

Case study

Regaining Consciousness After General Anesthesia: a Personal Experience

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Abstract

In 2015 I underwent heart surgery under general anesthesia. Just before I regained full consciousness, I felt I was like a huge spaceship or something anchoring with bolts and nuts to a huge kind of steel base structure. I discovered later that similar experiences in similar circumstances were reported in relevant studies. In similar circumstances patients often describe sensations of floating, heaviness, being "reassembled", feeling like machines or parts of systems or divine perception and awareness. Evidently the interpretation of these narratives depends on the theoretical framework of one or the other of a variety of theories of consciousness.

In this paper an attempt is made to explain this subjective spaceship anchorage mental experience within the theoretical framework of each of these constructs of consciousness. namely; Global Workspace Theory (GWT), Predictive Coding (PC), Integrated Information theory (IIT), Higher Order theories (HOT), and Penrose – Hammeroff Quantum Paradigm (Orch-Or).

Keywords: Workspace theory, Predictive Coding, Reassembled, Consciousness, Higher Order Theories.

In 2015 I underwent heart surgery under general anesthesia.

Just before I regained full consciousness, I felt I was like a huge spaceship or something anchoring with bolts and nuts to a huge kind of steel base structure. The act of anchoring, I sensed, was associated with loud clamor of two huge steel structures frictioning and being carefully towed and adjusted to fit in place with huge nuts and bolts. It did not feel painful but it was scary, like when you see huge structures being adjusted and fear if something went wrong there is going to be a colossal crash with damage and debris all over the place.

Let us first dissect this experience

Two huge machine-like structures connecting one on top of the other.

That I was like an outside observer not completely disembodied

That I was wonderstruck.

That experience was before I regained full proprioception touch sensation or movement,

That I had no control of what was happening.

I discovered later that similar experiences in similar circumstances were reported in relevant studies

In similar circumstances patients often describe sensations of floating, heaviness, being "reassembled", feeling like machines or parts of systems or divine perception and awareness. (1, 2, 3)

So, in all this what is common is

Feeling floating, heaviness, or undergoing a reassembly. Additionally, some individuals describe feeling like machines or parts of systems during their recovery of states of full wakefulness from unconscious states. Patients recovering from Ketamine infusions reported sensations of floating and heaviness (2)

So, all instances seem to do with regaining what we call consciousness after a state of unconsciousness. But what is consciousness anyway?

Evidently the interpretation of these narratives depends on the theoretical framework of one or the other of a variety of theories of consciousness.

So how does my subjective spaceship anchorage mental experience figure out within the theoretical framework of each of these constructs of consciousness.?

Consciousness theories seem to provide a wide spectrum of explanations for post

anesthesia mental experiences ranging from the mundane neural activity through more sophisticated information processing leading to quantum and indeed psychic interpretation.

Let us examine the explanations inferred from five famous theoretical approaches to this discussion, namely; Global Workspace Theory (GWT), Predictive Coding (PC), Integrated Information theory (IIT), Higher Order theories (HOT), and Penrose – Hammeroff Quantum Paradigm (Orch-Or).

Predictive coding and Bayesian theories

According to predictive coding and Bayesian constructs the brain responds to sensory input by balancing it against prior beliefs to infer plausible explanations and that consciousness represents this inferential process. (4)

Brain structures like prefrontal and parietal cortices were experimentally implicated in predictive coding and conscious inference (5, 6)

Thus, my spaceship anchorage narrative might have arisen from inferences from this interaction between neural responses and prior experiences. I am not aware of any prior experience of this nature that I have encountered before. Admittedly dreams like

states may involve all kinds of unfamiliar scenarios. However, explaining my ship anchorage narrative by dream like states is begging the question as dreams themselves are equally in need of explanation. Besides this predictive coding postulate does not explain why I was in the middle of all this feeling like standing there disembodied like a standby observer regarding this process of reconnection with awe and worrying that something might go amiss and that might result in some colossal damage. Who or what was that by-standing observer.?

Global Workplace theory (GWT)

According to GWT consciousness emanates from a speculative workplace in the brain integrating and transmitting appropriate information from a hypothetical processor whose function is to transmit information involuntarily to the workplace. (7). fMRI and EEG studies have demonstrated widespread innervation of the brain associated with conscious experience. In contrast, unconscious experiences did not show significant cortical activation.

more recent empirical findings show that as the anesthesia wears off, the brain follows a

specific pattern of activity, (8) and that consciousness reboots, as it were, through a series of specific states (9).

In yet another revealing study an asymmetry was demonstrated between anesthesia induction and the recovery process. This phenomenon was labelled hysteresis effect establishing that the path to losing consciousness is at variance with regaining it, thus demonstrating two different mechanisms, one for induction of, the other for recovery from anesthesia. (9).

Thus in the global workplace context my spaceship anchorage metaphor, though highly individualized, may be seen as a brain interpretation of both sensory and cognitive data during the recovery process. However, the subjective consciousness experience remain unexplained.

Information Integration Theory {IIT}

Unlike GWT, Giulio Tononi (8) defines his IIT based consciousness as the intrinsic ability of a system to integrate information. IIT is a step forward as it purports to explain the ontology of consciousness experience.

IIT suggests that human consciousness is mediated by cortical and subcortical structures and its level is determined mathematically by a measure denoted “phi”.

IIT is claimed to be substantiated with numerous experiments including anesthesia studies where lower phi was associated with loss of consciousness and higher phi corresponded to elevated consciousness. In this respect my spaceship anchorage narrative may have arisen from low phi levels as the relevant information processing system reassemble. But for all its mathematical rigor still IIT does not sufficiently explain my subjective depersonalized bystander observing and reacting to the spaceship anchorage ideation. It might be relevant to reiterate David Chalmers’ query how and why does qualia arise from what seems to be, in the last analysis, a physical process.

Higher order theory (HOT)

Higher order theory (HOT) defines consciousness as the awareness of a mental state of a higher order; lower order mental states being like primary sensations. HOT claims to best explain conditions of anosognosia, phantom limb and lucid dreaming. Here my spaceship anchorage experience can be described as a higher order mental state resonating with a lower state experience of recovering sensations.

There is, however, neurophysiological evidence that primary sensory areas, per se, may be enough to generate forms of

conscious experience. Gazzaniga and Sperry (10) demonstrated conscious perceptions can be generated by isolated hemispheres. In yet another compelling evidence Lamme (2006) (11) found that processing in primary visual cortex can induce consciousness experience. HOT seems to lack unequivocal empirical evidence. (11).

Orch-Or quantum theory (Penrose and Hammeroff)

The Orch-Or theory represents a paradigmatic shift in consciousness deliberations. Here consciousness is believed to emanate from quantum processes occurring within the brain. Its explanation is a meeting ground for quantum and relativity theories as well as biology. (12).

Intricate quantum physics notions such as superposition, collapse and entanglement are supposed to explain consciousness experiences. According to Penrose the unstable superpositions within the brain particles collapse due to a fundamental connection between quantum mechanics and spacetime geometry and that consciousness occurs at the moment of this nonrandom collapse.

While quantum processes per se are borne out by irrefutable evidence, their demonstration in biological systems proved to be enigmatic.

Hammeroff studies offered a solution by suggesting that brain microtubules by virtue of their cytoskeletal structures and their orchestrated activity may well act as quantum processors. It has been shown that tubulin proteins in microtubules are capable of resonance and dipole alignment which are processes that may arguably allow the occurrence of quantum effects. (12). More recently quantum vibrations were shown to persist even in biological temperature, (13). Similarly, quantum coherence effects were discovered in photosynthesis and avian navigation. (14).

Orch-Or theory can provide the best explanation so far for my spaceship anchorage experience. It can be seen as suggesting that processes of quantum superposition and collapse happened to me probabilistically leaving me as a by-standing observer.

But even if quantum processes can occur in microtubules their role in consciousness experiences were not directly established.

My main concern, though, is that if collapse is non-random and governed by an underlying geometry of spacetime this may entail that consciousness is outside the control of the conscious being, i.e. involuntary. So, in this paradoxical sense

consciousness experience is, as it were, not conscious; not unless we conceive these quantum experiences as lower order leading to higher order interpretation, reflection and reaction.

Thus far we have examined explanations for my spaceship anchorage experience based on five major theories of consciousness theories. Though extremely nourishing these explanations were not conclusive. But since all those theories are invariably brain-centric, one may conceivably ask why must consciousness explanation reside in the brain?

Panpsychism theories of consciousness may constitute a way out of this dilemma.

Like some others, I have been particularly intrigued by the Qur'anic concept of Fu'ad which recurred 16 times in the Holy Book invariably in connection with hearing and seeing sensations, indicating unequivocally both their interconnectedness and their separate identities.

Fu'ad being associated with spiritual dimensions (15, 16).

Hussain and others investigated Fu'ad as a central concept in Sufi psychology, representing the innermost core of the heart

and its connection to divine perception and awareness.

This Qur'anic transcendental concept of Fu'ad was clearly indicated even in early exegesis of Quran. (See Altabary (839-923) on Surah Alnajm 53:11; Sura Al Quasas 10-20 Alzamakshari (1074-1143); Alqurtubi (1204-1273) on Sura Al Israa 17:36; on Sura AlNajm 53-11.

In this Qur'anic context Fu'ad may conceivably be meant to represent the core of person-hood accommodating deep faith, comprehension and moral agency. Its inseparable relation with the equally important sensory function is that of higher order and lower order. In this sense my anesthesia experience was presumably a moment of separation of two huge worlds of soul and body and their rebinding just before regaining consciousness is like two huge ontologically distinct machines carefully reuniting my unique person-hood. This might explain though in a vague manner the feeling of massiveness and extreme diligence that everything should fall precisely in place.

So, what is the bottom line?

Latent states of consciousness during anesthesia as well as in conditions of lucid and deep sleep (17) may also be interpreted as indicating that Fu'ad consciousness on the

one hand and the body / brain on the other, are ontologically distinct but uniquely connected; one is made for the other. My metaphoric spaceship may symbolize a distinct alien and the bolts and nuts may symbolize the distinctiveness of their binding. It is as if suggesting that this consciousness cannot fit anywhere else—perhaps only in pathological conditions.

My spaceship anchorage experience is thus far only vaguely explained.

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