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Knowing Your Choice Before You Choose

Sabendo sua escolha antes dela ocorrer

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ABSTRACT

In 1980s, neuroscientists joined philosophers and psychologists in the investigation of volitional actions and freedom of will. In a series of experiments pioneered by Benjamin Libet (1985), it was observed that some neural activities correlated with volitional action regularly precedes the conscious will to perform it, which suggests that what appears to be a free action may actually be predetermined by some neural activities, even before the conscious intention to act arises. Shortly after publication of that study, Libet's findings and interpretations were started to be criticized on philosophical and methodological grounds. In this study, the legitimacy of the criticisms directed to Libet's and his successors' experiments is discussed by taking recent neuroscience studies on volition into account and it is argued that these criticisms are not sufficient to eliminate the doubt that these experiments casted on the freedom of the will.

Keywords: Free will, Benjamin Libet, neuroscience, unconscious intentions.

RESUMO

Na década de 1980, os neurocientistas uniram-se a filósofos e psicólogos na investigação das ações volitivas e da liberdade da vontade. Em uma série de experimentos liderados por Benjamin Libet (1985), foi observado que algumas atividades neurais correlacionadas com a ação volitiva regularmente precedem a vontade consciente de realizá-la, o que sugere que o que parece ser uma ação livre pode, na verdade, ser predeterminado por algumas atividades neurais, mesmo antes de surgir a intenção consciente de agir. Logo após a publicação desse estudo, as descobertas e interpretações de Libet começaram a ser criticadas em bases filosóficas e metodológicas. Neste estudo, discute-se a legitimidade das críticas dirigidas aos experimentos de Libet e seus sucessores, levando-se em conta estudos recentes da neurociência sobre a volição e argumenta-se que essas críticas não são suficientes para eliminar a dúvida que esses experimentos lançaram sobre a liberdade da vontade.

Palavras-chave: Livre-arbítrio, Benjamin Libet, neurociência, intenções inconscientes.

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Introduction

Choosing from among the possible options available to an individual is one of the most indispensable human abilities. Individuals tend to assume that these choices are free, at least when they do not investigate the question from a philosophical or scientific perspective. From this point of view, we influence our future, at the very moment we make a deliberate decision.[2] On the other hand, some philosophical and scientific studies threaten this intuitive belief that our choices are free. Determinism is perceived as a threat to freedom of will by incompatibilist thinkers. For an incompatibilist, if our decisions are determined before we make them, it cannot be true that we have genuine alternatives and it cannot be true that we make this decision freely (Van Inwagen, 1978; Ginet, 1996; Kane, 1999).

Benjamin Libet's (1985) seminal work poses a challenge related to determination and causal efficacy of conscious will. Libet's work was based on an experiment in which participants were asked to flex their finger or wrist whenever they want to do so. Meanwhile, using a rotating clock dial the participants noted when they first had the intention to flex, the timing of the actual flex was recoded. Simultaneously, Libet measured the readiness potential (RP)—an electrophysiological event in the supplementary motor area (SMA)—and observed that the RP regularly preceded the participants' awareness of their intention to flex by 200 ms. These findings indicate that there was a physical indication in the brain that the participants would flex their finger even before they were consciously aware of their intention to do so. By challenging the dominant intuition that conscious will is driving power of volitional actions, Libet's work was considered ground-breaking and remains an important reference point. If we consider Libet's research method sound, then it could be concluded that intention is nothing more than the mediator between unconscious neurobiological activity (the cause of any action) and resulting action. It is even possible that conscious intention is only an epiphenomenon, lacking any causal power. On the other hand, acceptance of Libet's findings is not universal; his research methods and his interpretations of the results have been widely criticized.

The present study aims to provide an overview of the current philosophical and scientific literature related to the Libet's work on free will, in an effort to show that Libet's findings present an important obstacle to the libertarians (in the context of metaphysical freedom), who defend that there are genuine alternative possibilities available to people when they make a decision. In each of the following sections a particular objection to relevance of Libet's experiment to free will is presented and discussed, which, in total, will illustrate that the experiment substantially strengthens the view that we do not exercise free will, since we may not really be choosing our actions among from genuine alternative possible actions.

1. Concerns on Measurement and Interpretation of the Gap Between RP and Conscious Will

Before stepping into conceptual discussions on free will, in this section, some remarks about the concerns on the amount and interpretation of the time gap between RP and conscious will, will be made. Such criticisms of Libet center on the fact that given a number of variables involved in his experiment the 200-ms gap between RP and awareness of will might in fact be insignificant (Libet, 1985, p. 539). Such criticism address mainly two possible alternative explanations for 200-ms gap: (1) The amount of time the participants needed to be aware of their will; (2) the amount of time the participants needed to read the clock.[3] Moreover, Daniel. C. Dennett (1991; 2004) and Filippo Tempia (2008) argue that Libet's very interesting finding may be a result of inaccurate perception of the participants about the order of internal events especially when very short periods of time are concerned.[4] These methodological problems become less of a concern over time; since (1) several subsequent experiments dramatically extended the measured time gap between physical markers (such as RP) and conscious awareness of will from the 200 ms noted by Libet to as much as 7-10 seconds (Fried, Mukamel, & Kreiman, 2011; Soon, Brass, Heinze, & Haynes, 2008)[5] and (2) several other experiments support the hypothesis that there are causal relationships between neural states preceding conscious will and conscious will itself (Brasil-Neto, Pascual-Leone, Valls-Solé , Cohen , & Hallett, 1992; Fried, et al., 1991; Desmurget, et al., 2009; Haggard & Eimer, 1999).[6]

2. What Counts as Free Action?

Considering the complexity of human behavior, Libet's decision to base his experiment on the simple and easy to observe/measure behavior of finger/wrist flexion is methodologically wise; however, the very same decision is also a primary reason why Libet's work remains underappreciated. Critics of his work, especially philosophers, question the

[2] For a discussion on the subjective experience of free will and its implications on the problem of free will, see Arıkan Sandıkçıoglu, 2016.

[3] See Wasserman, 1985.

[4] See also Bayne, 2011 and Dominika, et al., 2018.

[5] See also Soon, He, Bode, & Haynes, 2013.

[6] Sohn, Kaelin-Lang and Hallett (2003) were unable to reproduce the results of Brasil-Neto, Pascual-Leone, Valls-Solé, Cohen , & Hallett, 1992.

pertinence of the action measured by Libet to infer daring conclusions on free will. John Searle states that, "(…) the examples used in the study of the readiness potential tend to be rather trivial examples of human behavior" (Searle, 2010, p. 125). Searle suggests that a more appropriate (less trivial) behavior/action for investigation would be (if it were possible to investigate) Churchill's decision in 1940 to continue fighting the Germans. Alfred R. Mele (2009, p. 83) contends that the "trivial" actions measured in readiness potential studies are similar to Buridan scenarios in which participants must choose between two equally attractive alternatives. Bruno G. Breitmeyer similarly does not consider finger/wrist flexion a "meaningful action," given its low cost/benefit function (Libet, 1985, p. 539). He considers the action that Libet studied to be *habitual*, in William James' sense (1950). Searle, Mele and Breitmeyer thusly fundamentally question Libet's philosophical interpretation of his findings based on the claim that the assigned task does not qualify as a valid or at least interesting example of an expression of free will, since finger/wrist flexion does not bring about important differences, under given circumstances.

It is true that in the setting of Libet's experiment, finger/wrist flexion was devoid of any *major* ethical or pragmatic value, and a less controversial version of the experiment would involve a more significant value for the subjects. In the next section, I will suggest a version of Libet's experiment which clearly involves more significant ethical and/or pragmatic value(s), without causing any extra complications affecting the experiment's feasibility and defend that the debates on the ethical/pragmatic significance of studied action can experimentally be settled.

On the other hand, since such an experiment has not yet been conducted,[7] in this section, the subject will be discussed conceptually and theoretically. Even if it is true that finger/writs flexion in the Libet's experiment does not involve *major* values, I defend that the actions in question are associated with *some degree of* ethical and/or pragmatic values. Conscious intentional action in the absence of motive is conceptually impossible, as such actions are performed explicitly to achieve a goal, regardless of the degree of its significance. One then might question what motivation is there to perform finger/wrist flexion and what motivation is there to perform it at a particular time in an experimental setting. As John S. Stamm and Libet indicate, boredom might have been a motive for performing finger/wrist flexion at any time during the allotted time period (Libet, 1985). It's also possible that Libet's participants' motivation for performing finger/wrist flexion had to do with meeting their obligation of being a participant of the experiment and/or they may have just wanted to please the researcher(s). As the participants were deciding when to perform the finger/wrist flexion, let's consider what their internal monologue might have been: "Do I really want to flex now?"; "If I wait a little longer will I have a stronger desire to flex?"; "Am I waiting too long?"; "Should I flex spontaneously?"; Should I choose a time to flex in advance?"; "The previous time I flexed too early, maybe I will flex later this time". These are just a few examples of the possible thoughts' participants might have had in association with Libet's experimental model, and they imply that despite the conclusions of Libet's critics, a simple finger/wrist flexion, in fact, may involve some degree of ethical and/or pragmatic value.[8]

Another weakness of standard Libet-style experiments is about the number of repetitions the participants need to do. In order to gather enough neural data, participants need to do the same task many times and this might be causing them to start making decisions automatically without being mentally and emotionally involved in the task. So even if the actions being studied involve a degree of ethical and/or pragmatic value, this value induces less and less mental/emotional response from the participants, after doing excessive repetitions. This is a fair concern and I believe that the experimental paradigm that I will present in the next section will not be suffering from this concern as much as most current studies do. On the other hand, even if I agree that the small amount of ethical/pragmatic value(s) involved in Libet-style experiments would induce even smaller mental/emotional involvement after many repetitions; for the reasons mentioned above, I defend that there should be a degree of mental/emotional involvement. Boredom and responsibility to complete the task could become the main motives after many repetitions; however, these motives too are related to ethical/pragmatic values.

Important or trivial all decisions share a few characteristics: They are conscious and they are made in an effort to reach an important or unimportant goal throughout a probabilistic or deterministic interaction with the environment. Lower-order, less significant decisions are not qualitatively different from higher-order, more substantial decisions, in that respect. No matter how relatively significant or insignificant it may be, it is conceptually necessary that they involve some subjective pragmatic/ethical value; otherwise, we would have no reason to choose.

Bridgeman raises another criticism to Libet: For Bridgeman actions of the participants in the experiment were not a consequence of free choice, since the participants were told by

[7] In the last few years, abstract choices of human beings and pragmatic choices of monkeys are started to be investigated, in addition to the motor actions (Soon, He, Bode, & Haynes, 2013; Maoz, et al., 2013). The results show that unconscious brain activity regularly precedes higher-level abstract decisions of this sort too.

[8] Libet and colleagues (1983, p. 625) instructed participants of the experiment "(…) to let the urge to act appear on its own at any time without any preplanning or concentration on when to act". This may seem to some readers to be a reason why the participants would not have some of the monologues. On the other hand, I believe, you cannot eliminate all these thoughts by instructing participants. Flexing your finger at a particular moment rather than other moments without any reason, seems quite unlikely. For a discussion on the question whether the actions studied in Libet-style experiments fall within the scope of free will, see Bayne, 2011.

the experimenter to act within certain boundaries (Libet, 1985, p. 540). Obviously, there are certain restrictions under which the participants made their choices; however, Bridgeman's point is not quite as simple as it appears, because no matter what intentional action is considered, an individual must necessarily act under some limitations (i.e. social norms, abilities, laws of physics). Therefore, an action's being performed under certain limitations, does not show that it is not a pertinent action to investigate free choices. In Libet's case of deciding when to perform finger/wrist flexion, the participants were limited by the experimental protocol while they were also had alternatives to select the time to flex. Searle's example of Churchill's decision to continue fighting the Germans, which Bridgeman himself would consider to be a legitimate instance of a free decision, was also subjected to limitations—economic, military, and political. Every decision is associated with some limiting factors that may or may not be a result of the individual's earlier decisions, but despite the fact that such factors limit the number of alternative actions, they do not determine choice *per se*. That is precisely why we refer to this activity as deciding; conceptually speaking, decisions require not infinite, but at least two possible alternatives. Since Libet's participants did have numerous alternatives for the timing of finger/wrist flexion, I insist that the experiments are relevant to free will in a philosophical sense. If deciding when to perform finger/wrist flexion and continuing to fight the Germans during WWII are claimed to be substantially different types of decisions, then a clear *qualitative* difference must be shown.

Last but not least, Libet's participants believed that they chose their action freely; "Subjects reported that they were aware of the urge or intention to move before every act in the series; that is, the acts were not automatic or involuntary 'tics'" (Libet, 1985, p. 532). Even if used only to challenge the participants' belief that they chose to perform the action freely, Libet's finding is extremely interesting and remains relevant to the question of free will.[9]

3. A Methodological Suggestion to Study Ethically/Pragmatically More Significant Actions

In line with the critics discussed in the previous section, Libet has pointed some difficulties associated with studying free will experimentally:

> *There are several concerns about the significance of the act we studied, a spontaneously initiated quick flexion of fingers or wrist, in relation to voluntary actions in general (Breitmeyer, Bridgeman, Danto, Jung, Latto). We wanted our measurements of relative timings (for the onsets of RP and W) to be quantitative and operationally definable, without reliance on intuitive impressions or speculations. Such an objective is much more difficult, if not impossible, to achieve with any of the more common voluntary actions recommended by the commentators for study (Libet, 1985, p. 562).*

Libet may seem right in that it is difficult to conduct an experiment in which ethically and pragmatically more significant actions are observed; however, this drawback of Libet's experimental model, in my opinion, can be avoided. While it is common for psychologists and economists to study ethical and pragmatic human behavior using prisoner's dilemma (PD) scenarios, to the best of my knowledge, PD scenarios have not been used in experiments studying free will, up to the date.

PD scenarios are simple game theoretic situations involving two individuals making ethically/pragmatically significant decisions. An example payoff matrix could be as shown in the Table.

In this PD scenario, two participants are trying to earn some money in an interactive game. Each participant chooses their action not knowing what the other will do. If both of the participants choose to cooperate by pressing button 1, they each get $10. If (only) one of the participants betrays the other by pressing button 2, the defector receives $15, whereas the other gets nothing. Finally, if both participants choose to defect, they each get $5. As the only *Nash equilibrium* of this payoff matrix (mutual defection) is not *pareto optimal*, playing an iterative version of this game optimally (with respect to total payoff) requires coordination and trust between two parties. The interesting aspect of PD can also be formulated as follows: While no matter what other player chooses, betrayal of each opponent is more profitable for themselves; mutual betrayal is not as profitable as mutual cooperation. Noting that there are Libet-style experiments that provide participants the freedom to choose between two possible actions (Sohn, Kaelin-Lang, & Hallett, 2003; Haggard & Eimer, 1999), PD scenarios can be

Table. Payoff matrix for PD scenario.

Participant 1/Participant 2	Button 1 (Cooperation)	Button 2 (Defection)
Button 1 (Cooperation)	$10, $10	$0, $15
Button 2 (Defection)	$15, $0	$5, $5

[9] See also Libet, 2003 and Bayne, 2011.

used in the future studies. By associating the choice between cooperation and defection (or betrayal) to two buttons, studying ethically/pragmatically more significant actions would be as easy as studying a finger flexion.

Another advantage of this experimental paradigm is that it is more likely to keep the participant's mental/emotional involvement in the task stronger after many repetitions. If ethical/pragmatic aspect of a PD scenario is presented to the participants, rewards and payoff matrix involved in the PD game are adjusted throughout iterative games properly, this may induce the participants to get involved more in their decisions.[10]

Such an experiment would test the hypothesis that decisions with a significant ethical and/or pragmatic value is predictable by neural activity preceding the conscious will. These experiments would not only contribute to the neuroscience of free will, but also have the potential to answer some questions, contribute to existing debates and give rise to new questions in the field of philosophy of freedom.

4. Causal Relationships Implied by Libet's Experiment

Libet's or his successor's studies do not show that RP or any other unconscious neural activity determines conscious will, since the relationships found in these studies are not deterministic. They only suggest that there are significant correlations between unconscious neural activities and conscious will (Fischborn, 2016). However, considering the computational complexity of the brain, it is not surprising at all that relationships found in these studies are not deterministic or do not imply neurological determinism. After all, there are approximately 100 billion neurons in a human brain and our brain imaging methods are quite limited with respect to spatial and temporal resolution (Herculano-Houzel, 2009; Menon, Gati, Goodyear, Luknowsky, & Thomas, 1998; Kim, Richer, & Uğurbil, 1997). Perhaps, neuroscience will not reveal causal relationships between unconscious neural activities and conscious will precisely, without methodological revolutions. However, significant correlations found in such a complex system (nervous system), with limited measurement and computational tools, in my opinion, shades doubt on the idea that conscious will is at least partly independent contributor of volitional actions.

Although there are supporting findings (Fried, Mukamel, & Kreiman, 2011), Libet's experiment does not unequivocally show that the RP is a cause of conscious intention. Mele, (2009), Robert W. Doty (Libet, 1985, p. 542), Tim Bayne (2011), Hans Radder and Gerben Meynen (2012) argue that probably RP is not a cause of conscious intention.[11] Radder and Meynen give important philosophical insight why data collected in Libet-style experiments does not show that RP is a cause of free decisions and actions; however, there are a few points to discuss in their claims:

> *Even if we could establish a strong correlation between individual RPs and Ws, this fact alone would not be enough for drawing the relevant conclusions. After all, the singing of early birds (who start before sunrise) is strongly correlated with, but definitely does not initiate, the rising of the sun (Radder & Meynen, 2012, p. 12).*

It is definitely true that singing of early birds does not initiate the rising of the sun; however, it is highly likely that two events have causal relationships, since there is a consistent and non-accidental correlation. Actually, there is a relationship between early singing behavior of birds and the amount of light they perceive from the environment (Montgomerie & Doucet, 2007, pp. 183-184). Needless to say, the very same event, namely relative movement of the Earth and the Sun causes both increases in the amount of light the birds perceive and sunrise. That is to say this relative movement is the common cause of both early singing behavior of birds and rising of the Sun.

In the same way, in my opinion, the correlation between RP and conscious intention suggests that they are causally linked in a way that has yet to be discerned. In other words, RP may not be a cause or the cause of conscious will as Alexander and colleagues (2015) defend; but it is likely that RP is causally related to conscious will in one way or another: To illustrate, RP and conscious intention might have a common cause, or RP might be a mediatory cause which only partly contributes to conscious will. Regardless of how one thinks about the link between RP and conscious intention, Libet's and his successors' findings suggest that there is a significant causal link between the two events.[12] This likelihood threatens the idea that when we consciously intend to do something, we actively influence on the future course of our actions.

Libet (1985), Haggard (2005), Roediger et al. (2008), and Shariff et al. (2008) think that if there is a neural event (N) regularly preceding an action (A) and associated conscious will (W), then W cannot be the cause of A. This notion is understandable, as N determines A before W comes into existence; however, Mele, states that this reasoning is faulty:

> *The point to be noticed here is that from the datum that some "neural events leading up to the movement" begin before*

[10] Avoiding some of the experimental restrictions may also be used as a means to avoid automatic responses. For an experimental paradigm in which participants decide whether or not to follow the instruction see Salvaris & Haggard, 2014.

[11] For another study on the causal status or RP in volitional actions see Keller & Heckhausen, 1990.

[12] For a discussion on the causal status of conscious will, see Wegner & Wheater, 1999; Wegner, 2003 and Alexander, et al., 2015.

> *a conscious proximal intention emerges, one cannot legitimately infer that any of the following play no role in producing the movement: the acquisition of the proximal intention, the agent's consciousness of the intention, or the physical correlates of either of these items. After all, when lighting a fuse precedes the burning of the fuse, which in turn precedes a firecracker exploding, we do not infer that the burning of the fuse plays no causal role in producing the explosion (Mele, 2009, p. 71).*

Mele is right in that the (neural activity underlying) conscious will[13] may be a mediatory cause of action that is caused by unconscious neural events; however, even if the conscious will is a mediatory cause of performed action, this does not help the existence of free will in a philosophically significant sense. Note that in such a scenario, (assuming that future studies would find deterministic relationships between conscious will and previous unconscious neural activity) conscious will, which is determined by unconscious events, determines the action, which implies that the unconscious action determines the action by transitivity. Even if a conscious will, which is determined by unconscious events, causes an action, the action determined by unconscious events cannot be chosen freely, as we have no control over the unconscious neural activity determining the will and as a result the action.

Taking conscious will as a mediatory cause which is determined by some unconscious event reminds one the thought experiments on mind control. Assume that a crazy neuroscientist, Jane, remotely controls the neural mechanism underlying her husband's (John) conscious will by using a device she installed into his brain. She cannot make John sit down or stand up involuntarily, because her device does not let her determine John's motor actions directly. What she can do, on the other hand, is to make John want to sit down and John's brain does the rest for her. To illustrate, using her device she makes John intensely desire to buy a red rose for herself: In such a case, John does what he (and Jane) wants, if there is no physical reason preventing him from buying a rose. When she wants him to walk out of or come back to the house, she does not (and cannot) determine John's motor actions, but modifies his conscious will accordingly. In such cases, John's conscious will (determined by Jane) is a mediatory cause of his actions; but still, it seems unreasonable to claim that his actions are caused by his free will, since his will is determined by something over which he has no control. This is the reason why if our conscious will is determined by some unconscious events over which we have no control, our conscious will's being the cause of our actions does not help to save freedom.

5. Possibility of Vetoing the Intended Action

Libet's (1985; 1999; 2003) studies suggests that there is a possibility of vetoing a preplanned action as late as milliseconds before the action is performed, given that individual wants to do so. Doty's (Libet, 1985, p. 542) and Fred Vollmer's (2001) key solution to the problem of freedom lies in this possibility. According to this view, the act of conscious vetoing is a lifesaver for freedom, which could be considered to be in agreement with the libertarian principle of alternative possibilities, as, in a way, it embraces the possibility that an individual could do otherwise if s/he wants to (Kane, 1999; Kane, 1996; Kane, 1989; Ginet, 1996; Van Inwagen, 1983). On the other hand, even if there are some limitations with their study, Elisa Filevich , Simone Kühn and Patrick Haggard's (2013) findings suggest that there are actually neural precursors of decisions whether or not to veto a previously made decision.[14] Ockham's razor also implies that conscious vetoing should be expected to be dependent on physical activity rather than being independent of it. If the initial intention to move is dependent on physical events, then the subsequent intention to veto or confirm the initial intention should also be determined by physical events. If this is not the case, two separate theories of conscious intention are required to explain initial intention and later intention to veto. That is to say, despite the fact that possibility of vetoing the predetermined action independent of prior neural activity is logically possible, I argue that it is not likely due to its ***ad hoc*** nature.[15]

6. The Unconscious Intention to Act

The proposed existence of unconscious intentions is another hypothesis that, if proven to be true, may protect the free will from implications of Libet's findings. Arthur C. Danto thinks that consciousness is not a necessary condition for freedom (Libet, 1985, p. 541). Mele, defending a similar position quoting Anthony Marcel: "Oddly, many psychologists seem to assume that intentions are by their nature conscious (as cited in Mele, 2009)."[16] If Danto, Mele,

[13] This paper does not hold a dualistic view and assumes that every mental state including conscious will, unconscious intentions, and so on, supervene upon physical. Therefore, whenever it is stated that a mental state is a cause of an action or event, in this paper, it should be understood as the physical events underlying that mental state is the cause of that action or event.

[14] The time interval during which an individual is able to veto a previous intention is as short as 100-200 ms, rendering its experimental observation difficult (Schultze-Kraft, et al., 2016; Schurger, Sitt, & Dehaene, 2012; Libet, 1999; 1985).

[15] Haggard (2008; 2005) provides a detailed scientific and philosophical analysis of the thesis that conscious vetoing is a result of physical activity in the nervous system.

and Marcel are correct in that intentions do not need to be conscious, then it is possible that an unconscious intention precedes and causes the RP before the conscious intention to act arises. Note that Danto, Mele, and Marcel's hypothesis that there are unconscious intentions seems to be in agreement with Hubert and Stuart Dreyfus's studies on skillful coping (Radman, 2012; Dreyfus & Dreyfus, 1980; 2000). Danto exemplifies allegedly free actions without conscious deliberation between alternatives: "A slow-motion film of Matisse shows the artist making countless decisions with his fingers that at normal speed looks like a single confident chalk stroke defining the edge of a leaf" (Libet, 1985, p. 541). Mele, one of the most well-known proponents of unconscious intentions, provides another example, which seems in agreement with those of Danto and the Dreyfuses:

> *When I intentionally unlocked my office door this morning, I intended to unlock it. But since I am in the habit of unlocking my door in the morning and conditions this morning were normal, nothing called for a decision to unlock it. The requirements for deciding are stronger than those for intending (Mele, 1992, p. 231).*

There are certainly unconscious behaviors that serve for a purpose. We do not consciously decide how far forward we should put our foot in order to stay balanced while walking, nor does a playmaker necessarily make a conscious decision about the angle she should throw the basketball to deliver it to a teammate. On the other hand, contrary to claims of these critics of Libet, it is not clear that such habitual unconscious behaviors that serve for a purpose are legitimate examples of intentional action.[17] First, it can be defended that Mele's, Danto's and the Dreyfuses' conception of unconscious intention is self-contradictory, on the premise (which I hold) that intention requires deliberation and deliberation requires consciousness. Frederick A. Siegler (1967, p. 258) writes "(…) a person cannot be unaware of his intention."[18] For this view in Mele's example of allegedly unconscious intention, before he unlocked the door he might have well (consciously) decided (for the reasons he is aware of) to *get into his room*. If so, *getting into the room* is definitely intentional; but since he did not consciously decide to unlock the door, he did not unconsciously *intend* to *unlock the door*. Even if Mele does not accept the premise that all intentions require deliberation, there is another question he and proponents of unconscious intentions need to account for: What is the (introspective) evidence that such unconscious intentions exist at all? In other words, how does one figure out that s/he *unconsciously* intended to act in a certain way? One may well be aware of the outcome action resulting from the unconscious intention, yet, by definition, s/he cannot be aware of the *unconscious* intention. To put it more concretely, why would Mele think that he *unconsciously* intended to unlock the door, even if he does not have a memory of deliberating or deciding to unlock it? Apparently, Mele might not have been aware that he intended to open the door while he was *unconsciously* intending to do so. However, at some point after unlocking the door, because he was aware that he did, in fact, unlock the door, which is not a tic or reflex and which serves for a purpose of him, he decides that he must have *unconsciously* intended to perform it. Only evidence that supports the idea that the unconscious behavior under consideration is intentional is that it serves for a purpose; however, a behavior's serving for a purpose does not guarantee that it is intentional. Intentional actions and behaviors serving for a purpose are not one and the same thing. A person's heart's beating or a toy robot's changing direction when it encounters an obstacle serves for a purpose; yet, these behaviors are obviously not intentional. Assuming that deliberation is a necessary condition for intentions, it can be claimed that in Mele's case, the behavior of *unlocking the door* is not caused by an intention but a tendency: After gaining many experiences about locked doors and particularly his office door, perhaps, Mele's nervous system developed an unconscious tendency to unlock his door whenever he consciously intends to get into his room. After all, *unlocking the door* is a necessary subtask of the task of *getting into his office room*.

Catherine Raeff (2017) also defends that Libet's experiment does not show that we are not free, in a similar way with Mele:

> *[F]rom a systems perspective, non-conscious aspects of action cannot be isolated from the wider whole of which they are parts, and sometimes, the wider whole of which non-conscious aspects of action are parts is a form of free action. The non-conscious activity does not occur in isolation, but takes on meaning within the wider whole of free action. As such, it does not necessarily mean that the person is not acting freely, but rather that non-conscious activity is integrated into free action. For example, in some cases, voting involves pulling a lever or placing a ballot into a box. A person may have deliberated and decided whom to vote for, and thus he/she is engaging in free action when voting. However, pulling the lever or folding the ballot before putting it in the ballot box may occur quite*

[16] A similar position is advocated in Dreyfus, 2000.

[17] For comprehensive discussions on unconscious intentions and skill acquisition see Dreyfus & Dreyfus, 1980; Dreyfus & Dreyfus, 2000; Dreyfus H. L., Responses, 2000 and Freeman, 2001.

[18] Even if they do not directly discuss coherency of unconscious intentions, see Davidson, 2001 and Carrier, 1986; which discuss the relationship between intentional actions and subjective reasons to act in a certain way. See also Bayne, 2011 and Deecke, 2012.

> *non-consciously, as the person does not explicitly decide to move his/her arm towards the lever, or explicitly decide to curl his/her fingers around the paper ballot in order to fold it. One could argue that the wider free action of voting is possible in part because a person does not have to be aware of and make conscious decisions about curling his/her fingers (Raeff, 2017, pp. 17-18).*

The fact that a person has unconsciously performed a series of motor actions during the voting process, undoubtedly does not indicate that voting is not free; however, the behavior of "pulling the lever or folding the ballot before putting it in the ballot box" should indeed be analyzed separately from the wider act of voting. It is my position that in Raeff's case, even if the act of voting for a particular person is intentional, the subsidiary unconscious behaviors like reaching the lever are not. Note also that in Libet's experiment, timing of the finger flexion is not a subsidiary action or choice, but is the decision to be consciously deliberated on.

As it is stated above, I defend that there is no evidence supporting the hypothesis that there are unconscious intentions; however, let's for the sake of argument, assume that we have two kinds of intentions: unconscious ones and conscious ones. What characteristics do conscious and unconscious intentions have in common? As unconscious intentions are not observable introspectively, the only thing we can conclude they have in common is that they both result in an observable action. Unlike conscious ones, unconscious intentions are not accompanied by a direct conscious deliberation. What is more, evolution (learning/unlearning) of unconscious intentions of a person is substantially different than that of conscious intentions. Evolution of a person's conscious intentions typically involve a conscious evaluation of the outcomes of past decisions. After making some bad decisions on a subject, let's say romantic relationships, we hopefully give a break and think on our behavioral pattern thoroughly. And after building some opinions about the possible reason why we fail in relationships, we make a conscious decision to change our future conscious decisions to have better relationships. Or after making bad decisions in stock market, we reanalyze our past decisions to have better judgements in our later options. Evolution of so-called unconscious intentions, on the other hand, is quite different: Neither Mele's unconscious decision to unlock the door, nor artist's making countless unconscious decisions(?) with his fingers (in Danto's example) changes as a result of conscious analyses as straightforward as conscious decisions does. You need some experience on painting to build a skill/habit to paint properly and you cannot change your painting skills/habits simply by a conscious evaluation. The same is true for Mele's habit to unlock his door. If Mele's locking system is replaced by a key card system, regardless of his conscious will, his so called unconscious intentional actions may fail him for a while. If he does not start directing his awareness to the task of unlocking the door, he may find himself reaching his pocket as if he needs his old regular key, instead of using the key card in his wallet. In such a case, he would need some time and practice to develop new habits, in order to successfully unlock the new system. In adaptation period, neither Mele, nor the artist can suddenly change their habit by a conscious decision on the subject. What they need is practice.

Consequently, these so called *unconscious intentions*, whatever they might be, are quite different in kind than conscious intentions as buying a new car (after considering the possible outcomes of the action) and their position in the philosophical discussion of freedom needs to be reevaluated.

Furthermore, even if such unconscious purposeful behaviors are to be considered intentional for conceptual reasons, they are not free actions, as it will be demonstrated in the following thought experiment: Let's say that Megan's father has had a heart attack and she is urgently driving to the hospital to see him. Naturally, she is not consciously thinking about the condition of the road, when to shift gears, or the speed limit; but she is successfully coping with these details unconsciously. Now, are countless unconscious behaviors performed while driving freely chosen or intentional? Or are they just preprogrammed purposeful behaviors? In order to answer the question, let's further assume that the hospital is very close to Meghan's office, and that because she normally drives to her office on the same road used to get to the hospital, thinking about her father's condition, she turns onto the wrong street and drives toward her office rather than the hospital, until she recognizes that she took the wrong turn. As a result, she wastes some time in an emergency situation. Now, in this instance did she choose to drive towards her office instead of the hospital and if she did was it a free choice? In other words, did Megan choose to lose some time on the road towards her office and reach the hospital later than she could? Freedom and responsibility require being aware of the possible outcomes of performed actions but unconscious behaviors do not satisfy this requirement. When Megan mistakenly turned towards her office instead of the hospital, she clearly was not aware of the consequences of her behaviors. At that moment, she was not even aware that she had any choices, but ***skillfully*** (in Dreyfus's sense), though mistakenly, drove towards her office under the direction of her unconscious neural activities. By not consciously attending to the road, her "choices" were relinquished to her unconscious nervous system, which safely accomplishes the task of driving in the lack of contribution of conscious abilities. There was no deliberation and she was not aware of the outcomes of her possible behaviors. Taking the wrong turn was not a choice and clearly not a *free* choice. Unconscious behaviors and so-called unconscious intentions are not caused by free will, since the agents are not aware of consequences of their unconscious behaviors while they perform them. Despite his endeavor to reconcile free will with Libet's experiment, Gilberto Gomes also notes that only actions that are decided and intended consciously "should be considered as really free" (1999, p. 75).

On the other hand, Gomes (1999; 2007) suggests a promising conceptual analysis of free will to reconcile Libet's experiment with freedom. He defends that even if certain un-

conscious neural activities determine conscious self to make a choice, since these neural activities are parts of the workings of the *self* (or "*I*"), it can be said that it is the *self* (*I*) who makes the decision. In this view, even if it is/were true that RP determines an individual's decisions, since RP is a part of the workings of the self, it can still be said that it is the self who makes the decision. Gomes' analysis is promising to clarify certain conceptual problems about free will, however, I do not agree with his conclusion on the problem of free will, because I hold the view that *unconscious* brain activities should not be taken as parts of the self (I). In the case of Libet-style experiments, these neural precursors of conscious will are observed significantly earlier (in some experiments 7 to 10 seconds) than conscious will, which suggests that they are not parts of the conscious will. That is why, in my view, they are not likely to be parts of self either. Therefore, if the premise that self refers to brain activity corresponding to only conscious processes is held (as I do), the experimental findings of Libet and his successors pose a challenge to free will: if the self and its decisions are determined by neural activities which are not accompanied by consciousness, then the self is determined to do what it does, because of something external, namely unconscious neural precursors of it.

Please note also that there is no reason to believe that in Libet's experiment, participants' intentions to flex their finger/wrist were unconscious. As it is stated above, the action of flexion at a desired time was not a subsidiary action but *the* action to make a conscious decision about and unconscious neural activity did precede this particular action consciously chosen among from multiple alternatives. The participants reported that they consciously performed the action. This type of action is fundamentally different than Megan taking the wrong turn. Megan turning the wrong way was an unconscious automatic response to the circumstances she was in, while her attention was directed to condition of her father.

In this section, dedicated to (so called) unconscious intentions, four objections to Libet's critics have been raised: First, it is argued that unconscious intention can be defended to be a self-contradictory concept, on the premises that intention requires deliberation and deliberation requires awareness. Second, it is claimed that whatever these unconscious intentions are, they are not observable or falsifiable. What is more, even if the existence of such unconscious intentions is accepted for conceptual reasons, they are not caused by free will and not relevant to the problem of free will and responsibility. And finally, there is no reason to believe that in Libet's experiment, the participant's choice of timing was unconsciously intended; actually, the participants reported that they consciously intended to flex their finger/wrist at a particular time.

Conclusion

Libet's contribution to the study of free will continues to influence the philosophical debate on free will—and rightly so. One of the most prominent philosophical objections to Libet's and follow up studies is that the actions studied in the experiments involve little in the way of ethical and/or pragmatic value. In this paper, it is defended that all voluntary actions involving a conscious consideration have ethical and/or pragmatic value from the perspective of the subject. Otherwise, the subject would have no motivation to act or at least to deliberate. In the same vain, finger/wrist flexion, as used in Libet's experimental model, has ethical and/or pragmatic value(s); therefore, there is no reason justifying that his findings cannot be applied to other voluntary actions. In other words, the difference in degree of the ethical and/or pragmatic value between any two actions does not constitute a qualitative difference making them different in kinds.

Nonetheless, additional research based on actions with a greater degree of ethical and/or pragmatic value than simple finger/wrist flexion would undoubtedly contribute to the debate on free will. The experiment described in the section 3, which is based on a prisoner dilemma scenario, is an example of how to use an action as simple as finger/wrist flexion, but with an obviously higher degree of ethical and/or pragmatic value, to study free will in a laboratory setting.

The thesis that unconscious intentions precede both conscious will and RP is appealing to some philosophers. If they are right, unconscious intentions or neural activities underlying it could be the driving force for the actions studied in the Libet's and his successors' experiments; however, it is argued in this paper that the concept of "unconscious intention" is self-contradictory and existence of such intentions is not experimentally grounded. Moreover, actions resulting from so called unconscious intentions fail to satisfy certain criteria for freedom of the will: Since they are unconscious by definition, subjects are not aware of their consequences and do not possess any control over them. Both being aware of the consequences of choices and having control over the choices (and resulting action) seem to be necessary conditions of freedom.

The ability to consciously veto an action, which Libet concedes to exist, in consideration of its *ad hoc* nature, does not help free will either. After RP is produced and conscious intention has arisen, individuals can decide not to perform the action; however, this does not exclude the possibility that such vetoing is neurologically predetermined, as was the initial will to perform the action. There is an experimental study suggesting that decisions whether or not to veto an action also have neural precursors (Filevich, Kühn, & Haggard, 2013).

Libet's and his followers' findings are strong evidences that support physicalism and anti-libertarianism. As there is a physical state consistently preceding conscious will, I agree with the abduction that there is a physical cause for the conscious will and neural events underlying it. Libet's experimental findings have implications beyond the metaphysical assumption that every event, including mental events, are caused by physical. When we choose an action to perform, we intuitively believe that from among the alternative possible actions, the action we do perform is (at least partly) determined at that very moment it is consciously chosen. Libet's experiment and subsequent studies decrease the credibility of this very intuitive assump-

tion, which is of particular importance to libertarian (metaphysically) philosophers. Time gap between the precursors of conscious will and conscious will itself makes it harder to construct a libertarian concept of freedom, which would reconcile with the Libet-style experiments.

Perhaps, the conscious will is not as important for determining what actions we perform as is commonly thought, but is no more than a neurologically predetermined (in a broad sense), mediating cause of the actions we think we choose to do.

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