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**RETHINKING ABOUT FREE WILL AFTER THE COMING OF  
NEUROSCIENCE: IS IT WELL-GROUNDED FEAR?**

Before the coming of brain science, the problem of free will was investigated by conceptual analysis and theoretical assumptions. But these speculations weren't borne out of the facts. The possibility of experimental evidence about those questions did not exist yet. Since our knowledge about human nature is also the result of studies in the neuroscience field, the way of facing many conceptual questions considerably changed. Now the philosophers too have to face the naturalistic-reductionist perspective of the world. From this viewpoint all concepts need to be included into the natural science ontology. So if you can't include a notion in this field, it means that it is an irreducible concept and, for this reason, you have to eliminate it. According with this perspective, the discussion about the problem of free will includes also an account of neuroscientific investigations that are made to discover what happens in our brain when we are making a decision.

Since Benjamin Libet made his first experiments about conscious actions, the intuition about our freedom was called into question. The idea of people as free decision makers was attacked by several studies suggesting the illusion of free will. So, the common sense intuition of free will isn't up to date any more and, perhaps, it's going to be revised or even eliminated, as well as closely moral responsibility concept. In fact the fear about the end of free will notion is linked with the concern

about the concept of moral responsibility: we usually look at people as moral responsible, only if we believe in freedom of their actions. If neuroscience proves that performed actions are out of our control, this means that we can't keep considering ourselves as free and moral responsible agents because our neural processes, without our free volition, make the decisions. It's nevertheless too early to declare the end of free will and moral responsibility: these neuroscientific investigations are criticized because of methodological and conceptual problems. Although those whom supporting this neuroscientific perspective above all, think that the discussion about free will is settled, the debate is still open. It's worthwhile highlighting that the free will question is actually very complex. It needs not only philosophical and neuroscientific research, but also studies from humanities and social science. Even though neuroscience show that we are not free, we don't know our possible reaction, we can't imagine our hypothetical ways to face the new reality and the relationship with others. Someone, like Saul Smilansky (2002), thinks that, if we will stop to believe in free will, we could give up our moral behavior. On the other side there is someone, like Peter F. Strawson (1962), who thinks that discovering the illusion of freedom, won't have any consequences in our way of living and thinking about ourselves as free and responsible from a moral point of view.

It's a given that nowadays we can't discuss about free will without considering the neuroscientific perspective. But we need to play the question safe, to avoid a

conjectural apocalyptic view of the future world, with neither freedom or moral responsibility.

### **Experimental investigations**

In the naturalistic-reductionist perspective of free will notion, Libet's pioneering experimental investigations about the connection between conscious decisions and underlying neural processes are actually crucial: in fact they mark a turning point in conceptualizing the issue. It was the first time neuroscientific research was involved in philosophical debate about free will.

During his investigations, Libet asked subjects to perform a basic action, like a movement of the wrist or finger. This action had to be performed in a totally free way: subjects didn't think about decision making, they had to move only when they felt the urge to do it. At the same time they looked at a special, really precise, clock. So they could remember the precise moment of the intention, that is the moment when they decided to move, according with the position of the clock pointer. They had to tell experimenter this record at the end of the task. This was the system to estimate the moment in which awareness aroused, compared to the motor action. At the same time electrical brain activity was measured at their scalp surface. It turned out that the time of intention typically precedes the movement by approximately 200 milliseconds. Nothing weird, 200 milliseconds is a due period of time for putting to use a movement. Unexpected was the recording of an evoked potential (the readiness

potential, or RP) by the electroencephalogram. This activity preceded the awareness of intention by approximately 350 milliseconds, and, so, also preceded the motor activity by about 550 milliseconds. According to Libet's interpretation of data, considering that the beginning of the process leading to perform a free action starts unconsciously in the brain, by 350 milliseconds before the awareness coming, this means that the decision-making is not due to subject's volition, but depends on neural unconscious processes. This, in Libet's interpretation, means also that we can't go on thinking about our decisions as free deliberations, because the real decision maker is the brain. Thus, free will does exist no more, at least in the common sense meaning. This account of neural processes coming before our awareness poses a real challenge to our common sense intuitions about our own autonomy, leading us to believe that free will is actually just an illusion. Although Libet poses a challenge to common concept of free will, he also attempts to save human freedom. In fact he holds that we have veto power over our automatically generated actions. During that 200 milliseconds between awareness and the motor action we can abort the movement and, so, we can be the ultimate free decision-maker of the action. Actually this is not free will, rather it is free veto or, as called by Libet, *free won't*. The start of a decision lies in our neural processes, but it is our consciousness the real decision-maker (Libet, 2004).

Libet's investigations are most assuredly of great importance in analysis of the free will problem, also because his studies have paved the way to other experimental

investigations about this topic. But it would be premature to think that these findings unequivocally show the end of the common free will notion.

Although Libet's studies are really important for the study of the relation between action and awareness, those who hold that his findings are less important in the free will debate made several objections. A well-known remark to Libet's interpretation comes from Daniel Dennett. According to Dennett, Libet's interpretation leaves us to think that consciousness is only an observer looking at what happens in our mind: as if consciousness lays in some place of the brain waiting to know what others parts of brain are doing. This is, according to Dennett, an erroneous interpretation, corrupted by an outdated dualistic conception of consciousness. In his opinion, Libet didn't show that consciousness is late compared to decision-making, but just that conscious decisions need such a time to be made. (Dennett, 2004). Also Mario De Caro makes some methodological objections to Libet's discovery: he maintains that there are some perplexities about the evaluation criteria about subjective timing of consciousness and, above all, about the correlation between timing measurement and objective timing of neural processes measured by technical equipment. Moreover, another question exposes Libet to attacks. During his experiments Libet registered the moment in which the subjects were aware of their urge to move. Here the problem is just about the word *urge*: we can't consider the action led up to urge as typical of the whole class of free actions. The urge is not a necessary condition for voluntary actions and neither a sufficient one. During our lives we often perform free actions as

the effect of a long deliberation, rather than a urge. At the same way we often perform action caused by urge that we can't call free, like sneezing. So we can't use the account of impulsive actions as a typical example of free action and, above all, we need to pay attention in drawing conclusions about free will based on this wrong assumption (De Caro, 2009). The same opinion is held up by Alfred Mele: he thinks that it's not the case of filling us with enthusiasm and neither worrying about Libet's findings about the urge to move as preceded by unconscious processes. In fact feeling the urge to move doesn't mean necessary to perform a free action (Mele, 2007). Another critical remark is about the first moment the subjects make their decisions. Before sitting in front of the clock to perform the task, subjects have to make an important decision: that, as a part of the experimental task. According to many researchers this is an important moment in the whole decisional causal chain that will lead to the final motor action of the wrist or finger. But Libet's interpretation doesn't take this moment in account and considers decisional process as a chain of events that, maybe, started before the performance in the experimental task (De Caro, 2009).

In line with Libet's investigations, Soon *et al.* recently made another experiment that leads to more drastic conclusions (2008). In this case the action performed by the experimental subjects had two possible choices: pushing the button under right index finger, or pushing the button under left index finger. Subjects had to act in absolutely freedom, just when they felt the urge to do so, as well in Libet's task. The experimental room was settled in this way: the subjects sat in front of a monitor,

while a series of alphabetical letters turned up on the screen. They should remember the letter presented when their motor decision was consciously made. So, at the end of the task, they could tell researchers what letter was on the screen at the precise moment of the decision. Their brain activity was measured using functional magnetic resonance imaging (fMRI). It turned out that, alike in Libet's experiment, the subjects felt awareness of the action's intention only after the brain activity. Also in this study the brain looks like the decision maker while our intuition of free volition appears to be just an illusion. An interesting aspect of this research is about the time span between brain activity and entering awareness. Soon *et al.* claim that the outcome of the decision can be encoded in brain activity up to ten seconds before it enters awareness (Soon *et al.*, 2008). It's worthwhile noting that ten seconds is a very long period speaking about brain activity timing. This experiment was planned in order to guard them against the same remarks made to Libet. An important difference is the technical equipment used by Soon compared to Libet's one. Soon, in fact use fMRI because he judges it better in measuring brain timing than the electroencephalogram used by Libet, with also a better spatial resolution. Another difference is about how the system estimates the moment in which awareness enters. In the Libet's task there was a clock, so the subjects could have systematic preference about the position of the clock's hand. That is, they could decide to move when the pointer of the clock was indicating a particular time. With the use of a monitor and alphabetical letters this was no more possible. A randomized succession of letters made impossible any

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prevision about the moment when pushing the button: there was an updating in the letters sequence every thirty seconds, so the subjects couldn't preview what letters would appear later. Moreover the task had two possible choices, not only one. This was a way to guard Soon *et al.* against the objection about the first moment subjects make their decisions. In fact, in this case, the subject could push the button under his right index finger, or that under his left one. So at the moment in which the subject decided to be involved in the experiment, he didn't start the whole decisional process. The decision, in fact, is about right or left, and not about moving or not, or the time of the movement. The causal chain leading one to take the final decision starts just when he's sitting in front of the screen, not before (Haynes, 2010).

Maybe Soon's experiment is less objectionable compared to Libet's one, but maybe is not. Some criticism can be evaded, but some of the remarks made previously to Libet are also valid for this experiment. Those cautions, in fact, are not enough to stand up for Soon against the Dennett's remark about the use of an outdated dualistic conception of consciousness. Moreover, in this experiment we can criticize the evaluation criteria about subjective timing of consciousness and its correlation between that and objective timing of neural processes by technical equipment. And finally, the use of the word *urge* referred to the impulse to act is present in this investigation too. But we have just considered the problem concerning the impulse to act as not typical of the whole class of free actions. Another remark by De Caro pertains to the classical theory of decisions. According to theory of decisions,

in order to have a real decision we must have a hierarchy of preferences. In the typical situation of decision-making, the subject assesses the potential implications of all the options and he chooses only one according to this valuation. During Soon's task, when the subject pushed the button under his right index finger, or that under his left one, he had no preference for one or another, he chose in a random way. Therefore that was a decision wherein there wasn't a hierarchy of preferences, so maybe not even a real decision, at least according to classical decision theory (De Caro, 2009). It seems that an experiment aimed to show that our decisions aren't free, maybe, was testing not even real authentic decisions.

In the reductionist analysis of free will problem, Daniel Wegner's *Illusion of conscious will* (2002) aroused many people's interest. In his *theory of apparent mental causation* he holds that people experience conscious will when they look at their thoughts as the cause of the actions. But, actually, that experience is not about a real causal connection between thought and action. According to Wegner we mislead the question thinking that we are the cause of our own actions because causation is only about neural processes, that is processes of which we can't be aware. In fact "this theory of apparent mental causation depends on idea that consciousness doesn't know how conscious mental processes work" (*ibidem*, p.67). Wegner calls to his support several examples and argues that conscious will is just an illusion resulted of a self-perceived apparent mental causation. Actually we can't access directly to the causes of our decisions: "unconscious and inscrutable mechanism create both

conscious thought about action and action, and so produce the sense of will experience by perceiving the thought as cause of the action” (*ibidem*, 2002 p.98). As noted by De Caro, although Wegner uses several examples to support his theory, his phenomenological arguments for agency and intention in determining action are not definitely demonstrative of the illusion of conscious will. We can’t judge about the freedom of our decisions basing on the reports of consciousness, because we perform many actions without awareness, but certainly in a free way. For example when we are driving the car we always perform actions automatically to avoid obstacles, but this doesn’t mean that the performed actions weren’t free. Moreover, when Wegner holds that: “we can’t know, let alone keep track of, the tremendous number of mechanical influences on our behavior because we inhabit an extraordinarily complicated machine” (*ibidem*, 2002 p.27), Dennett asks himself who is that “we” inhabiting in our brain. In fact Dennett maintains that Wegner can also be criticized for his use of a dualistic Cartesian notion of consciousness (Dennett, 2004 p.326).

Summarizing previous analysis of reductionist studies about the question of free will, we can assert that, at the moment, neuroscience didn’t solve the free will problem. Experimental investigations are without any doubt fundamental in the analysis of the issue, above all considering that nowadays we can’t face the problem of freedom regardless of neuroscience, as well any other philosophical matters. But, as we have seen previously, we need to dampen enthusiasm before declaring human freedom just an illusion.

### **The pseudo-threat of neuroscience to free will**

It's interesting to point out that different interpretations of the same neuroscientific experiment with implications in free will can be used to support discording theories about this issue, as noted by De Caro (2009). For example illusionists and skeptics can call on neuroscientific discoveries to support their theories, and so, to affirm that the intuition of free will is just an illusion. But illusionists and skeptics aren't the only ones trying to bring grist to their mill through the outcomes of neuroscience. Also the compatibilists and hard determinists can do the same, and they effectively do it so. In a compatibilist view, free will is compatible with the truth of causal determinism, so causal determination isn't at all a problem in freedom execution. They maintain that freedom can be determinate, but absolutely neither forced nor compelled. As things stand, neurobiological determination postulated by Libet doesn't show that we aren't free, quite the opposite, freedom needs that determination. Moreover, also the hard determinist, which holds that free will doesn't exist because it isn't compatible with determinism, can use neuroscience in his favor: he claims that science proved the illusion of free will just because it shows determination of neural events. At last, even a libertarian as Robert Kane can maintain that the indeterministic event allowing freedom could lay just in those 200 milliseconds in which we can abort the action through veto or choose to go on it (De Caro, 2009).

Those who are afraid of neuroscientific findings about free will can also reassure themselves looking at several data coming from experimental philosophy. In this field people common intuitions are investigated in order to discover their natural tendency to be compatibilist or incompatibilist. Some experiments ran by Nahmias *et al.* (2005) show that ordinary people are naturally compatibilist. As things stand, if neuroscience will prove that we are determined in our decisions, our intuition of freedom won't result undermined. It seems that the end of free will intuition isn't going to come. Until now we can continue to think ourselves as the real decision-makers of our lives.

We considered the possible challenge posed by neuroscientific discoveries to some of the fundamental concepts of our lives, as the existence of free will and the possibility of blaming or praising people for their actions. We also analyzed the remarks of who claims that we need to dampen enthusiasm before declaring human freedom just an illusion. As things stand, it's worthwhile mentioning Adina Roskies's arguments for showing that fear about free will and moral responsibility is not well grounded (Roskies 2006, 2010). She seems actually encouraging in her ideas about the grounding of free will intuition. Roskies claims that neuroscience today is not in a position to resolve the debate, and more importantly, neither is any foreseeable neuroscience. Nonetheless, she holds that neuroscience may be able to influence our philosophical positions about free will in important ways. And more, she maintains

that we shouldn't worry about neuroscientific demonstration of the inexistence of a unitary-self, because our common sense intuition of freedom doesn't depend on that.

Normally during decision-making processes the agent is aware of his intention and, above all, of his reasons to act, this is really important in order to say that he's actively participating to deliberation process. But, as pointed out by Roskies, it doesn't need that the subject is aware of his intention and his reasons during the whole decision-action process. Intuition of freedom is not the same of intuition of a unitary-self, rather it is correlated with the possibility of being an active part during the decisional processes (Roskies, 2010). So, neuroscientific investigations regarding the moment in which awareness enters during a decision to move a finger are not really relevant for the philosophical problem of free will. About freedom and determinism Roskies claims also that what neuroscience told us about determinism and indeterminism problem isn't enough. In fact she holds that it will be theoretical physics, not neuroscience, that we must ultimately appeal to, in order to answer the question of indeterminacy. Neuroscientific technology is not able to tell us if a system is definitely deterministic: apparently indeterministic behavior at one level can be the result of indeterministic or deterministic behavior at a lower level and, in the same manner, apparently deterministic behavior at one level can be the result of indeterministic or deterministic behavior at a lower level. Regardless the truth of deterministic theory, as the majority of authors maintain at least at a macroscopic level, Roskies claims that neuroscience is not able to tell us how things stand at all

the levels of description. Maybe a better physics theory could tell us how the things stand, but not brain sciences: “no evidence for indeterminism at the level of neurons or regions of activation will have bearing on the fundamental question of whether or not the universe is deterministic” (Roskies, 2006 p.421).

So, if the answer to the question “are we free?” relies on the state of the world, maybe we shouldn’t search that answer in the neuroscientific field. Rather it is actually useful a better theoretical analysis, because the issue is more worrying if we consider the possible conceptual compatibility of free will with determinism or with indeterminism. In fact both compatibilists and incompatibilists have to face the problem about the difficulties in conciliating both theories with the notion of free will. An ancient debate is just about this issue. As Roskies points out, the problem of free will exists independently of neuroscientific advances, that is, it is primarily a conceptual problem: “if the universe is deterministic, then everything, including our actions and the brain activity that causes them, is as it is, only because of the initial state of the universe and neural law. Is this is the case, then we cannot do other than we do, and so we are not free” (Roskies, 2006 p.419). And she goes on about the problem of linking freedom with indeterminism: “if our actions are not determined, but instead due to these chance events, then it is chance, and not our will, that leads us to act as we do” (*ibidem*). Probably Roskies is right when she claims that a better comprehension of mechanisms underlying decision-making process and physics

theory is the way to reach a better comprehension of the question of free will (Roskies 2010).

Neuroscientific studies considered up to here are mostly focused on investigations of voluntary actions. In those experiments, in fact, the subjects usually perform basic voluntary movements of the wrist or finger. But when we think about free will we usually think about more complex actions than moving a finger. The typical moments of life in which we experience our free will are those in which we take time to deliberate: the decision is the outcome of thinking about the reasons to make a choice. For example we think about what candidate vote for, or about the way of investing next years of our lives. These are typical moments in which we feel that we have free will and that we are exercising it. Neuroscience can't investigate this kind of phenomenon, but it limits itself to investigate simple voluntary decisions connected with the motor system. Obviously this is the only way to deal with a very hard problem. In fact the problem of free will is such a complicated issue that, at the present time, it doesn't seem threatened by neuroscience.

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