



On the question of free will in a quantum physics inspired model of consciousness

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ABSTRACT

We analyse the results of Libet type experiments in light of a quantum physics inspired model of consciousness states and show that the claim about the absence of free will due to onset of readiness potentials prior to awareness of decision is not tenable. It simply points to the fact of the existence of unceasing subconscious processing beneath the conscious level out of which only those that receive the impetus to come up to conscious awareness by the focusing of attention, only are known. The free will problem then shifts to the free will to direct attention on certain subconscious processes. But the subconscious processes possess an autonomy of their own, which point to the operations of a superconscious all-pervading will that is omniscient and hence governs all individual will.

Key Words: states of consciousness, free will, determinism, quantum physics, subconscious, superconscious

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Introduction

The age-old philosophical debate of determinism versus free will has in recent years kept neuroscientists, quantum physicists and psychologists in its grip following novel experimental results and theoretical analyses (Libet 1999; 't Hooft 2007; Pockett 2002; Wegner 2002). Originally, it arose as a possible conflict between the will of man versus that of god in certain situations because if the latter is known, the former can presumably go against it, thereby effecting a contradiction of sorts (Van Inwagen 1975; Fischer JM 1994). Can human will contradict God's will? This is the conundrum. If free will is there, there arises the possibility of achieving the impossible, because God's will is assumed supremely powerful and irresistible and as the only free will existing (Krishnananda 1983). The free will experienced by humans then necessarily has to be an appearance only, and a special conditioned projection of God's will and therefore, having no fundamental significance (We-

gner 2002). Such theological determinism, though differs from scientific or causal determinism, still has the same negative implications as the latter in regard to existence of individual free will. This is because if the past determines the future as per the causality principle, then no freewill can operate at any point of time, the events having already been determined by past causes.

In Physics, there is the quantum measurement quantum measurement problem, where the observer apparently decides the outcome by his free will to choose one of the possible alternatives, even if the experiment is headed in the direction of a particular outcome, as in the so called delayed choice experiments (Wheeler 1978; Jacques et al. 2007; Peruzzo et al. 2012; Manning et al 2015). Conway and Kochen proved the freewill theorem in quantum measurement theory which clearly states that the results of experiments are not independent of the experimenter's free will to decide upon what to measure and how (Conway and Kochen 2006, 2009).

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't Hooft however has argued in favour of absence of free will in Quantum Theory as well as in the Theory of Everything ('t Hooft 2016; 't Hooft 2017). Aharonov et al have invoked weak measurements to conclude that a fully determined future does not exclude free will or create causal paradoxes because of quantum indeterminacies in two-way interactions in time (Aharonov et al 2016):

“Physical law therefore enables prophecy of future events only as long as this prophecy is not revealed to a free agent who can otherwise render it false”.

This means that perfect knowledge of the future is not commensurate with individual freewill that can possibly vitiate the possibility of the inevitable future! Pradhan (Pradhan 2012) in discussing on 'determinism and freewill' in light of his Psychophysical interpretation of Quantum theory was led essentially to the same conclusion:

“But, once the future is known with certainty by an individual subject, the free-will simply ceases to operate. Perfect knowledge (quantum determinism) of the future arises only in one who has given up individual freewill.”

Indeed, retrocausal quantum effects can be demonstrated to be possible using formal quantum mechanics with broken time reversal symmetry of the Hamiltonian, which in view of the psychophysical interpretation can be linked with the functioning of the free will through the advanced waves (Pradhan 2017).

Similarly, Libet's experiments in neuroscience point to the nonexistence of a free will since neural processes signified by the readiness potential (RP) are observed to take place about 550 ms prior to the activity and the awareness of the intention for that precedes it by about 200 ms (Libet et al 1983). There is thus a lag of about 350 ms between the onset of RP and the conscious awareness of the decision for the activity. Subsequent experiments have more or less confirmed Libet's results, though the interpretations differ somewhat, but nevertheless the onset of RP prior to awareness and activity is common to all (Keller and Heckhausen 1990; Haggard and Eimer 1999; Alexander et al 2016; Schultze-Kraft et al 2016). However, we also note that some recent researches have raised serious concerns over experimental loopholes in Libet's experiments (Papanicolaou 2017; Kihlstrom 2017).

In this article, we propose to explain these experimental observations on the basis of a quantum

model of consciousness states proposed by Pradhan (Pradhan 2010), wherein the three states of sleep, dream and waking constitute the triplet resulting from the composition of two spin-1/2 like states of a pair of 2-state observables, namely, existence and consciousness, while the superconscious corresponds to the singlet state. Note that in this dualistic model, the brain is but a conduit for consciousness to function and it is not its generator. The exact nature of such mind-brain connection may be through the conscious electromagnetic field which interpolates between the material brain and the non-material mind as a metaphysical medium having dual (mind-like and matter-like) properties by virtue of its being an intermediary. The neural systems are the specific material configurations that permit such interactions between mind and matter through such electromagnetic fields (Grandpierre 1997; Fingelkurts et al 2010; Jones 2013, 2017).

Quantum modeling of states of consciousness

In Pradhan's model (Pradhan 2010) the subconscious state is the dream state which also spans the preconscious phase of thoughts, before they become conscious thoughts by coming to the knowledge of the individual through the focusing of attention on them. This subconscious realm is the realm of incessant thought waves and they are continually emerging and dipping down into it as do virtual particle-antiparticle pairs in the quantum vacuum or electron-hole pairs in a semiconductor at finite temperature.

The subconscious processes are not happening with the awareness of the individual but only those that cross a particular threshold to come to the conscious waking state do become conscious thoughts by virtue of the attention on them. The subconscious processing is tremendously large compared to the conscious processing portion of it, of which the individual is aware. Conscious thoughts are conditioned by spatiotemporal, neurobiological and psychosocial limitations, while the subconscious processes are to a great extent free from them, as their contents are culled and compiled from the entire span of psychic memory associated with the individual. The subconscious processes constitute ephemeral neural excitations and their mutual interconnections which dissolve before they can cross the threshold in their spatiotemporal extent to become conscious thoughts which require longer duration excitations of interconnected neural assemblies. Thus, it is that we remain largely unaware of subconscious processes.



The only windows available to that realm are dreams, altered states of perception, prolonged meditation etc. which are mostly short-lived and taken to be of weird character because of their mismatch with the waking state experiences (Pradhan 2010).

The unconscious is the third state and has still vaster dimensions in terms of its contents which remain hidden from the waking and dream domains. Again, as in the boundary of conscious and subconscious, from the unconscious domain thoughts pop up into the subconscious across the boundary crossing the corresponding threshold and die unperceived. But the fourth state, the superconscious, is the substratum of them all and has access to all of them as it is shorn of all individuality and thus is filled with universal knowledge of all states of all individuals (Pradhan 2010, Pradhan 2012, Pradhan 2018, Grandpierre 1997).

Autonomy of biological processes

While discussing free will we must not forget the glaringly evident fact that most biological processes in any organism continuously proceed without its exercising any conscious will in those regards. It is as if right from the intra-cellular processes onwards, all organismic processes have a kind of autonomous functioning without any conscious will operating in those directions (Chaix et al 2016, Mirsky et al 2009). Not only that, the individual cannot willfully stop such autonomous processes too, without jeopardizing its own life (Brown 1959). It is thus reasonable to assume that the free will that we seem to enjoy must be of limited scope and must therefore be subordinate to some superior will that works through all living systems.

The autonomous biological processes in an organism must have some explanation. They can be assumed for all practical purposes to be driven by the commands from the subconscious level. But just as the conscious state does not enjoy free will, similarly too the subconscious does not function with freedom, but is guided by the underlying universal consciousness, and the fourth state wherein all knowledge is stored and which being all-pervading, has direct access to all states of all individuals and can command and control the subject-object interactions in such a subtle manner that the subjects feel a sense of free will (Pradhan 2010).

Absence of free will

In this quantum mechanics inspired model, there is a gap between the subconscious and conscious levels

which makes the subconscious processes unavailable to the conscious awareness of the individual though they are operating on the brain or the neural systems. Further, there is continuous subconscious processing going on all the time behind the conscious awareness of the individual. Any wilful activity must have a conscious thought behind it and which of necessity must have crossed the threshold of the subconscious to reach the conscious awareness level by overcoming the gap. Even the random-looking activities of the mentally deranged or of such patients with psychopathological conditions must have their associated subconscious processing before their happening, even though the conscious awareness of them may be absent or the thought-forms not fully realized by the agents at a conscious level. Thus, it is not surprising that in the Libet type experiments RPs corresponding to the future activity were generated in the brain prior to the activity and conscious awareness of the activity.

First, the attention has to be directed to the particular subconscious process that is to become a content of the individual's awareness as happens, for example, when recalling a past experience from memory. It always requires certain cues forming a template either from the conscious domain or drawn from recent active memory (which is excitable by minimal attention as if outermost electrons in an atom or those in the conduction band in a solid) to be taken to match the corresponding stored image in the subconscious to effect a recall from memory (Pradhan 2014). It is only after the recall is done or the cognition about possibilities is achieved that a decision is taken. Similarly, attention is to be focused for any perception to occur (Pradhan 2014). Attention as a purely psychological faculty has recently been advocated by us while modeling it for temporal perception (Pradhan and Tripathy 2019). It can also facilitate mind-matter interactions (Pradhan 2015).

Thus, decision always follows the attention on the possibilities. Therefore, it is observed that the awareness of decision to act precedes the act itself. Thus, it is attention that excites the thought-form from the subconscious to the conscious level exactly as it happens in case of electronic excitations in atomic systems by shining light. Such analogy of transitions between quantum states and transitions between consciousness states were already envisaged and proposed along with elaboration of some selection rules earlier (Pradhan 2010). The same framework



has also been applied to propose a treatment of a particular form of sleep disorder (Pradhan 2016).

The RPs are observed to occur prior to awareness due to such attention-induced neural activity of subconscious processing for taking a decision or having a cognitive perception. The decision to act and the activity itself have a time lag which is explainable as being due to the conscious processing required to perform the act e.g. in activating the corresponding motor neurons for a hand movement.

Conclusion

Thus, what we consider as free will to act is primarily a free will to decide, and at even more deeper level it is a free will to focus attention on the definite section of the innumerable subconscious processes that are constantly running in the background of the conscious state. Therefore, the Libet type results don't preclude the existence of a free will but only shift it to a deeper realm of operation- the realm of the subconscious. The absence of freewill in that level then becomes a problem of still deeper realms of the unconscious and the superconscious. In both these states individuality is absent, but in unconscious state, awareness of any kind is absent while in superconscious state omniscience prevails. It is this omniscience of the superconscious state that has all knowledge and hence all things at once in a transcendent manner and thus individual free will has no place. Since everything is known in all the three periods of time, nothing can be altered by any free will operating in any manner whatsoever. Thus, as long as knowledge of the future and memory of the past are imperfect, we can claim the existence of a free will. On reaching the superconscious state, individuality vanishes along with freewill and all.

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