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Is Free-Will Defensible in light of Modern Day Psychology?

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ABSTRACT
In the past few decades a number of psychologists, beginning with neurophysiologist Benjamin Libet experimentally tested free will. In the experiments subjects were asked to perform a simple motor task, and determine when they felt as though they had made the choice to act based on a special timer while at the same time experimentalists recorded electrical activity in the brain which initiates muscle action. These experiments found that the electrical activity to initiate action occurs prior to conscious awareness of a decision, indicating that our intuition we have conscious control over our decisions is false. Libet's work and the work of similar psychologists has been used to undermine the idea of free-will. In this paper I argue that this conclusion is unwarranted if we consider the implicit assumptions made by these experiments. I first explain what the Libet experiments are and what they attempt to show. Then I argue that we have reason to believe that the experiments do not test instances of free-choice but rather random action. Next I argue that it is difficult if not impossible from a biological, philosophical, and cognitive perspective to identify a moment of choice. I develop each of these objections at length not to establish free-will but to show the Libet and similar experiments fail to undermine the intuitive notion that we have conscious control over our actions.

KEYWORDS
Libet, Free Will, Choice, Decision, Action, Consciousness, Freedom, Volition, Voluntary, Neurophysiology

Free-Will: A word of advice: if you ever find yourself in a conversation with a philosopher, whether she be a student, professor, or an interested reader, and the conversation goes dull; bring up free-will. The philosophical question of free-will is an interesting and very relevant question because it touches on every moment and every area of our lives. Defining free-will is difficult to begin with. It is for this reason that many philosophical debates revolve around the definition and nature of free-will. Beginning in the 80s, a number of psychologists, most notably Benjamin Libet, attempted to experimentally test whether or not we have free-will. The original experiments were interpreted to undermine the common belief that we have free-will. Subsequent experiments have been conducted and have produced similar results (Soon et al. 2008) whereas others challenge the original conclusion made by Libet and colleagues (Trevena et al. 2010). In this paper I want to critically examine the initial experiments done by Libet. In order to do so, I will first explain the experiments. Next I will attempt to show that the experiments do not undermine belief in free-will because they make faulty philosophical assumptions about the nature of free-will among other reasons. Before proceeding I must make two points. First, I am not attempting to show we do in fact have free will, only that the experiments fail to show we don't have free-will. Second, I am not going to have a rigid definition of free-will throughout the paper[1], I will be using the following working definition (with clarifications along the way when necessary): free-will is the capacity for an agent to consciously choose to follow some course of action. Essential to free-will is the idea that it is a personal act in that it is an act of a conscious agent and second that it is the person herself who determines how she will act.

I. THE LIBET EXPERIMENTS AND THE RESULTS

The first notable experiment attempting to test free-will was conducted by neurophysiologist Benjamin Libet. His initial experiment set the framework for future experiments which are more or less the same thing with minor modifications. There are three reasons that I exclusively focus on Libet's original

1. My justification for not using a rigid definition has three components. First of all, in the interest of space I cannot defend my definition and therefore using a rigid definition will simply raise more questions than it solves. Second, the arguments of this paper are meant to be fairly universal in that they should hold for a variety of definitions and understandings of free-will. Third, I have no need to give a rigid definition. Clarifications on my working definition will be given and justified when I see fit throughout the paper.

work. First, Libet's experiments are the most well-known as they are the first of their kind. Second, in the interest of space it is not possible to discuss every variation on the initial experiments however future experiments have been similar (as noted earlier) in both style and results. Third, my criticisms are applicable to the class of experiments in general because they are broad philosophical ones and therefore it is not necessary that I describe each subsequent experiment after Libet.

Libet's initial experiment is recorded in the journal Brain. In his paper, Libet describes his experiment. The basic structure of the experiment is as follows (Libet et al. 1983): subjects are told to sit down and are hooked up to an electrical apparatus (EEG) which records the readiness potential (RP), a kind of electrical activity in the brain indicative of motor action. While in this position, subjects are asked to view a kind of timer (a lit dot rotating around a circle in a clockwise fashion). Subjects are then told to spontaneously initiate a brief motor action such as a wrist flick and determine when (based on the timer) they had the conscious desire to make the motor action.[2] Experimenters emphasized to subjects that the decision to act ought to be as spontaneous as possible as opposed to a planned decision. Further, Libet et al. claims that subjects distinguished successfully between the pre-planning and consideration to act and the final feeling of a decision or "urge" to act as it was described (Libet et al. 1983).

Libet's experiments concluded with a discussion and statistical analysis of the results. Most significantly, Libet found that the RP generally occurred 550 milliseconds (ms) before action whereas the conscious awareness occurred on average 200 ms before action (Libet et al. 1983). This means that if we interpret the RP as the impetus to act, it follows that the action was set in motion prior to the feeling of a decision, prior to the perceived "moment of choice."

It is necessary to clarify some basic science behind this procedure. First of all, a readiness potential (RP) is an electrical current in the motor cortex of the brain which precedes motor action, including voluntary muscle action (Libet et al. 1983). The brain is a complex set of interconnected cells known as neurons. The cells in the brain are connected to muscles in the hands via the spinal cord. Neurons generally communicate (transmit information) to one another in the form

2. In the actual experiment there are in fact more complicated instructions because there are different phases. After the phase described there were other phases for instance involving having the subject see what time he thought he had moved based on the timer. It is beyond the scope of this paper to go into details. For more see Libet et al. 1983

of chemical messengers known as neurotransmitters. These neurotransmitters cause changes in the cell which receives the signal (a post-synaptic cell) which often result in a change in the polarity (that is the relative electrical charge of the neuron compared to the external environment) of the post-synaptic neuron. This change in polarity in turn causes this cell (post-synaptic) to release a neurotransmitter of its own. In motor neurons (neurons involved in muscle action), signals are transmitted from the brain through the spinal cord and ultimately to a muscle cell where the release of a neurotransmitter takes place causing chemical changes in the muscle initiating movement. Measuring the electrical activity of neurons therefore can tell neurophysiologists about their activity because such activity is indicated by electrical changes within the cells. The presence of an RP indicates the beginning of nerve firing which ultimately results in muscle movement. Another point should be made as well: there is no reason that the activity of neurons must be conscious per se. Much activity in the brain is in fact unconscious, for example, the neurological signals which result in our breathing or the release of hormones. Accordingly, only certain neurological activities rise to the level of conscious awareness. The proposal in the Libet experiment seems to be that even voluntary motor action which is a paradigm case of free action (hence the term "voluntary") is in fact at a more fundamental level an unconscious action which eventually rises to the level of conscious awareness in a way that other unconscious actions do not.

If the Libet experiments are correct in showing what they set out to, then it follows that what we experience as voluntary motor action is in fact just as unconscious and involuntary and therefore non-volitional as any other neurological activity like the control of blood-pressure. Consequently, it is argued, the determining factor in what feels like a free choice is in fact unconscious neurological activity and not a conscious decision. These experiments put the subject in the passenger's seat because the real driver is the subconscious brain not the conscious mind. Although this does not disprove free-will entirely it does cast doubt on the idea since, so the argument goes, voluntary motor action is a representative case of free-choice.

In the years since the Libet and similar experiments a number of criticisms have unsurprisingly been brought forth from both philosophers and scientists. It is beyond the scope of the paper to discuss each of these criticisms. In what follows I want to discuss what I perceive to be the biggest problems with the experiments

from a more philosophical perspective, however my criticisms also touch on some methodological problems as well.

II. PHILOSOPHICAL PROBLEMS WITH "FREE-WILL"

The first problem with the Libet paper is a faulty conception of free choice. While many consider the Libet experiments to capture paradigm cases of free-choice, this assumption is in fact unwarranted and likely false. To begin with, the so-called instances of choice being examined, while completely spontaneous are probably not instances where free-will is relevant. In the choices subjects made, there were no inherent reasons why one would opt to choose option A over option B, for instance, the choice to flick or not to flick the wrist. In other words, the choices were completely arbitrary. Most choices in our experience we make for various reasons. For instance, if I choose to have a cup of coffee in the morning, it is because I want to be alert for the rest of the day in order to get my work done. This is a free decision of mine, but it isn't done arbitrarily. This does not mean my desire to be alert determined that I would choose to make a cup of coffee[3] in the sense that I could not have chosen otherwise; it only means that the reason why I did choose a coffee is intelligible. The choice for whether or not to do a simple motor task such as a wrist flick (or similar) is completely arbitrary and therefore it may not even be appropriate to call it a free act. There are many reasons to hold this view of free-choices which go beyond the scope of this paper, but the basic thrust of my argument is as that the best way to make sense of free-will in the first place is to understand it as goal-directed action. In other words, the will is a way of pursuing objects which we perceive to be good. Objects of the will may vary from quenching thirst to fulfilling ethical duties, but in every case, they are objects which we identify as worth pursuing. In the case of the Libet experiments, there isn't a clear object worth pursuing. Hence it is at least plausible to say that these so-called "choices" are random rather than rational acts and consequently they are not appropriately considered acts of free-will in the first place.

3. If one is inclined to accept a compatibilist notion of free-will, she can maintain that the desire determined the action yet the action is still freely chosen. My point about wrist flicks stands, in fact it may even be stronger, because there are no competing desires, it follows that there is no desire which can determine action.

This approach is not an ad hoc response to Libet's results either. For starters, the driving reason to maintain that humans do have free-will is to maintain a sense of responsibility. This presupposes choices are somehow rational. It is not essential that every muscle twitch be voluntary, only that meaningful choices are. Second, in understanding what the will is in the first place, it seems as though the best arguments explain will in relation to desires, motivations, and human rationality as noted above. These considerations which I will discuss further in the following paragraphs give us no reason to assume that the Libet experiments are instances where free-will is in fact operative. Rather, if we understand free-will in light of pursuing perceived good and as necessary for responsibility, then we might even have independent reasons to predict that Libet's experiments will not be instances of free-will given that the experiments measure cases where rational desires and responsibility (moral or otherwise) are not in any way relevant.

One who denies free-will may concede this and still think the experiments have a certain value. For instance, one could make the point that while these experiments do not successfully establish that all purported instances of choice are not in fact free, the experiments do establish that at the very least we cannot rely on our intuitive sense of choice, the 'feeling' that we choose or any introspective evidence in order to support free-will. The experiments thus neutralize one of the main arguments in favor of free will. The main problem with this objection however is that the subjective experiences in making an arbitrary 'choice' and the kind of choice we make that is not arbitrary (like the coffee example I just provided) are different experiences. The main difference is this: in instances of the former, I cannot explain why I chose as I did but in the latter I can explain why. The similarity in both cases rests on the fact that I do not feel any compulsion or determining factor outside of myself which directs me to action. Yet this is only part of the subjective experience for a free-choice. Another crucial element in a free-choice is that I understand the reason for my choice. When I choose to drink my cup of coffee in the morning, I not only feel as though it is free because I don't feel compelled to do it, I also feel as though it is free because it is my choice and I understand why I do it. In other words, an essential part of a free choice is that its locus is in the capacity to reason, i.e. the incorporation of our rationality or intellect is an essential element to the experience of choice. Goal directed action feels different than arbitrary action despite some prima facie similarities. Since there are independent reasons to see free-will as goal-directed

rather than arbitrary acts as noted above we ought to reject the premise of these experiments.

A second element to this basic problem is that the choices in question are not morally relevant. One very important argument for free-will is that it is necessary for moral responsibility. If there is no free-will, it doesn't make sense to praise virtue and punish vice. Therefore, free-will matters most when we consider morally relevant choices, such as the choice to befriend an outcast or give some money to the less fortunate. Since deciding to do some simple motor action at a certain time under experimental conditions is not a choice with any ethical imperative, it is plausible that the choice is in fact determined and we still have free-will when it "really counts" so to speak. The same objection to the previous argument can be made to this one: true, the experiments may not be about morally relevant choices, but at the very least they falsify the idea that we can rely on introspection to support the idea of free-will. The same response we gave above applies, i.e. the experience between arbitrary choices and choices with reasoning behind them is different. Moreover, this response can be strengthened in the case of morally relevant choices. This is because the experience of moral decisions is different from the experience of ordinary choices. So not only can we distinguish between arbitrary choices and intelligible choices, we can distinguish further between ordinary intelligible choices and choices which have moral content. Together, these considerations should lead us to the conclusion that even without further considering the methodology of the Libet and similar experiments, we ought to reject their conclusions on the basis that they rely on a number of dubious philosophical assumptions and implications.

III. PHILOSOPHICAL PROBLEMS WITH "MOMENT OF CHOICE"

Leaving aside the fact that Libet's experiments as well as subsequent ones use particularly poor instances of choice, there are other problems as well. In this section I want to concentrate on the philosophical problem with locating a moment of choice in time as well as some methodological problems which are related to the philosophical problem. What is said here stands or falls independent of the argument in the previous section however I certainly think that a case can be made that reading this section of the paper in light of the previous section can greatly strengthen the force of the following arguments.

One of the major assumptions of the Libet experiments (and others) is that the subjects in the experiment correctly indicate the time at which they made their choice. There are two main problems with this assumption. First, it relies on the vague notion of the "moment of choice" and second, there may be lurking variables which create a time lag between the RP and the conscious awareness of the choice.[4]

The experiments rely on subjects to report a moment of decision. This however is a very vague notion. A little introspection makes this clear. If we conceive of free-will as the power to generate from nowhere an instantaneous jolt which initiates movement, then these experiments may pose a problem. However, this description of free-will is not intuitively plausible. This definition seems to describe reflexes or urges more than anything else.[5] One of the most important elements of free-will is that we can deliberate, reflect, consent, and direct our attention over continuous periods of time. There are a number of reasons why crimes of passion are considered less serious than crimes of deliberation, however certainly one of them is the idea that during periods of passion, our free-will is limited. This is because the normal elements of choice mentioned above are not really present, only a blind direction towards action driven by emotion rather than higher cognitive function is operative. This is relevant to the Libet experiments because if we accept that deliberation etc. are essential elements to free-will, then we have two reasons to question the concept of "moment of choice" employed by Libet. First of all, deliberation, reflection and directing our attention occur over time. Even consent often happens gradually. In the Libet experiments, choices are understood to be instantaneous. In fact, as noted in section I, the experimenters

4. This is of course leaving aside the contested assumption that the RP is in fact the moment of neurological "choice." See Trevena et al. 2010

5. It is even possible to suppose that discrete choices are determined yet maintain humans have free-will if we accept a compatibilist account of discrete choices (one can even hold this and be a libertarian with regards to free-will in general). On this account free-will focuses more on the ability to gradually form our character through our thoughts and intentions over time. Three brief points are in order: (1) biologically, neuroplasticity provides a potential basis for this kind of freedom. Even if the neurons involved in momentary wrist flicks are not subject to conscious control, perhaps the synaptic connections in certain brain structures (e.g. the PFC) are subject to conscious control over time. (2) Psychologically it makes sense to see free-will as the ability to form our character over time rather than focusing on discrete motor actions. (3) Philosophically, this model can preserve morally relevant freedom and is consistent with various related positions e.g. libertarian or compatibilist, dualist or materialist.

explicitly request that the choices of subjects be completely spontaneous and unplanned (Libet et al. 1983). Second, in the subjective experience of choice, it is difficult to introspect and pick which part of the experience of freedom counts as the actual choice. It is not only very difficult to locate the straw that breaks the camel's back in a choice, it may not even be coherent to define given the variety of factors involved in what we all know to be our free-choices. Even if it is coherent however, it is manifestly very difficult to articulate what counts as the special moment. If we accept this analysis of free-will, it might be the case that certain elements of the decision initiate the RP but these elements are distinct from what people often consider the "moment of choice," however they are in fact the most important components of free-will.[6]

Even if the "moment of choice" were a perfectly clear concept, it does not follow that it is useful in these experiments. The reason is that even if we understand what it means, this does not entail that we are really good at determining when it occurs. I will make two simple observations that readers will hopefully relate to in order to make my point. First, our internal 'cognitive clock' as it were is manifestly inaccurate. Leaving aside choices, it is difficult to pinpoint the time in which a thought popped in our head, an urge occurred to us, or even something external to us happened exactly. This is because our minds are in continuous flow and it is difficult to break time up into such fine moments. This provides evidence which casts doubt on our ability to pinpoint the time something occurs regardless of whether or not it is internal and casts doubt on the Libet experiments as a whole which rely on an accurate internal 'cognitive clock.' Second, even if we accept internally we are perfectly capable of pinpointing a time of choice, it is manifestly difficult to match that time up with events in the external world. For instance, even if the subjects in the Libet experiments correctly identified the moment of choice, it would still be extremely difficult to match this up with an external timer. One mustn't only identify the vague moment of choice, she must also identify it in relation to a fast timer. The

6. N.B. The proposal described in an earlier footnote suggesting it is possible to hold free-will and hold choices are determined is relevant through the argument as presented in this paragraph however it is not essential. The point in this paragraph is to emphasize that there are a number of components to free-will which make it difficult to pinpoint a moment of choice. This is perfectly consistent that the moment of choice is undetermined (contra the aforementioned footnote) or that choices are determined yet we still have free-will (in accord with the proposal of the earlier footnote).

evidence is muddied even further once we realize the time intervals discussed in the Libet (and similar) experiments: about .3 seconds. If one doubts any of this, she need only set up a stopwatch and observe the difficulty herself.

A possible response to this criticism is that if it is difficult for us to identify the moment of choice then we should expect the experimental results to be random rather than consistent, i.e. they shouldn't consistently show the RP before the conscious awareness. Although there is some validity to this response, I want to also point out that it is likely that if there are inaccuracies in our internal 'cognitive clock' and its ability to match up with the external time, they are likely to favor one result rather than another and it may simply be the case that the inaccuracies bias the experiments such that the RP occurs before conscious awareness consistently. Just as a real clock may be either too fast or too slow consistently, so too our cognitive abilities may be slightly inaccurate in one way or another, that is, consistently. This intuition can be justified on several grounds. First of all, our cognitive abilities form as a result of natural selection. It makes sense that if there are inaccuracies, they are there as a result of an evolutionary advantage[7] and consequently would not be random. Second, given the biological basis of cognition, it seems unlikely that the inaccuracies of our cognitive abilities in this area are simply due to random neural chemistry. More likely, there is some inherent biological explanation for the cognitive errors which is universally applicable in the sense that the error results from the way the human brain is structured or how it functions rather than moment to moment problems with the inner workings of neurons. Third, other elements of our cognition are consistent with this picture in that most of the time they are not random but explicable in terms of neurobiology, cognitive psychology, and evolutionary biology. Overall, this analysis does not prove that Libet's experiments are faulty, only that there are certain relevant and important factors which should cause psychologists and

7. An inaccurate cognitive clock may be evolutionarily advantageous. There are various kinds of cognitive bias which are technically erroneous yet they still persist in the human population because they are advantageous overall. Further, cognitive inaccuracies may be beneficial in that they help us follow through with reflexive life-preserving behaviors free from distraction. Additionally, cognition is biologically dependent on the nervous system. While a cognitive inaccuracy may not be itself advantageous, the neurological basis for the cognitive error may be. For example, maybe it's the case that the cognitive clock bias exists because the neural apparatus involved in the internal 'timer' is less metabolically active and this fact could be given plausible evolutionary explanation independent of the cognitive function of the apparatus.

neuroscientists to think twice before concluding from the experiments that free-will does not exist.

These considerations about the internal cognitive clock and the subjective experience of choice tie into the main thesis of this section in two ways. First of all, if we think of free-will as a gradual weighing of desires, thinking about options, and analyzing reasons for acting, it makes perfect sense to say that there is extreme difficulty in pinpointing a moment of choice. In other words, if we accept the analysis of free-will presented at the beginning of this section, we ought to expect cognitive difficulty in determining the exact timing of a choice.[8] Second of all, the key features of free-will go beyond momentary choices. This is not to deny that there are momentary choices, rather, it is to show that there may be many momentary choices going on all of the time which together make up a complex system of thinking and deliberating which ultimately lead to some action. We must understand free-will in this entire context. It makes sense then that we would have difficulty pinpointing the moment of choice given that many cognitive tasks are going on in continuous fashion which play an important role in free-decisions.

Some however may have a problem with the foregoing argument because they may say that it is incoherent to speak of free-will without reference to discrete choices. To this I would respond in two ways. First of all, I am not denying discrete choices. I am only making the point that these are not the entire story. The reason is that free-will has to with a sum total of free choices over an extended period of time while incorporating other cognitive tasks such as thinking and planning. Therefore, the exact moment of choice is hard to identify in an ontological, biological, or psychological (including first person) perspective. Second of all, I would deny that an instantaneous choice is as important as many would immediately think. As I said, I am not denying its significance or even necessity, only pointing out that there are other ways to think about free-will.

8. This fits nicely with potential neurobiological models of choice because any model must incorporate neurons in higher brain areas reaching a threshold gradually over time. This may be due to long-term synaptic changes or short-term electrical signal build up (e.g. in the case of temporal or spatial summation). Whatever the final trigger for action from a biological perspective is, we ought to consider the system as an interactive whole rather than simply focusing on one neuron's action potential. Thinking of free-will as a function of the system over time makes more sense given the complexity of a system capable of choices to begin with. This is a parenthetical point yet a good consideration from a technical standpoint.

Although this is somewhat speculative, perhaps we ought to think of free-will more in terms of will, desire and motivation than instances of choice. This may be accomplished if we think of free-will as an ongoing sustained desire for a good, the continuous consent to a certain motivation. For example, the committed athlete freely decides to workout. Those who think of free will primarily in terms of choice might see the athlete as making a distinct choice every day which is free to go to the gym. This however I think mischaracterizes what free-will is all about. The athlete goes to the gym because he constantly desires to get better. His choice to go to the gym is implicit in his desire to be in shape. The fact that the athlete actively desires to stay fit and deliberately intends to do so is what leads him to go to the gym consistently. However, this deliberate intention is an ongoing act of the will rather than a series of day to day discrete choices. Discrete choices may be important in some cases, but they may be secondary compared to ongoing acts of the will. Further, the choice to go to the gym every day is still a free-choice however this must be understood in light of the general desire to be fit. The choice to go to the gym therefore shouldn't be seen as a random act of spontaneity which leads the athlete to go to the gym. Rather it should be seen as the natural result of the athlete sustaining his desire to be fit, his knowledge that the means to this end is the gym, and his awareness of the fact that at this particular moment he had planned to go to the gym. Sometimes competing desires come into play and may change what a person wills, but that does not alter my argument here. In summary, one need not accept this picture. I only make it to point out there is no dogma which places an individual choice at the center of free-will. Free-will might be better understood as continuous deliberate intention rather than discrete choices. Again this is not to deny individual choices play a role, only to point out that the role might need to be reinterpreted in light of an alternative understanding of free-will.

IV. CONCLUSIONS

It is exceedingly difficult to define what the "moment of choice" is when discussing free-will. This is true on a biological level, a psychological level, and a philosophical level. There are a number of reasons for this including the fact that defining a moment of choice raises problematic philosophical issues of its own as well as difficulties methodologically. Additionally, free-will is best understood as rational decision making rather than random action. This is because introspectively

we think of free acts in terms of desire and because the main reason for positing free-will, namely to maintain a sense of personal agency and responsibility, is inherently wrapped up with the notion of choices being based on motivations. With these considerations in play, we ought to reject the Libet style free-will experiments because they rely on determining a moment of choice and rely on a notion of free-will which is philosophically untenable and is better understood as random action. My argument does not demonstrate that humans do have free-will, only that Libet style experiments fail to show that we do not. Finally, if further empirical studies are to be done on free-will, these considerations must be taken into account and the results of the studies interpreted in light of these.

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