Going Beyond the Evidence

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I share many of the views and hopes expressed by Fins and colleagues (2008). I share the sense that the task of discovering the degree of consciousness experienced by apparently unresponsive patients is an urgent one. I also share the expectation that neuroimaging will contribute significantly to allowing us to distinguish between genuinely unconscious individuals and those with some degree of experiential life.

I also share with Fins and colleagues (2008) the view that it is important to avoid arousing unrealistic expectations in the general public, especially among those who care for individuals who have been diagnosed as in a persistent vegetative state (PVS) or minimally conscious state (MCS); accordingly, I endorse their call for clinicians to “avoid speculation” and to present research findings with “caution and humility.” In fact, my major disagreement with the authors is that they do not go far enough in this direction. Though I agree that neuroimaging holds great potential for penetrating the mystery of consciousness, I think that the authors overestimate the extent to which it has yet produced findings that can bear weight.

Neuroimaging has produced strong evidence of a variety of cognitive processes in individuals diagnosed as PVS or MCS, some of which Fins and colleagues (2008) cite. The work of Di and colleagues (2007), cited here, apparently demonstrates a neural response to the patient’s own name; similarly, unpublished data reported by Perrin showed a P300 response—correlated reliably with recognition—to the patient’s own name in PVS (Laureys et al. 2005). Schoenle and Witzke (2004) measured event-related potentials in the brains of PVS patients, using sentences ending in congruent or incongruent words as stimuli. In normal controls, an N400 response is elicited by the incongruent endings. Twelve percent of vegetative state (VS) patients and 77% of what the authors describe as near VS patients exhibited the response, reflecting preserved semantic processing in these patients. Most spectacularly, Owen and colleagues (2006)

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elicited evidence of apparent instruction following in a patient diagnosed as PVS. But are these results indicative of consciousness or might the relevant processes be carried out unconsciously?

In interpreting this work, it is necessary first to be clear what we mean by consciousness. Rather than attempt to define consciousness—and in recognition of the fact that a satisfactory definition remains elusive—the authors offer a list. For them, consciousness apparently encompasses “subjectivity, sentence, self-awareness and an ability to appreciate the relationship between the self and the environment;” and brings with it “features such as access to information processing systems in the brain, and [...] content or phenomenal experience, permitting states with qualia and conscious awareness” (3). But these different capacities and processes are heterogeneous and almost certainly sometimes dissociate. Accordingly, I will follow the mainstream tradition and equate consciousness with the having of states with an experiential feel, what the authors call qualia. The centrality of this aspect is recognized by them by the fact that they make susceptibility to pain central to their discussion; to feel pain is to be in a state with an experiential feel.

Consciousness, so understood, does not seem necessary for a great variety of cognitive processes. In both normal and pathological cases, subjects frequently engage in mental activity that is not conscious. Automatic actions—actions carried out by processes that do not need conscious supervision or initiation—are extremely common, making up perhaps 95% of the actions of ordinary people (Bargh & Chartrand 1999). Inside the laboratory, normal subjects also show evidence of semantic processing without consciousness; the content of a stimulus can be demonstrated to be causally effective on their behavior, while they deny conscious awareness of it. The most obvious example involves priming by masked stimuli (Dehaene et al. 1998). A stimulus is shown to a subject very briefly (50 ms) and then immediately masked by another. In this paradigm, the subject reports that she has not perceived the first stimulus. But she has nevertheless processed its content. For instance, given the masked stimulus “sheet” and asked to complete a word stem task (“she-”) she is more likely than chance to complete the stem with the primed word than alternatives (“sheep,” “shear,” “shell,” and so on). There are also many pathological syndromes, in which apparently unconscious subjects act. In automatism, subjects may engage in all kinds of activity, some of it very sophisticated—driving a car while obeying traffic signals, playing the piano, and so on—in the apparent absence of consciousness (Broughton et al. 1994; Searle 1994).

We know, therefore, that a great deal of cognitive processing can occur unconsciously. We do not know whether these processes can occur only in people who are conscious; whether, that is, unconscious processing can occur only in the brains of awake and alert people. It is widely assumed that somnambulism, which certainly involves a great deal of cognition, occurs in people who are not conscious, but that is debatable (perhaps somnambulism is akin to MCS). However, for the moment it is an open empirical question whether, or what, evidence of cognitive processing is evidence of consciousness. Thus, absent conclusive evidence about somnambulism, absence states, and the like, we cannot infer from the evidence Fins and colleagues (2008) cite that the patients concerned were MCS. Neuroimaging evidence cannot provide a window into consciousness—not yet.

Fins and colleagues (2008) might resist this conclusion, on the grounds that we possess an account of the neural correlates of consciousness which allow us to bypass the debate over automatism. They seem to accept Laureys’ (2005) claim that consciousness requires the activation of higher associative cortices. This view is widespread and attractive, but it is far from uncontested, with dissent expressed by prominent philosophers of mind and neuroscientists. If our aim is to avoid speculation, we cannot invoke it in support of our claims. It is worth noting, moreover, that the view seems to entail that there can be a great deal of cognitive activity in the absence of consciousness. In the only imaging study of somnambulism so far (Bassetti et al. 2000), frontal and parietal cortices supposed to be necessary for consciousness were inactive. Thus, if consciousness does require activity of higher associative cortices, future imaging studies will have to measure such activity in patients as well as activity correlated with the task demand; these measures are absent, for instance, from Owen et al. (2006), giving us further reason to hesitate before ascribing any state of consciousness to the patient. (Fins and colleagues (2008) confidently state that the patient in this study was MCS. I think this unlikely. If the study provides evidence of any consciousness, it is full-blown consciousness, so demanding was the task demanded of the patient.)

It is often felt that consciousness is ineliminably private and will always remain inaccessible to science. That is not the conclusion I wish to draw from the considerations just mentioned. I think consciousness will likely yield to science; evidence from across the sciences of the mind, including and especially neuroimaging, will one day allow us to confidently decide whether a particular unresponsive patient is conscious or not. That day may be soon (Adrian Owen, for instance, is currently engaged in work that might put the consciousness of some PVS patients beyond doubt), but it may be quite distant. For the moment, we ought to avoid raising ungrounded expectations or, for that matter, prematurely dashing hopes. That is the message of the paper commented on here, and we ought to take it to heart; more, indeed, than the authors themselves do.

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Soul-Making in Neuroimaging?

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After the world “watched” Terri Shiavo die in media reports, conundrum about whether Schiavo had consciousness did not end with the court’s ruling that she was in a vegetative state. Schiavo’s parents construed her behavioral responses and interactions with them as indications that she was conscious. However, for Schiavo’s husband and the expert physicians, revealed in Schiavo’s behavior was nothing but reflexes (Farah 2008). In our searching for invariances in the world on which we could count to be more objective and truthful (Nozick 2001), behavior seems to be a poor instrument for resolving the debate on whether Schiavo still had consciousness and personhood before she died.

In Conscious, Imaging, Ethics, and the Injured Brain, Fins and colleagues (2008) argue that appropriate use of neuroimaging could rescue the often-neglected personhood of individuals with disordered consciousness. Implied in their arguments is that we could detect the soul in the body more reliably by seeing it through neuroimaging than by feeling it in our behavioral interactions. According to them, following reports of persons in vegetative state who demonstrated complex and paradigmatic functional neuroimaging patterns under appropriate stimulations and settings, hope for changing the rough diagnostic categories of disordered consciousness has increased. As there might be many cases of false-positive diagnosis of vegetative state and lag between consciousness recovery and behavioral manifestation (Farah 2008), it seems justified to declare that we should allow more persons on the “border zones of consciousness” to be “naturalized” into the countries of conscious persons (Fins 2007). Metaphorically, it is about discrimination, segregation, and disparity in allocating research resources to the technology of giving “voices” to the new race of people with disordered consciousness through “images.” It is horrible that souls are trapped in unresponsive bodies and suffer from others’ neglect and maltreatment. It is mandatory for us to use functional neuroimaging to find the poor souls and rescue them from misery.

Nevertheless, as functional neuroimaging “digitalizes our souls” and makes detecting souls a just and virtuous science, one important question to ask is how much weight functional neuroimaging has in our deliberation of the soul’s existence. I argue that contextual information about subjects’ humanness inevitably affects researchers’ interpretations on objective neuroimages that correlate with subjective consciousness. To wit, it is not that functional neuroimaging allows us see the souls but that we want to see the souls in the human beings we already know. To see is to believe. But, also just because we want to believe, therefore we see. Vision is a powerful tool to persuade people. The problem, as Roskies argued, is that people tend to neglect the theory-ladenness and multiple processes involved in constructing and interpreting functional neuroimaging data (Roskies 2008). Functional neuroimaging data definitely are not an accurate representation of neural activities (Roskies 2008), not to mention the illusion that it is a photograph of the souls in action. Maybe, except for the infrequent compelling case reports of souls acting seen by neuroimaging, we interpret the neuroimaging data mostly based on our senses, both cognitive and emotional, about the humanness of people with disordered consciousness. The senses originate from