the hood, as it were, via neuroimaging studies of vegetative states, we see that not all vegetative scans look the same. Finally, we also see that the vegetative state, unlike a diagnosis, can be transient or permanent (Posner et al. 2007). This is not the stuff of which confident diagnoses are constructed.

Quinlan and the Right to Die

Clinical interest in the vegetative state intensified because of a brain injury case in New Jersey involving Karen Ann Quinlan (Matter of Karen Quinlan 1976; Fins 2010a). Ms Quinlan had lapsed into a coma and then moved to the vegetative state after a presumptive drug overdose at a party. The exact cause of her condition was never determined (Quinlan 2005).

Quinlan required life-sustaining measures, including a ventilator. After a protracted period, her parents asked that her ventilator be removed and that she be allowed to die. They were devout Catholics, had consulted with their church, and felt that ongoing ventilation was an “extraordinary measure” not required by Catholic teaching. So they asked that the ventilator be withdrawn. When Karen’s doctors and the nursing home where she resided objected, the case went to court.

Ultimately, the New Jersey Supreme Court determined that Karen’s parents could remove her ventilator. Informed by testimony from the court-appointed expert witness, Dr Fred Plum, who had examined Ms Quinlan, Chief Judge Hughes wrote:

. . . It was indicated by Dr. Plum that the brain works in essentially two ways, the vegetative and the sapient . . . We have no hesitancy in deciding . . . that no external compelling interest of the State should compel Karen to endure the unendurable, only to vegetate a few more measurable months with no realistic possibility of returning to any semblance of *cognitive or sapient life*.

(Matter of Karen Quinlan 1976)

It is an interesting decision that forever linked the right to die to the utter futility of the vegetative state, in which Karen’s existence would be destined to have “no realistic possibility of returning to any semblance of cognitive or sapient life” (Matter of Karen Quinlan 1976). But it was also an internally contradictory decision. If Karen was forever without cognition, sapience, or consciousness, how was it that she was *enduring anything*, much less the unendurable? That error in logic was overlooked at the time but it demonstrates how easy it is to project one’s own feeling onto a state in which thoughts and feelings are absent (Fins 2010a). As we shall see later in this chapter as we consider the cases of Nancy Cruzan and Terri Schiavo, the vegetative state throughout the history of bioethics—and American political life—has stirred the passions but often confused our thinking. This is just one early example from the pen of a distinguished jurist.

The Quinlan decision was also important to bioethics for another *institutional* reason. Judge Hughes, in his opinion, also suggested that the courts were not the best place to adjudicate such cases. Instead, he thought the deliberative process should be closer to the patient’s bedside, recommending a role for then nascent hospital ethics committees (Matter of Karen Quinlan 1976).

When the ventilator was removed, however, Karen did not die. Although this was a surprise given all the talk about the right to die, it was not unexpected by the court-appointed expert, Dr Plum, who had examined Karen to provide information to the presiding judge (Fins Under Contract). He knew that she had an intact brain stem and maintained respiratory drive. Thus she was able to breathe on her own. Indeed if she had lost her respiratory drive, she would have been brain dead, as defined by whole brain death—i.e., death of the entire brain, both the brain stem and higher cortical functions. This contrasts with the vegetative state in which the brain stem remains intact (Posner et al. 2007). These observations about the vegetative state, and the criteria defining this condition, would be codified by a group of experts in the mid-1990s.

The Multi-Society Task Force Report on the Vegetative State

The paradoxical nature of the vegetative state led experts from diverse specialties to gather as a Multi-Society Task Force (MSTF) to reach a consensus on the condition. In 1994, the MSTF had two key articles published in the *New England Journal of Medicine* further clarifying the parameters of the vegetative state (Multi-Society Task Force on PVS 1994). These authors came to a consensus agreement that remains useful today. They maintained that if the vegetative state lasts a month it is defined as being persistent. If it persists longer than that, it is designated as being permanent. Unlike the persistent vegetative state that may be transient and lead to recovery, the permanent vegetative state is irreversible and cannot be ameliorated.

Experts, drawing upon epidemiologic data, also distinguished the etiology or cause of the vegetative state as it relates to the question of when the state becomes permanent or irreversible. It was determined that permanence is reached three months after anoxic injury, or profound oxygen deprivation that occurs following a cardiac arrest, and one year after traumatic brain injury. The difference in time courses reflects the different mechanisms of injury and possible recovery that attend these etiologies.

The authors realized that from a clinical perspective, when one advises families about the nature and duration of the condition and about the potential for recovery, the most important historical fact the physician can ascertain is how the injury occurred and how long ago it happened. Because not all vegetative states were created equally, the answer would depend upon the cause of the insult and how long that condition had continued. According to the MSTF, a patient four months post-anoxic injury would be considered permanently vegetative while one who had reached that point after traumatic injury would still have months to experience a recovery before the specter of permanence set in. This remains true today, although patients who receive therapeutic hypothermia (or cooling) following the anoxic brain injury of cardiac arrest have a more favorable prognosis than that outlined in 1994, however its details are still not fully defined.

The Right to Die: From Cruzan to Schiavo

The vegetative state figured prominently in two additional national debates over the right to die. The first was the Nancy Beth Cruzan case in Missouri, in which the parents of a woman in the vegetative state petitioned to have her *feeding tube* removed (Annas 1990). The request was refused by officials at the nursing home where Ms Cruzan was receiving care. The case differed from Quinlan because it involved a feeding tube instead of a

ventilator. Was the delivery of artificial nutrition life support or ordinary care? Should it be treated just like a ventilator or should feeding always be morally obligatory? The case was also distinct from *Quinlan* because it made national law, adjudicated in federal court.

After battles in lower courts, the case went up to the U.S. Supreme Court, which ruled in 1990 that adult competent patients have a constitutional right to refuse life-sustaining therapy based on a liberty interest enshrined in the 14th amendment (*Cruzan v. Director* 1990). But Ms Cruzan was not a competent individual and unable to express preferences. So the second point of the decision was that *each* state could set an evidentiary standard to determine what degree of evidence was necessary to empower surrogate (or alternate) decision-makers to make a decision to withdraw life-sustaining therapy. Finally, the Court ruled that food and water was a medical treatment and was no different than other life-sustaining therapies. Ultimately, the case was returned to Missouri where evidence was presented to a new court that found that its evidentiary standard was met, thus enabling the removal of Ms Cruzan's feeding tube.

One of the challenges of the case was ascertaining the presence and accuracy of any prior wishes about life-sustaining therapies. The court did not require a specific level of information, but instead ceded that judgment to each state to determine for itself according to its own laws, traditions, and values. To avoid the challenge of unclear, uncertain or absent prior wishes, Justice Sandra Day O'Connor raised the question of whether it might be a good idea for adult competent individuals to articulate their preferences in an advance directive before the onset of decisional incapacity (McCloskey 1991).

These recommendations eventually found their way into federal legislation, the *Patient Self-Determination Act* (PSDA) authored by Senators John Danforth of Missouri, an ordained minister, and Daniel Patrick Moynihan, a sociologist (McCloskey 1991). Physician-ethicist, Mark Siegler termed this law the high water mark of patient autonomy, eclipsing the age-old traditions of paternalism and beneficence which had determined the doctor-patient relationship (Siegler 1993).

The PSDA legislation required that each state set out a mechanism in law to engage in advance care planning either through the use of a living will or designation of a health care agent (DPAHC) or durable power of attorney for health care who speaks with the authority of the patient (*Omnibus Budget Reconciliation Act* 1990). The hope was that through this process a patient's wishes would outlive his or her ability to articulate a preference, thus directing care either through a document outlining wishes (a living will) or through the delegated agency of a surrogate (DPAHC).

That was the state of the law and the national consensus on end-of-life care until the right to die was expanded to a right to physician-assisted suicide. Some viewed this as the natural extension of the negative right to refuse life-sustaining therapy, while others saw it as a distinct positive right, upon which there was not wide agreement. Indeed, the broad consensus within the bioethics community in *Cruzan*, in which there was one bioethics *amicus curiae*—or friend of the court brief—was fractured in the cases brought to the Supreme Court to assess the constitutionality of physician-assisted suicide in 1997. In that fractious debate, there were two bioethics briefs, both pro and con (Transcript of Oral Arguments 1997; *Vacco v. Quill* 1997; *State of Washington v. Glucksberg* 1997).

The details of that debate are off-point to our discussion, but the split in views anticipated the political divide that occurred in the Terri Schiavo case (Annas 2005). This

case involved another woman in the vegetative state. And like the Cruzan case, it centered on the removal of her feeding tube. Cast against the conservatism of the times, the case challenged ethical and legal norms that had seemingly been codified in Cruzan and subsequent medical practice.

But the Schiavo case was different because there were growing doubts about the vegetative state, with some arguing that Ms Schiavo, and patients like her, were actually aware. As such they were entitled to a different sort of consideration given the provision of food and water, which is considered “ordinary care” in some religious traditions and thus obligatory. Although the question of awareness in the vegetative state had been settled by Dr Plum’s testimony as a clinical question in *Quinlan*, and the distinctiveness of artificial nutrition and hydration had been litigated as a judicial question in *Cruzan*, these matters were brought to the fore once again in the contentious debate surrounding Terri Schiavo (Fins 2006).

From an historical perspective, the image that captures both issues is the video of Ms Schiavo and her mother in which Terri seems to be looking at her mother. That six second video clip, excerpted from hours of tape, was shown as a loop on television. It was powerful stuff raising the question whether her glance was intentional, and thus an indication of preserved awareness and consciousness. Just as in *Quinlan*, the paradox of the wakeful unresponsive nature of the vegetative state had an emotional impact on society and the ensuing right to die debate. In the context of the polemics of the day, the video depicting Ms Schiavo’s condition took on greater meaning. Forces that sought to prevent the withdrawal of her feeding tube sought to assert that her diagnosis was not vegetative but MCS, a category that entered the medical literature in 2002 (Giacino 2005).

The Minimally Conscious State

MCS is a newly described disorder of consciousness in which patients exhibit definitive evidence of consciousness, intention, attention, memory, and awareness of self, others, or the environment. The diagnostic challenge is that patients manifest these actions or behaviors in an intermittent and episodic manner. They are not reliably reproducible. When families see these behaviors and report them to physicians caring for their loved ones, these actions are often not repeated. The common result: Clinicians may chalk it up to wishful thinking or the denial of the families, not appreciating that the episodic and intermittent nature of these actions is part and parcel of MCS. To further complicate evaluation, when these patients are *not* following commands, they are indistinguishable from the vegetative patient on bedside examination, especially on a single examination. Finally, there are medical power dynamics. If a patient arrives from the hospital at a nursing home in the vegetative state, as assessed by physicians at an academic medical center, and then morphs into MCS, will the doctors working in chronic care make a diagnosis against hospital-based experts? Will they know of the recent category of MCS? And if so, will they go against the diagnostic assessment of referring doctors who are more specialized than they are? Probably not.

In the aggregate all these factors translate into a staggering misdiagnosis rate of 20–40 percent for these patients (Childs et al. 1993; Wilson et al. 2007). The most recent diagnostic error rate for nursing home patients with traumatic brain injury diagnosed as vegetative, but who actually are in MCS, is 41 percent (Schnakers et al. 2009).

Biology of the Vegetative *versus* Minimally Conscious State: Ethical and Clinical Salience¹

The clinical and ethical imperative to distinguish the vegetative from the minimally conscious has its roots in the biologies of these two conditions (Fins 2008). In contrast to vegetative patients, those who are minimally conscious have retained or regained the ability for *integrative* function. MCS brains can activate internal networks that form the basis, in a sufficient aggregation, for consciousness. This is not the case for patients who are permanently vegetative.

This distinction was clearly underscored in a paper on positron emission tomography by Laureys and colleagues, examining the pain response in patients in the vegetative state (Laureys et al. 2002). Unlike normal patients, who activate a broad pain network mapped widely on the brain, patients in the vegetative state only activate the first way station or the primary sensory area. Activation of subsequent areas are “*functionally disconnected*” from secondary somatosensory areas and higher-level associative areas (Fins and Schiff 2007).

This is in contrast to the network-level activations seen in the processing of language in patients in MCS. Using a passive language paradigm, Nicholas Schiff and his colleagues published a paper in 2005 that showed that when spoken narratives were read to patients in MCS, large-scale network activation or integration resulted, as they did in control subjects (Schiff et al. 2005). This response seemed to relate specifically to language; it did not occur when the same narratives were played backwards, with the same frequency spectrum.

The epistemic and ethical salience of these findings—i.e., the differential responses of subjects in MCS and vegetative state—cannot be overstated. Although they appear overtly similar, at the level of neuroimaging patients in MCS respond to the outside world and seem to do so in response to language. This suggests that these patients may retain or have regained the ability to process language, grammar, and speech. When patients with these capabilities are conflated and confused with patients in the vegetative state, it comes at the cost of discounting conscious individuals who at some level may have the ability to appreciate their isolation and segregation from the rest of us. Such diagnostic errors also preclude efforts to develop a rationale for a neuro-palliative ethic of care for this long neglected population (Fins 2005). Making the diagnosis of MCS is very important from a clinical perspective. First, if a patient reaches that level of consciousness before the permanence of the vegetative state precludes additional recovery, then the prospect remains for the return of functional communication. Patients who regain reliable functional communication are said to have *emerged* from MCS. That evolution is not well understood, and to date we are unable to predict who will make this transition. But the key point is that if a patient reaches MCS, they have the prospect of recovery, even years and decades after their injury (Lammi et al. 2005).

This was the case with Terry Wallis, who emerged from MCS some 19 years after traumatic brain injury (Fins and Schiff 2007). Such variability in time course, and even the likelihood of additional recovery, points to the heterogeneity of these brain states and the difficulty of prognostication.

The diagnosis of MCS is also important from an ethical point of view, regardless of whether or not patients have the capability for additional recovery and emergence. It is important to identify patients in MCS so as to distinguish them from those in the vegetative state (Fins and Plum 2004). The difference may seem marginal at the bedside

but patients in MCS are conscious. Those who are truly in the vegetative state are not. And if patients in MCS are conscious, then it raises a rather fundamental question of what is owed to them.

It would seem self-evident that our moral obligations to a sentient being, able to interact with and be aware of herself and others (a patient in MCS), should be different than what is owed to patients who are unconscious and vegetative. The potential of the former to perceive pain, feel lonely, sense isolation and abandonment—while unexpressed—is plausible given the biology underlying the MCS. At the very least, we have an ethical obligation to clearly and properly distinguish those who are in the vegetative state from those who are minimally conscious (Banja and Fins 2007). By doing so, patients in MCS with a more favorable prognosis, i.e., a retained capacity for communication, might be further engaged through diagnostic and therapeutic interventions geared towards their reintegration into their families (Fins 2009).

Neuroimaging and Neuroethics of Disorders of Consciousness

If the aforementioned work were to mark the extent of progress in neuroimaging relating to disorders of consciousness, there would already be much to debate and discuss. But these mid-decade papers were only the start of a revolution in neuroimaging that is demonstrating the potential for diagnostic discordance between what one sees at the bedside and what one observes on neuroimaging scans. It raises the question of which criteria should be used—behavioral or neuroimaging—to make a diagnosis. And if there is a difference in assessment, with one method calling for a vegetative diagnosis and the other the MCS, which diagnosis should the patient carry? This is not a trivial question. Conscious individuals should not be treated as though they were unconscious and forever uncommunicative.

These questions quickly came into stark relief in 2006 when Adrian Owen and colleagues at the Universities of Cambridge and Liege published a paper that showed that a “vegetative” patient could respond to *active* language paradigms (Owen et al. 2006). Investigators asked a 25-year-old woman in the vegetative state, six months out from traumatic brain injury, a series of questions while she was undergoing functional magnetic resonance imaging (fMRI). She was asked to imagine playing tennis in her head, walking through her home, and disambiguating two linguistically similar words. The results were quite amazing and brought international press coverage and widespread commentary. Even though she was vegetative by behavioral criteria, she had neuroimaging activations in motor, spatial, and language networks that were identical with controls.

Her “responses” raised serious questions regarding her diagnosis. As we saw with Plum and Jennett, the word “diagnosis” needs to be used with caution; so more precisely, we must ask what was the nature of her brain state? If the vegetative state is one of wakeful unresponsiveness and she responded, how could she be viewed as vegetative? On the other hand, her response was not a response by conventional standards but through the prism of neuroimaging, which might be less reliable than an overt behavioral response. So how should her brain state be described?

My colleague, Nicholas D. Schiff, and I have suggested that patients who are *behaviorally* vegetative but who demonstrate active responses on neuroimaging should be placed in a new category of *non-behavioral* MCS (Fins and Schiff 2006). We believed that the subject’s highest level of function should dictate the description, given the

prognostic importance of the potentiality of being MCS and not vegetative. Interestingly, five months later the patient described by Owen et al. met behavioral criteria for MCS (Owen et al. 2006), although that need not have occurred for her to occupy the non-behavioral MCS category. It is possible that other patients will be stuck there and not progress to MCS.

More recent papers by Monti et al. and Bardin et al. further complicate—or enrich—the terrain. Building upon the active language paradigm of Owen, in 2010 Monti et al. asked subjects to toggle yes or no responses to playing tennis (yes) and walking in their home (no) (Monti et al. 2010). One patient with traumatic brain injury who was diagnosed as vegetative by behavioral criteria was able to reliably answer yes/no questions using this method of willful modulation, providing a narrow band communication channel for someone otherwise thought to be vegetative and unreachable.

Before we get overly enamored with the technology of neuroimaging, it is important to note that this patient was subsequently identified to be MCS by behavioral criteria with redoubled efforts of assessment after investigators knew of the response on fMRI. And it should be noted that behavioral assessment remains the most reliable mode of assessment when the proper Coma Recovery Scale-Revised assessment tool is used to evaluate patients (Giacino et al. 2009).

A 2011 paper by Bardin et al. used a similar method as Owen and found inconsistent responses in subjects who were behaviorally able to respond at the bedside but did not always produce the expected images on fMRI (Bardin et al. 2011). This was just the opposite of the Monti patient. Behavioral output was not consistently followed by evidence on scanning based on prior spatial and temporal expectations (Bardin et al. 2012; Fins 2012).

A Prudential Ethic

By this juncture it should be clear to the reader that neuroimaging is an evolving and still unperfected technology, and that we need to be cautious in applying it outside of the research context. We still must determine as a scientific and ethical community how to reconcile behavioral findings with data obtained on neuroimaging. Until we break that code, it will be as if we are trying to understand the relationship of genotype and phenotype without an appreciation that there is an inheritable and mutable biological material that can effect multigenerational changes in the phenotype (Fins 2007).

Neuroimaging will be an important tool in diagnosing and assessing these brain states, but for now it is best if they remain investigational tools, lest false information or false hope be disseminated to families desperate for information about their loved ones (Fins et al. 2008). We need to do large-scale studies correlating what is currently known with a relatively small sample of patients and developing the test characteristics of sensitivity and specificity for discrete populations of patients, before these methods are brought to routine clinical practice (Fins and Shapiro 2007).

Until then, we need to balance the vast potential of these methods against their limitations, appreciating the importance of attending both to the history of how patients came to be injured and the remainder of the clinical exam, to place neuroimaging—and all the clinical data—into a proper context. Only then can these methods realize their full potential to provide useful information.

Most importantly, we need to be careful to avoid premature adoption of these “communication” technologies, which have the potential for profound misconstrual in patients who are at the edge of consciousness and can neither reliably speak nor interact.

To turn to scanners to ask patients whether they want to live or die, as has been done, is to open up the possibility of generating wrong or inauthentic answers that have the potential to do great harm (Fins and Schiff 2010). Given the state of our technology, responses from patients will be totally dependent upon the questions that are asked and who asks them. These patients cannot initiate queries. Moreover, given the state of technology, we must be cautious about how a non-response is interpreted. Although a pause or hesitancy may be *interpreted* by a listener, it is important to appreciate that there are many reasons why a non-response might occur: Latency of response, distraction, fear, consideration of choices, fatigue, or a failure of the methodology itself. All of these variables need to be better understood and characterized lest we be overconfident in thinking that we are giving voice to patients through these prosthetic devices. The more worrisome paradox is that we might be hearing only part of what they want to say and silencing their true expressions, if indeed they have a requisite level of cognitive, sapient thought.

Conclusion

As we have seen, the study of disorders of consciousness helps illuminate the evolution of the right to die in America. It is also an important focus of study for students in the emerging field of “neuroethics”—a domain of knowledge made possible by technology and utterly dependent upon it (Fins 2011).

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Related Topics

Chapter 35, “Brain Death,” Winston Chiong

Chapter 37, “Disability and Assisted Death,” Leslie P. Francis and Anita Silvers

Note

1 This section is drawn from Fins (2010b).

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