

Generalist View of Free Will and Related Science

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Abstract

Free will and consciousness have been major philosophical areas for centuries. In the last few decades, they have become major areas of neuroscience as well. The paper considers first determinism and free will. It is argued that determinism is scale dependent. Free will and compatibilism have been defined differently. The major experimental findings on free will are then discussed and it is argued that there is now increasing evidence for free will. The possibility of further work in the area is briefly considered in the final section.

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Introduction

Determinism may be defined as a belief that every future activity of an individual is decided by the past condition in conjunction with fixed laws of nature. In other words, the laws of nature operate in such a way that given the past only one future is possible. Free will on the other hand may be defined as the ability to *consciously* choose between alternatives. Determinism is in conflict with free will as no free will is possible if determinism is true. The philosophers are divided and may be classified into three different groups. Hard determinists believe that no free will is possible. Compatibilists believe free will and determinism can coexist. Libertarians believe that there is no restraint to free will and also there is no determinism. Majority of philosophers seem to favour compatibilism.

Developments in neuroscience have a large impact on the free will debate. The impact was mainly due to Libet (1) who through his EEG experiments suggested that our conscious decision to act is really made in the unconscious. These experiments questioned free will with *facts and figures*. Several papers have been published in this area with more sophisticated experimental techniques. The majority seem to support the lack of free will. But the experiments involve simple movements and there is scope to broaden the tasks.

The purpose of the present article is mainly to look at free will from science point of view. The article first looks at determinism in which the free will operates. Compatibilism is defined in a way different from usual

philosophical approach. The major experimental work in the area is then discussed. Scope to clarify free will through further experiments is briefly considered.

2. Determinism

Determinism may be looked at differently for physical and biological systems.

2.1. Physical determinism

Physical determinism was well argued with Newtonian physics and examples abound. Here we take up few cases where determinism is not clear cut. Descartes compared determinism to a gigantic clock that moves relentlessly forward. One may argue that in the current scenario of science the clock needs periodic winding to keep going.

2.1.1 Reaction kinetics

Modern theories like transition rate theories (2) make use of Maxwell distributions to obtain fraction of molecules above a specified energy. These modern theories are capable of estimating reaction rates from fundamental principles. The point of interest here is whether the laws of kinetics are deterministic or not. At the level of overall system, the reaction may be deterministic based on transition rate theory. But what about the molecular level? Surely the modern theory is talking in terms of probability of an ensemble of molecules and how they behave. We cannot however predict the behavior of individual molecules. Thus *the problem of determinism is scale dependent*. At the molecular level it is indeterminate while at the macro level it is determinate.

2.1.2 Quantum physics and determinism

The structure of atoms is now well known. If we take a metallic atom it has an identity and can be moved from one point to the other in a tunnelling microscope. But when we consider the electrons in the atom the whole of quantum mechanics comes into play. We have to talk in terms of orbitals, energy levels, and spin to explain the atom. In fact the position of electron can only be referred to in terms of probability. Thus, once again *determinism is scale dependent*.

There are several other phenomena at the quantum level that are counter intuitive. For example electrons may behave as waves or particles as evidenced by double slit experiments (3). The behaviour is based on the observer. If the observer focuses on one of the slits and notices which particles are going through it an interference pattern is obtained. Otherwise the particle behaviour is observed. So the natural question is where is determinism? The experiment has been interpreted as the intervention of consciousness on experimental outcome. One interesting speculation may be made here. Consciousness of each individual is different. How do we then get same interference pattern irrespective of individual? The possibility is that some form of universal consciousness is involved with person acting only as a medium.

Several other phenomena like quantum entanglement also exist. In fact quantum phenomena have a bearing on how reality should be perceived (4). Thus quantum mechanics is putting determinism increasingly in doubt.

2.2 Bio-determinism

Firstly, the word bio-determinism is apt for living organisms. But in many cases the word used is simply determinism. Falling in line with general sciences biosciences also have adopted determinism. The reductionism which is an off shoot of determinism that proclaims a system can be understood by understanding its components. This approach has only partial success. It is now clearly recognised that biological systems exist at different levels of organization and complexity that range from the subatomic realm to individual organisms to whole populations (5). The important dictum stated by Aristotle (384-322 BC) is still relevant here. He stated that *whole is more than the sum of its parts*. The behaviour of human cell for example cannot be predicted by knowing about the cell alone. Its behaviour can only be understood in an integrated way with other cells with all the complexity involved.

2.3 Free will and determinism

Free will may be defined as the ability to make a choice between alternatives consciously. Sometimes it is defined as the ability to do otherwise.

As discussed in the previous sections the concept of determinism for physical and biological systems is being increasingly questioned. One may still grant that for simpler systems reductionist approach may work. But strong philosophical positions like hard determinism where no free will exists may not be tenable. The common philosophical position now is compatibilism. This position says that both determinism and free will can coexist. This is mainly a compromise to account for moral responsibility. Without free will moral responsibility is not possible. Here *assuming free will exists* the author proposes a

more pragmatic approach to determinism. The idea is that *free will acts within a flexible boundary*. This boundary is determined by the available knowledge base and a host of personality factors of the individual. For convenience it is defined here as local deterministic space (LDS). The following paragraph clarifies the idea with examples.

Each individual has a level of LDS that is determined by his total personality, education, environment and any other relevant factors. It may be a good idea to illustrate three cases where one factor is dominant. A soldier going to war is a case where environmental constraints dominate. The commanding officer leaves precious little for the soldier to choose. In a scientific conference knowledge of the specific area dominates in making choices. Personality factors may dominate in making moral decisions where individual has to go beyond self-interest. Note in each case the person will make a choice within the LDS. Also within a group exercise of free will results in different choices for different people as each individual has a different weightage for each factor.

The above discussion hopefully sharpens our perspective and allows the possibility of free will acting within LDS. But LDS is specific to the individual. Also for a given individual the boundary changes with the type of problems in which choices have to be made. A physicist with deep knowledge will make choices regarding the future of particle physics with a lot of deliberation and hence with a large periphery of the boundary. The same physicist when asked to predict future recession will at best give an answer based on general knowledge and some articles in media. In this

case the boundary shrinks and exercise of free will shall be limited.

This approach is not concerned with moral responsibility as in compatibilism. The LDS naturally arises due to the state of mind. The present state of mind is a consequence of the past. But what is of interest is the present state irrespective of how it evolved.

Significant thinking has been done by Indian philosophers and spiritual leaders in on the issue of free will. The present article is focusing on the science part of consciousness. Deeper spiritual analysis is outside the scope of this paper. The only statement that can be made is that in general Indian thought supports the idea of free will.

3. Free will and neuroscience

Developments in neuroscience are having major impact on the age old questions of philosophy. The focus here will be on free will. In the last few decades we are explaining this phenomenon based on scientific experiments. The original work due to Libet and the later work by others seem to support the idea of hard determinism with no free will. Some more recent work on the other hand seems to support free will. These will be discussed below. The issue is major and by no means closed. This is followed by a section called 'Possible new approaches'. The purpose is to see whether new ideas can sharpen the free will debate further.

3.1 Libet and the lack of free will

Libet has tested by EEG the brain activity involved in voluntary movements. He wrote a series of papers from 1983 to 1999. Many others also have tested voluntary actions and

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seem to support the ideas of Libet. The central idea involved is given in Fig. 1 with typical values. This figure represents the brain activity as a function of time. Libet gave his

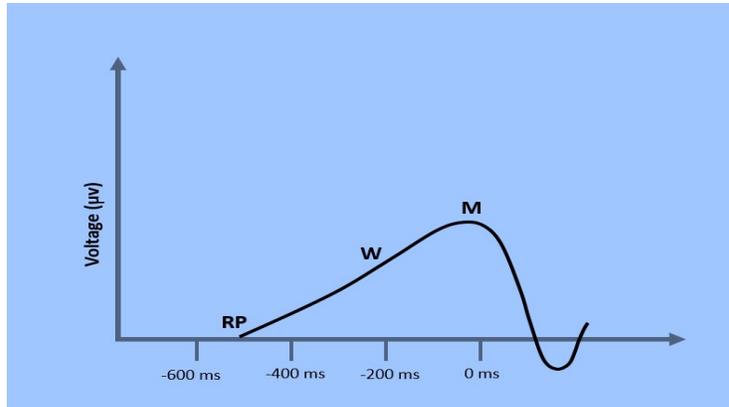


Figure1.Schematicdiagram of EEG

activity in voluntary action. RP is readiness potential, W is the will to act, and M is the motor action.

The motor activity involved is a voluntary act like flexing a wrist or jerking a finger. W is the point when individual makes a conscious decision to move. A little later the motor action is executed from M. The point M is taken as zero time. Though the person has willed the action at W there is prior electrical activity of few hundred milliseconds before as shown in the figure. This pre-activity starts about 550ms before M and marked as RP, the Readiness Potential. In some cases when the person does preplanning the RP may start earlier and can be 1000ms. The person is aware only of his conscious decision W and the later motor movement at M. Usually W the point of conscious willing is about 200 ms before M. The initial interpretation of this curve was that a decision was made in the unconscious to move the finger. This is counterintuitive as action is supposed to start after conscious decision. The person is conscious of the desire to move only at W. Though he feels he has consciously decided to move at W this is not so. It is interesting that the person can veto his

desire to move after W and before M until a point of no return. This is intriguing as ability to veto amounts to a kind of negative free will. Some more recent papers with sophisticated techniques do support the main idea though they differ in details. Also, specific brain areas that are active have been identified and an example may be cited (7)

There is a large debate on the work of Libet from philosophers, neuroscientists, and psychologists. A recent book edited by Mele (8) covers all the aspects in a consolidated manner with chapters 10 and 11 devoted to neuroscience aspects. The questions involved include what is RP, how and why conscious will arise at W and whether it is some kind of epiphenomenon. The other important criticism is that simple go/no go tests are arbitrary and far removed from the reality of decision making with multiple choices.

Here the author wants to make a brief observation regarding consciousness in relation to free will. It is well known that life is

conscious from cell to the organism. If we grant brain has its own consciousness it would simply mean that conscious brain acted ahead of self-awareness in Libet's experiment. The brain consciousness (BC) and self-awareness (SA) will have an interface that may act uniquely for each situation. For example, the same Libet type experiment was conducted with deliberate and arbitrary choices by Maoz et.al (9). The deliberate decision involved making a choice regarding payment of charity. They find that when deliberate decision was involved RP was absent supporting free will. On the other hand RP exists when arbitrary decisions are involved. Thus the RP is contextual and one may have to see the role of BC and SA interface for answers.

4. Possible new experimental approaches

The major issue is whether a free conscious decision leads to action. This was questioned by Libet and others pointing to unconscious activity responsible for action. However, the work by Maoz et.al cited in previous section shows that when deliberation is involved RP is absent supporting the normal view that activity follows conscious free decision. This approach may give further support if multiple choices are involved in the experiments. Also many activities like sports may have no time at all for RP. Such cases may be partly governed by autonomic processes. It appears computer games with multiple choices may involve more

conscious activity. It may need some research to select the right type of game for study.

Another interesting possibility is to study the neuroscience of twitching. Alien hand syndrome and its origins are being studied in detail. In such cases there is damage to the brain and one hand acts on its own and the person has no conscious control. But twitching of a finger is an interesting case. The brain is normal but muscle movement *is not consciously willed*. At the same time the person is conscious of the muscle movement that occurs. This offers interesting contrast to Libet type experiments in which there is a feeling of conscious willing. The interest is how the EEG for this case differs. This may clarify neural behaviour in free will further.

5. Conclusions

1. The present paper has firstly argued that determinism may not be pervasive and is scale dependent.
2. An alternative argument to accommodate free will within the bounds of determinism is provided and differs from the normal compatibility argument.
3. The central experimental ideas are evaluated. This at least shows free will as commonly understood is plausible. Further possibilities to establish free will are suggested.

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References

1. Libet B. Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behav. and Brain Sciences* (1985); 8; 529.
2. Laidler KJ. *Chemical kinetics*. Pearson Inc. (Indian edition) 1987.
3. Wessel-Berg T. The Double slit experiment for electrons. In: *Electromagnetic and Quantum Measurement*. Springer; Boston; 2001 (chapter 8).
4. Boccio JR. *In search of quantum reality*. Online book; 2014.
5. Lobo I. Biological complexity and integrative levels of organisation. *Nature Education* 2008; 1(1); 141.
6. Libet B. Do we have free will? *Journal of Consciousness Studies* 1999; 6; No. 8–9.
7. S Bode et al, Tracking the unconscious generation of free decisions using UHF fMRI *PLOS ONE*, June 2011
8. Mele AR. Editor. *Surrounding free will: Philosophy, psychology, neuroscience*. Oxford Press; 2015.
9. Maoz et al, Neural precursors of decisions that matter—an ERP study of deliberate and arbitrary choice. *eLife*, ,October 2019

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