



Lights, Camera, Inaction? Neuroimaging and Disorders of Consciousness

Joseph J. Fins & Judy Illes

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Correspondence

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Joseph J. Fins, Weill Medical College of Cornell University
Judy Illes, University of British Columbia

Martha Farah (2008) suggests that our article's focus on study design and standardization of technology, at the expense of more definitive statements about the relationship between neuroimaging and consciousness (Fins et al. 2008), is akin to analyzing a film's "steamy love scene ... in terms of lighting and camera work." Fair enough. But we focused on these more mundane aspects intentionally, to go slow. In our view our early courtship with this emerging technology makes it premature to make definitive statements on the contentious question of consciousness. If this avoidance of the neuroimager's equivalent of a "steamy love scene" makes us prudish, so be it. In most cases, it is the artistic depiction of the courtship—not its consummation—that turns a mere movie into a fine film.

At this juncture, we would prefer to be prudential and caution that this work is not ready for all audiences. It was by design that we engaged in this act of self-censorship and the peer commentaries indicate that it was good that our designs were circumspect. Professor Farah's elegant parsing of the divergent approaches to the study of consciousness—exemplified by Schiff and colleagues (Schiff et al. 2005), Boly and colleagues (2004), and Owen and colleagues (2006)—speak to the very caution that we advocate. So too does Levy's helpful distinction of automatism and consciousness, a point recalling Wilder Penfield's *Mystery of the Mind* (Penfield 1978) and his description of inducing such states while engaged in brain mapping using cortical stimulation (Fins, 2008a).

And yet, even with our cautionary tone, Stephanie Bird (2008) suggests that we were "overpromising" the capabilities of this technology at the risk of creating false hope, with us stuck in a Kuhnian paradigm that could distort our

underlying expectations. To dispel such misconstruals, let us be clear, notwithstanding the musings of Wu, we never implied—much less imagined—that neuroimaging would ever be used "to detect the soul in the body. . . ." (Wu 2008).

Moreover, we agree with Lanoix that "images only tell part of the story" (Lanoix 2008) and do not seek to reduce complex familial relationships into one of proxy consent. One of us has written about the artificiality of that contractual construct and urged a more covenantal approach to surrogate decisionmaking which took account of richer notions of reciprocal moral obligations (Fins et al. 2005). Our musings on surrogate decisionmaking was an isolated attempt to address that specific challenge, not an effort to rob intimates of their broader and more salient roles as advocates, caregivers and companions (Fins, In Press).

Each of the aforementioned comments point to the potential for scholarly works to be misinterpreted by peers and all the more underlines the cautionary notes about public dissemination made by Racine and Bell (2008), echoing Illes (2006). For all these reasons we sought to be tempered in our proposals and incremental in our approach. We also appreciate the danger—as noted by Wilkinson and colleagues (2008)—of neuroimaging evidence of loss of consciousness becoming a prerequisite under the law for the withdrawal of life-sustaining therapy. We prefer a reliance on the patient's prior wishes and note that most withdrawals of life-sustaining therapy do not involve patients with disorders of consciousness. While the right-to-die might have begun with the vegetative state, it did not end there (Fins and Plum 2004).

For all these reasons we were cautious. Our careful effort to circumscribe the discourse stemmed from our sense that

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Address correspondence to Joseph J. Fins, M.D., F.A.C.P., Division of Medical Ethics, New York Presbyterian-Weill Cornell Medical Center, 435 East 70th Street, Suite 4-J, New York, NY USA 10021. E-mail: jfins@med.cornell.edu

we are going through a paradigm shift, from a Cartesian approach (Baertschi 2008) into unknown conceptual frames that requires a degree of agnosticism to play out. We do not yet know how neuroimaging will enter the clinic and for that reason we need to adopt a neutral stance on some of these broader questions, specifically questions about which concept of consciousness will adhere. We did this intentionally to avoid an outcome bias or to preclude novel investigations, cautions we take to heart and to mind, notwithstanding Professor Levy's (2008) protestations to the contrary. As one of us noted in a plenary paper in this collection our goal should not be purely conceptual search for a truth, but rather *pragmatic and instrumental* (Fins 2008b). And it is here that commentators rightly have called us to attend to the pragmatic challenge of addressing the relationship of neuroimaging to pain and suffering.

The question of pain and suffering was, without a doubt, the most contentious issue during our two days of deliberations. The peer commentators have done us a service in advancing this conversation with their perspectives and erudition. As we note, the distinction between the integrative capabilities of the vegetative and minimally conscious brain is an important starting point in assessing the individual's ability to perceive and experience pain at a conscious level. This is mischaracterized by Schwartz and Schwartz as a bench-based distinction. (Schwartz and Schwartz 2008). It is in fact based on clinical criteria: a history and neurological examination and not a laboratory exercise at all.

And here we believe Baertschi misread our views of this categorical distinction as it relates to the possibility of catastrophic outcomes (Baertschi 2008). We argued for an evidence-based approach to prognosis and *against* unjustified nihilistic assumptions given the differing outcomes from anoxic versus traumatic injuries and the prognostic uncertainty of outcomes from the minimally conscious state (Lammi et al. 2005).

Following these distinctions, it is essential in the wake of Owen's findings (2006) to know the time course and nature of the injury and whether or not the vegetative state has become permanent. Based on Owen's report, (2006) a prudential ethic would maintain the possibility that some subjects still vegetative by exam but not yet temporally designated as permanently vegetative may in fact be or be becoming minimally conscious. If that is the case, such individuals would harbour additional capacity for recovery and as well as the possibility of added experiential burden.

Having said this it is very important to not generalize this potentiality to all vegetative patients, as does Duffy (2008). This conflation leads him to interesting but speculative comments about a vegetative state of consciousness "free of 'mis-perceptions' ", a point better left to theologians than to neuroscience. Owen studied a patient with traumatic injury five months after her injury who was on the cusp of MCS and thereafter unequivocally reached that diagnostic and prognostic plateau (Owen et al. 2006).

Duffy (2008) frames the permanently vegetative patient's response to pain—and the activation of primary sen-

sory areas as shown by Laureys (2002)—as possibly the experience of pain absent that of suffering. This is an intriguing speculation that would hinge on whether the perception of pain—absent suffering—also requires a subjective awareness of self or one's body and a distinction between neglect and subjective indifference. This is a point noted by Gilgorov (2008) who argues that some pain might indeed be unconscious, or perhaps pain evidenced by proxy markers on imaging technology when neither was evidenced behaviourally or reported overtly.

These are important—and pressing—questions that suggest the need for a neuro-palliative approach to care with these patients (Fins 2005) and vigilance with respect to pain management even when it is unclear what might be being managed. The threshold for pain relief should be low when there is a stimulus known to cause distress. Whether it is perceived or not should be a secondary question in the clinical setting.

But in the investigative realm it is critical that we appreciate the burdens sustained by patients with disorders of conscious. If we discover that some of these patients have the capability to experience pain and/or suffer—are in pain or suffering—we will be better positioned to ameliorate their distress. This quest to remedy errors of palliative omission seems a just one with appropriate regulatory oversight, interdisciplinarity, (e.g. Fukushi 2008) transparency and surrogate authorization. ■

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