

In the Offing? Neuroscience and the Solution of the Free Will Problem

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Together with the problem of consciousness, the problem of free will is one of the most discussed metaphysical issues of our time. It hasn't always been so, though. Until the beginning of the 1980's, not many philosophers worried about free will, and the few who did mostly dealt with it by sharpening the traditional compatibilist views proposed by Locke and Hume (Roderick Chisholm, who defended agent-causalism was an exception to that rule) (1964). Originally, the renewed interest in the problem of free will was a particular case of the more general renewed interest in metaphysics that dramatically changed the philosophical landscape in the last few decades of last century. As to the free will problem, van Inwagen's *An Essay on Free Will* (1983) was probably the most influential work of that period, since it set the stage for a new, more rigorous conceptual analysis of the problem, a rigorization of the taxonomy of the competing views, and also for the discussion of brand new arguments, such as the famous "Consequence argument." (*ibid.*)

In the last years, however, a new turn has spectacularly changed the agenda of many philosophers, the "Cognitive turn." As is well known, the huge influence of cognitive science (with its links to neuroscience, genetics and the theory of evolution) has given rise to very many naturalization projects that are keeping very many philosophers busy. This is true also for the free will problem. According to a growing number of scholars (both scientists and philosophers), the solution to this problem is coming – if it hasn't come yet – from science. If these scholars are right, the most contentious problem of science and metaphysics, as David Hume called it, is going to be solved within a few years.

In this article, I will examine two issues, one general one and one more concrete, related to the free will problem. As to the first, I will discuss the idea that the solution of the free will problem can come from empirical research. As to the second, I will analyze a recent and ambitious proposal, which suggests that free will is just an illusion, based on a neurophysiological experiment.

1. *Is Free Will an Empirical Problem?*

According to a view that is very popular today – let’s call it the scientific isolationist view – the free will problem is intrinsically empirical. So, if it can be solved, it can be solved by the empirical sciences (neurosciences, cognitive psychology, etc.). From this point of view, the problem of free will does not differ – but for its generality – from the problem of understanding what schizophrenia or autism are, and which agents are affected by them.

Such a view is, my opinion, naïve and clearly wrong. A serious discussion of the free will problem cannot even take off the ground without a preliminary conceptual analysis, which would imply a correct definition of the concepts involved, and of the theoretical options. And certainly, given the abstractness and the conceptual genesis of the free will issue, these are tasks (admittedly very complex ones) for philosophers.

So, it is regrettable, but not surprising – given how superficially the science-philosophy relationship is often dealt with (De Caro, Macarthur 2004; De Caro, Macarthur 2010) – that the problem of free will is often presented as if it were on the verge of finally being solved, thanks to this or that scientific achievement. Frequently, such an argument takes for granted a view that could be defined “unreflective libertarianism.” Such view is grounded in of an argument that has, more or less, the following structure: “Until it was common to think that the deterministic Newtonian framework was the correct one, free will was a real issue, since obviously determinism frustrates freedom.”¹ However, nowadays quantum mechanics has definitely proved the falsity of determinism; so the laws of nature, being indeterministic, do not represent a menace for our freedom. Therefore, the so-called ‘mystery of free will’ has finally been solved: it is not a mystery anymore!” (Eccles 1994; Penrose 1994).

As said earlier, this argument is wrong for several reasons, which are instructive to consider. First, as we will see shortly, it may be that determinism frustrates freedom, but even if it does, this is not at all “obvious;” and, even if we could find evidence for this claim, it would surely require remarkable intellectual sophistication. Then, one should be very suspicious of bold statements such as that science has *proved* the truth of indeterminism (and so, indirectly, the existence of free will). Both general epistemology and history of science should indeed make us suspicious of claims con-

¹ But see John Earman, who convincingly argues that not even Newtonian mechanics was “a paradise for determinism” (1986: 2).

cerning the alleged correctness of an empirical theory; in the present case, in particular – besides the obvious fact that no empirical theory can definitely be proven correct – , one cannot exclude that, in the future, quantum mechanics will be reinterpreted deterministically or replaced by a deterministic theory (Weatherford 1991; Hodgson 2002).

Moreover, it is reasonable to think that, in any case, the indeterminism of the subatomic world would not suffice, in itself, to infer the existence of free will. In the first place, it is very controversial whether subatomic indeterminism has significant repercussions at the macroscopic level. It is true that Roger Penrose famously maintained that the mind has peculiar properties (including free will) since it can perform non-computable operations (allegedly, in virtue of the systems of microtubules that sustain large-scale quantum-coherent activity) (Penrose 1989); and it is also true that Owen Flanagan reported that “there is work nowadays in chaos and complexity theories and in self-organizing dynamical systems theory that suggests that the human nervous system operates, at least sometimes, in ontologically indeterministic ways” (Flanagan 2002: 121) – and it is unclear if this indeterminism is due to ontological reasons or to our epistemic limitations. Nevertheless, the majority view seems to be that the workings of the cerebral mechanisms are deterministic or at most “quasi-deterministic” (in a sense close enough to ideal determinism that, in discussing the free will issue, one can ignore the “quasi” prefix), and on this basis some even claim that the same idea that our conscious will is in charge of our acting is illusory (Libet 1985; Walter 1998; Wegner 2002). Moreover, the deterministic thesis is frequently conjunct with two other very common claims – that causal relations hold between events and that actions are events – and, from this conjunction, many infer that deterministic, or quasi-deterministic, laws back the causation of actions. In sum, *if* determinism really represents a menace for free will, then we still have reasons to keep worrying – notwithstanding quantum mechanics.

Something more, however, has to be said in assessing the roles that philosophy and empirical science should respectively play in tackling the free will issue. As a matter of fact, a *purely conceptual* argument shows that, even if we were able to ascertain (as convincingly as possible) that indeterminism is relevant in the production of actions, our freedom would still be far from being proven. The idea is that in case our actions were generated in a purely indeterministic way, they would happen at random (or stochastically); and, as David Hume already noticed, randomness is the opposite of freedom – or, at least, of the freedom we care about (nobody would seriously think that a randomly generated action may be “free”!). Let us look

at this argument more closely, then.

If an action a is performed by the agent A without being deterministically caused, then in the causal chain of events that precedes the performance of a , there has to be at least one moment t , in which no specific future course of action is necessitated (i.e., it is not *determined* which of these courses of action will be actualized). So, at t , besides a , some other course of action had to be physically realizable – that is to say, that if, after the action is performed, time went backward to t , a different course of action might originate from exactly the same circumstances; or, to put it differently, if in another possible world W^* , identical to our world until t , the action were performed by A^* – A 's Doppelgänger –, that action could be different from the one performed by A . But this means that, in those circumstances, nothing and nobody could make any difference in producing the course of action that ends in the performance of a instead of the other potential actions. This means that A was not able to *control* the actual production of the action a ; and without control by the agents, there are no free actions, but only mere accidents. Thus we see that indeterminism – far from automatically generating freedom – *by itself* only produces randomness.

However, a different question can also be asked with regard to this issue: Does indeterminism *also* make freedom impossible, as it is frequently maintained? Or, can't it be that the addition of some other factors to indeterminism may make freedom possible, as libertarians (who think that freedom *requires* indeterminism) argue? This is a controversial issue, on which something will be said below.

At this stage, however, one should simply notice that the above-stated argument against unreflective libertarianism clearly shows that philosophy, with its conceptual clarifications and analyses, has an essential role to play in the discussion on free will by determining the correct scope and the conditions of use of the concepts involved, and by evaluating the relevance of empirical evidence. In this sense, philosophy's role is not confined to assessing the relation between indeterminism and freedom. Another example is the very common view that if our actions were determined, *ipso facto* we would lack freedom (a view that can be called “unreflective incompatibilism”). The secular philosophical discussion on this point certainly proves that, minimally the incompatibility of determinism and free will is far from being *obvious*. Indeed, the defenders of the so-called ‘compatibilism’ (the view according to which freedom is compatible with determinism) have proposed many different models for removing what they see as “the confusions that can make determinism seem to frustrate freedom.” Even though it is controversial whether they have suc-

ceeded or not, what is clear is that the thesis that determinism is incompatible with freedom cannot be taken for granted, since it requires a very sophisticated conceptual analysis to start with.

Nonetheless, at the level of conceptual analysis compatibilism also encounters two real difficulties. The first is the problem of accounting for the above mentioned “alternative possibilities condition” of free will. Traditionally, compatibilists have tried to show that in a deterministic scenario this condition can still be fulfilled if we correctly interpret it in *conditional* terms (Berofsky 2002). However, as said earlier, a more promising strategy has perhaps recently been attempted by those compatibilists who simply try to give up that condition of freedom. The debate on this proposal is still very alive but it is too early to foresee what conclusions it will reach.

The second conceptual problem of compatibilism is newer but more threatening, and is generated by the already mentioned argument known as “Consequence Argument” (van Inwagen 1983). Here is an informal version of such argument. In order to act freely with respect to a particular action she performs, an agent has to *control* that action; however, to be able to exert control, the agent should control either of the two factors that, if determinism is true, necessitate that action – i.e., the events of the remote past and the laws of nature. But both factors are beyond the agent’s control, since the past is inalterable and the laws of nature are inescapable; so, the agent cannot really control the action she performs. But since, of course, this reasoning can be generalized to all human agents and to all their actions, if determinism is true, no human can, ever could or will ever be able to, act freely. Determinism, therefore, is not compatible with freedom; and since its eponymous thesis is proven wrong, so is compatibilism.

This argument caused a very vast and interesting debate. Compatibilists have attempted at responding to the Consequence argument by challenging both its premises and the rules of inference it appeals to. The debate is still open. However what is interesting for us is that such debate is *conceptual* in character: as it happens with libertarianism, a purely philosophical analysis has to establish the credentials and the same legitimacy of a theory of freedom.

2. *Beyond Libet, Toward the Truth?*

In this perspective, it is interesting to assess the value of a very recent but already influential neurophilosophical proposal, whose ambition is to show that the traditional view of freedom is illusory.

Since Benjamin Libet's pioneering research (Libet 1985), much neurophilosophical research has been dedicated to the problem of free will, generally in a reductionistic or an eliminationistic spirit.² Not infrequently, however, this kind of research has been spoilt, both at the conceptual and at the methodological level, by false steps and sometimes real blunders. An interesting example of this kind of approach, and of its limitations, has recently been offered by an article, meaningfully entitled "Unconscious Determinants of Free Decisions in the Human Brain" (Soon, Brass, Heinze, Haynes 2008). It may surely be granted that the experiment discussed in this article has offered an interesting contribution to the debate concerning the neurological bases of human decisional processes. However, as we will see, in contrast with what is boldly claimed in its title, it can certainly be doubted that this article throws any new light on the question of whether humans can really make free decisions.

Soon *et al.*'s article is based on an experiment in which the subjects were asked to relax and then, "when they felt the urge to do so, they were to freely decide between one of two buttons, operated by the left and right index fingers, and press it immediately." In the meantime, the subjects were asked to concentrate their gaze on the center of a computer screen where a stream of letters was running (in particular, they had to notice which letter was on the screen when they made their decisions). At the same time, the subjects' brain activity was measured through an fMRI (perhaps put the full name of the machine).

According to Soon *et al.*, the results obtained with this technique are significantly more impressive than the ones that Benjamin Libet had obtained with his famous pioneering experiments on volitional processes. In order to see that, it is useful to look at the abstract of their article:

There has been a long controversy as to whether subjectively "free" decisions are determined by brain activity ahead of time. We found that the outcome of a decision can be encoded in brain activity of prefrontal and parietal cortex up to 10 s before it enters awareness. This delay presumably reflects the operation of a network of high-level control areas that begin to prepare an upcoming decision long before it enters awareness.

As is well known, Libet came to the conclusion that an unconscious electrical activity called 'readiness potential' precedes the awareness of the related volition to act of about 300 milliseconds, suggesting that it may

² Many critical arguments against the naturalization projects that appeal to the neurosciences as their rationale are presented in Bennett, Hacker and Stephen 2003.

play a relevant causal role in the production of the volition (a conclusion that gave hope to the project of accounting for decisional processes by only considering the corresponding neural level). In Soon *et al.*'s experiment, however, the interval between the unconscious neural processes that allegedly 'encoded' the outcome of the decision and the awareness of that decision was about 30 times longer than that claimed by Libet.

Besides these amazing quantitative differences, there are at least two more reasons for thinking that the experiment described in this article improves upon Libet's research. First, where for measuring the activity of the brain Libet only had the possibility to appeal to an electroencephalogram or EEG (which is the recording of the electrical activity produced by the firing of neurons), Soon *et al.* appealed to the much more sophisticated functional Magnetic Resonance Imaging or fMRI (which measures the haemodynamic response related to neural activity). Second, and more importantly, Soon *et al.*'s experiment was set so that a difficult objection that affected Libet's experiment could not be repeated. From the beginning of the experiment, in fact, Libet had told his subjects which action they had to perform (i.e., flexing a finger); so the task the subjects were asked to perform was only that of deciding *when* to execute that action. In this way, however, Libet's interpretation of his own experiment, according to which the conscious decision of flexing the finger was preceded, and arguably caused, by unconscious processes – that is, by the readiness potential – could be objected. This was because one could point to the moment in which the subjects had *consciously* decided to agree to perform the experiment as a relevant cause of the unconscious start of the readiness potential. Libet's experiment, in fact, did not give any reason to infer that *that* conscious decision was preceded by another unconscious process (one could, of course, speculate that that was the case, but no evidence for this claim was offered by the experiment). In Soon *et al.*'s experiment, however, the subjects were not told to make their own decisions at the onset of the experiment, but only that they would have to make it later, at the moment in which one of the two buttons needed to be pressed. In agreeing to participate in the experiment, therefore, the subjects only made a meta-decision that was different from the decision that, for the sake of the experiment, they had to make later. So this experiment was protected from the above-given objection.

An important thing that should be noticed in the abstract of Soon *et al.*'s article is that the word "free" is put in scare quotes. This is a very interesting typographical feature, since it signals that, in the discussion on free will, the authors sympathize for a particular version of 'incompatibil-

ism' – that is, the view according to which causal determination and freedom are incompatible. Incompatibilism comes in two main different versions. According to the first, called 'libertarianism', humans are free and – as long as they act and decide freely – they are not determined (since, in fact, there are indeterministic gaps in the course of the causal processes that generate actions) (Kane 2002: part 6). The second version of incompatibilism, often called 'illusionism', is the opposite of libertarianism. According to this view, we do not enjoy free will since our decisions and actions *are* causally determined – and perhaps, as suggested by Soon *et al.*, are even predictable. In the latter perspective, of course, it makes very much sense to write the adjective "free" in scare quotes (whereas it does not make sense if one endorses the view that free will exists). So in their article, Soon *et al.* implicitly assume the illusionist version of incompatibilism – that is, they endorse the view that the subjective feeling of freedom does not have any objective correlate, that human free will is nothing more than an illusion (Smilansky 2000).

However, if the main purpose of the article is clear, its line of argumentation is vulnerable to several objections. Some of these objections are well-known, since they have been raised also against other articles and books discussing free will in the light of neurophysiology, beginning with Libet's seminal work. In this light, for example, it can be noted that the experiment by Soon *et al.* presupposes two extremely controversial assumptions:

i) Neurological processes, on the one hand, and conscious processes, on the other hand, can be measured in analogous ways and put in a precise correlation;

ii) all mental events that occur in the subjects and are relevant for Soon *et al.*'s experiment (i.e., deciding which button to press, becoming aware of the moment in which one makes that decision, fixing the screen of a computer, being aware of the letter that is on the screen when one makes the decision) are simultaneous.

One could also repeat against Soon *et al.* a criticism that Daniel Dennett raised against Libet (Dennett 2003). According to Dennett, Libet assumed an obsolete Cartesian vision of the mind, according to which human conscious activities are performed in front of an elusive 'I', who witnesses and reports them. Furthermore, some general doubts have recently been raised with regard to the methodology of pattern recognition to which these kinds of experiments appeal in order to individuate the causal correlations that link the neural processes with specific mental activities and actions (Vul, Harris, Winkielman, Pashler 2009).

As said, however, these are standard objections, frequently raised against experiments similar to that of Soon *et al.* But, even if one discarded those objections, and granted that Soon *et al.*'s experiment is methodologically sound, other specific objections could be raised against the interpretation of the experimental data offered in the article. First of all, as we have seen, the authors seem to interpret their experiment as an indication that free will is illusory (in this sense, Soon *et al.* differ from Libet, who notoriously claimed that humans at least have the power to veto the actions that otherwise they would be unconsciously moved to perform). It is doubtful, however, that this is the case. In fact, even if one grants that the experiment is methodologically sound, it can be argued that *all* the traditional views of freedom (at least in some of their versions) can be reconciled with the findings of this experiment.

Certainly, it is legitimate to use the evidence described in this article in support of the view that free will is an illusion, as done by Soon *et al.* In order to prove that this is the correct view, however, two arguments are necessary, one empirical and one conceptual. First, one has to show that our decisions are causally determined; second, one has to demonstrate that freedom is irreconcilable with causal determination. The article can be seen as an attempt to corroborate the former assumption; but not a word is said in favor of the latter. That assumption, however, should not be taken for granted, since many philosophers have challenged it with arguments that certainly are not *obviously* wrong.

More interestingly, however, the findings of Soon *et al.*'s are compatible also with the two major views of freedom, 'compatibilism' and 'libertarianism'. In general, compatibilism – probably the most popular view about free will among Anglophone philosophers – states that acting freely amounts to nothing more than performing the actions that one intended, desired or willed to perform, disregarding whether one's intentions, desires or wills were causally determined or not. However, according to some compatibilists (including Leibniz, Hume, J.S. Mill, and many contemporary philosophers), the agent's intentions, desires and wills *have* to be causally determined if freedom is to be possible at all. In this perspective, often called 'supercompatibilism', then, it is not just that freedom is compatible with determinism, but actually that it *requires* it (this is because the authors of this article follow the influential tradition that states that the lack of determination would only generate randomness, which is obviously incompatible with freedom). So supercompatibilists could welcome Soon *et al.*'s experiment and argue, on its basis, that our decisions are determined and *because of that* we may well be free (whereas a regular

compatibilist, according to whom freedom is simply compatible with determinism but does not require it, may consider this experiment simply irrelevant with regard to the free will issue).

Moreover, and even more surprisingly, the findings of Soon *et al.* can even be seen as consistent with libertarianism. This is because the advocates of this view could appeal to the fact that, in this experiment, the accuracy of the experimenters' predictions about which button the subjects will press is in the order of 60%. Undoubtedly this is a statistically meaningful figure, and it certainly would be interesting to determine why it holds; the 40% gap, however, leaves open the possibility for libertarians to argue that that inaccuracy is not only due to our (perhaps contingent) epistemic limitations, but it is a meaningful consequence of the objectively indeterministic causal structure of the world.³

It is plausible that Soon *et al.*'s experiment adds something interesting to the substantial literature concerning the inaccuracy of the conscious reports of our own mental lives. However, the title and abstract of their article show that the authors seem more interested in dealing with the free will problem – and this is, perhaps, because they assume that the evident lack of awareness with which we perform certain actions implies that those actions are not performed freely. As to this assumption, however, it is important to notice that there are cases in which we interpret certain actions of ours as free even if they are performed at unawares. An example, which just happened to this writer, can clarify this point. I was cooking pasta and just before adding salt to the boiling water, my cellular phone rang. I answered and talked for a couple of minutes; then I hung up and added the salt to the water. Too bad, the pasta came out salty. The reason, of course, was that I had *already* salted it while I was talking on the phone. I certainly feel that, when I salted the water for the first time, while talking on the phone, I performed that action freely (because adding salt to the water was exactly what I wanted to do and I had the precise intention to carry out that action immediately.) Subjectively, then, my salting the water was a free action; still, I had no awareness of my having performed it.

In general, it happens frequently that we are not aware of performing actions that we would consider free; and this is particularly true of actions that are not particularly important for us or that we have performed many

³ Kane and Searle have developed two interesting causal-indeterministic views of free will. According to Kane (2005: 134), in the human brain there may be chaotic processes that “magnify quantum indeterminacies in the firings of individual neurons;” see also his *The Significance of Free Will* 1996 and Searle 2004. As to this view, see Flanagan's claim quoted above.

times in our lives, such as putting salt in the pasta water or – as is the case in Soon's *et al.*'s experiment – pressing a button. In a word, the actions that we judge to be free do not necessarily require awareness. Then, by the logical principle of contraposition, the performance of an action without awareness does not imply that that action is unfree. Therefore, experiments like Libet's or Soon *et al.*'s – which are certainly relevant for the discussion about the limitations of awareness in human decisional processes – do not support any particular conclusion in the discussion of the free will question (let alone that they are crucial).

However, Soon *et al.*'s interpretation of their own experiment is also exposed to more powerful objections. First, as seen, the main claim of their article is that some, and possibly all, actions that appear to be free from our perspective (i.e., actions that are *subjectively* free) are not free at all *objectively*. It can be argued, however, that the experiment presented in the article *does not* concern free decisions at all – and this not only in the objective sense, but also in the subjective sense. In order to see why those decisions are not free, even in the merely subjective sense, it is enough to look at the description of the instructions given to the subjects, as they are described in the article. In fact, the subjects were requested “to freely decide between one of two buttons,” when “they *felt the urge to do so*” (my italics). Feeling the urge to do something, however, is neither a necessary nor a sufficient condition of a subjectively free decision.⁴ It is not a *necessary* condition, since, in the vast majority cases in which agents believe they have freely performed an action, they have felt no urge to perform that action. (You have not felt the urge to read the phrase you have just read; but, at least subjectively, you would not consider that action unfree). But feeling the urge to perform an action is not a *sufficient* condition either, since very frequently, when we do something after having felt the urge to do that, far from feeling that we have done it freely we feel that we have been *constrained*. This happens, for example, when one feels the urge to sneeze or yawn in front of an interlocutor or when an akratic person goes for the next, very unhealthy glass of gin or, more spectacularly, when a kleptomaniac steals because of her neurotic condition. Normally, in these cases we would not say that the agent who has sneezed, yawned, drunk or stolen has acted freely, *even if he or she has felt the urge to do so*. (Actually, in terms of attributing freedom, the stronger the urge an agent feels to do something in cases such as these, the weaker their ability to act

⁴ Bennett and Hacker raised a similar criticism against Libet's experiment, (2003: 228-231).

freely actually is). And this proves that the set of actions that are preceded by subjectively free decisions has (at most) a small overlap with the set of actions that are preceded by an urging need to perform them. Undoubtedly, then, the latter actions should not be taken as prototypical examples of the former – as is instead done in the article we are discussing here.

There is no reason, then, to think that Soon *et al.*'s "free decisions" are really free, not even in the merely subjective sense. What is worse, however, is that the alleged decisions discussed by Soon *et al.* are not even genuine *decisions*. This is because – as uncontroversially assumed by both decision theorists and common sense – one can talk of a decision only when, in choosing between alternatives in a situation of uncertainty, an agent *considers her preferences*. In the context of Soon *et al.*'s experiment, however, the subjects are selected exactly because they do *not* have any preference between pressing the right or left button. In cases like that, in which nothing relevant for the agents is at stake by definition, it is extremely plausible that the subjects press either button automatically, paying no attention to which "decision" could be better for them – exactly because no genuine preference is at stake and there is no best or worst option at all. The upshot of this, then, is that Soon *et al.*'s "free decisions," besides not being free, are not even genuine decisions. It seems safe to conclude, therefore, that the main claim of this article – which can be taken as a good example of a very common strategy for disproving our intuitive belief in freedom – is substantially ungrounded.

Arguably, objections similar to the ones raised here could be moved against many of the other fashionable attempts to appeal to the neurosciences to reduce or eliminate the concept of freedom and, more generally, all mentalistic concepts.⁵ In general, at least for what we know now, neurophilosophy does not seem to offer any convincing reasons to think that the forms of non-reductive, liberal naturalism are erroneous. Of course, it is fair to add that this is no proof that those views are correct; it is up to their proponents, then, to find convincing arguments for showing that they are.⁶

⁵ On the explanatory potential of the neurosciences for the free will issue, see Roskies 2006.

⁶ Some doubts about the high expectations that, with the appeal to neurophysiological findings, the solutions of many traditional philosophical riddles are on the way are raised in Lavazza and De Caro 2010.

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