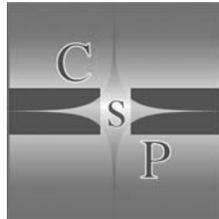


Cognitive Decision-Making

Cognitive Decision-Making
Empirical and Foundational issues

Edited by

Benoit Hardy-Vallée



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INTRODUCTION

To be, or not to be: that is the question: Whether 'tis nobler in the mind to suffer
The slings and arrows of outrageous fortune, Or to take arms against a sea of
troubles, And by opposing end them?

— Hamlet, Act III, Scene 1

Decision-making has been a formal topic for economists and logicians for many years. The rational agent was modeled as an omnipotent utility maximizer, and the analysis of decision-making consisted in spelling out the logical implications of the perfection of *Homo Economicus*. Nowadays, psychologists, neuroscientists, biologists, philosophers and other scholars are interested in the nature of real decision-making, where cognitive agents are involved. A growing number of interdisciplinary researches deepen our understanding of decision-making processes, creating thus an emerging field where the various levels of description (neuronal, cognitive, formal, behavioral, evolutionary) intersect:

- "Neuroeconomics" (Glimcher, 2003) and "picoeconomics" (Ainslie, 2001) use economic models to analyze neuronal, cognitive and behavioral mechanisms of decision;
- Computational architectures integrate neuroscientific data in decision modeling (Fiorillo et al., 2003);
- Neurosciences investigate neuronal substrates of decision (Sanfey et al., 2003);
- Affective neuropsychology shows the crucial role of emotions in decision (Damasio, 1994; Damasio et al., 1996);
- Game theory and microeconomics take a cognitive (Topol et al., 2007) and experimental turn (Camerer, 2003);
- Behavioral ecology and cognitive ethology model animal behavior with optimality theory (Kacelnik et al., 1997; Krebs et al., 1997)
- Cognitive psychology, following Kahneman and Tversky (1979), finds many judgment errors in practical reasoning, whereas evolutionary psychologists (Barkow et al., 1992; Gigerenzer, 2000) underline the adaptive origin of these so-called errors

- Management sciences are interested in limited rationality of agents in real decision situation (Shafir et al., 2002)
- Naturalistic philosophy see in this work an opportunity of reconsidering the nature of practical rationality and its normativity (Bermúdez, 2003; Stich, 1996)

Thus, studying decision-making is no longer identical to investigating formal, or normative rationality, but also *natural rationality* (see Hardy-Vallée, 2007), that is, the mechanisms by which humans and other animals make decisions. In 2005, a conference was held at the Université du Québec at Montreal (UQAM) and allowed researchers from various field to interact and discuss such interdisciplinary issues. *Cognitio 2005* was an occasion for philosophers, cognitive scientists and biologists to present the latest developments in their discipline, and this book aims at providing a general overview of current research in the field of cognitive decision-making (see <http://cognitio.uqam.ca/2005>).

In the first two chapters, Ferrand and Abrahamson explore philosophical questions related to decision making. Ferrand is concerned with the everyday concept of decision, where it is construed as a continuous deliberative process. He shows how this definition is deeply entrenched in our ordinary thinking, and analyse its implications. Abrahamson's chapter focuses on the Libet experiments. In these widely-discussed experiments, it was shown that subjects decision was taken (as indicated by EEG recording) before their conscious awareness of the decision. This interpretation and its connections with compatibilism (the philosophical point of view according to which free will and determinism are compatible) and libertarianism (a free action is one that could have been otherwise: hence free will and determinism are not compatible) are discussed.

The two following chapters deal with methodological issues related to the modeling of decision-making. This modeling can be either normative (what should be done) or descriptive (what and how agents usually do). While Beaulieu-Prévost's chapter is concerned with normative issues in psychology, Stewart's chapter focuses on the general problem of modeling decision-making agents. Beaulieu-Prévost is interested in epistemological questions concerning the null hypothesis, that is, the statistical procedure by which psychologists (and other scientists too) decide whether a hypothesis according to which there is no effect (the null hypothesis) should be rejected in favor of an alternative hypothesis that states that there is one. Beaulieu-Prévost shows that not only is this procedure often ill-understood, but often highly problematic. He then suggests how to ameliorate the procedure.

Stewart studies the computational modeling of decision-making in embodied agents. The problem is that there exist a lot of models, but there is no methodology to compare them. Hence Stewart suggests that they should be compared according to three features: their World Model (how simulated agents represent their environment), their Action Selection process and their Pre-processing (how they update information about the world).

The last three chapters present recent studies of decision-making in human and animals. Dussutour, Colasurdo, Nicolis and Despland study the mechanism by which collective decision making arise in eusocial animals like caterpillars. With simple behavior routines like allelomimesis (imitation of close individuals), they can account for the complexity of collective decisions, instead of explaining it by individual complexity. Roxanne Beaugh Benoit studies decision-making in conversation. She shows that talking implies a lot of spontaneous decisions: who should I talk to, what, when and why should I speak, etc. These decisions are influenced by the perspective taken by the speakers: whether they are considerate, egocentric or automatic in their utterance, the *who*, *what*, and *how* of conversations will change. Finally, using functional Magnetic Resonance Imaging (fMRI), Sohrabi, Smith, West & Cameron study the neural correlates of reward prediction in what they call *Risky Decision Making*: decisions in ambiguous, uncertain, and risky domains. They conducted experiments and present the results of their extensive studies of neural processes involved in the prediction of reward and punishment in gain and loss domains.

This book, we hope, should interest scholars who study the nature, modeling, evolution and substrate of decision-making.

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CHAPTER ONE

NATURAL DECISION

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How do you know that a few months ago I decided to write this paper? What if I were to assure you I never, in fact, decided to do it? Oddly, your reading it now is the best proof that I did, but when and where exactly did that decision take place? Back then, that warm summer day? A few days later, when I set out to come up with an outline? Or why not, at the moment the article was accepted? What about all of my other papers that were never printed: did I decide to complete them and failed, or did I decide against going on at some point? Maybe I never decided at all—or is that possible?

Wasn't all of that decision-making process a useless complication? So would you vote for me then if I were to promise you a decision-free life? Would you re-elect me? Could you? Before it even hits the cognitive level, decision is already puzzling and confusing. With all the awesome cognitive powers it endowed us with, couldn't Nature simply let us *do* things?

In the course of this paper I will attempt to clarify and present a thankfully familiar definition of decision as a continuous deliberative process. I will then observe how laborious it is, and how much we love it. Lastly, I will bring forth some evolutionary considerations to shed some light on the overarching question: Why do we decide at all?

1. Why we never decide

To help us establish what decision is about in the context of this article I will consider a classical view from the philosophy of language. In the process, I hope to clarify the differences between common sense, psychological, and philosophical uses of decision.

In his 2001 book, *Rationality in Action*, Searle brings forward the idea that once a decision is formed, it still has to be put into action; because of weakness

of will though, one sometimes does not act according to that decision. Thus he brings in the concept of a “gap” between decision and action. His aim, ultimately, is to find freedom, then consciousness, in that gap.

1.1 A closer look at decision

Let us first turn our attention to the concept of decision as Searle deploys it. I notice that this view assumes that decision is basically a point event: the definite end of a deliberative process. This idea is commonplace, at least in the way we usually refer to decision: one deliberates until she “reaches a decision”. Intuitively—in our experience—it is quite clear that this “decision” thing (for it could be a state of mind, a word, a cognitive state, a feeling...) is not sufficient to ensure the accomplishment of the planned action. This is a common illustration of weakness of will.

But what function and power is left to decision if forming a decision is not enough to warrant action? Is it really nothing more than that brief moment at the end of a deliberation? Notice that it is possible to say both “I have decided” and “I am deciding”. This points to the idea that decision should include the whole deliberation.

This leads us to another observation. In our everyday experience, it seems, no “true” (effective) decision really takes place until an eventual action settles the preceding deliberation. One can say that this is when an action is completed that any decision linked to that act is accordingly determined. For example it is not until I undertake the writing of this article that I have truly decided to do it. In that case decision is truly set when action is undertaken.¹

This definition undermines decision as it strips it of any distinctive role; because this role has almost always been conceived as problematic from the inception, a redefinition is in fact a way to question that state of affair.

1.2 Linguistic framing

The deceiving concept of an effective decision—which once taken would by itself be a force in motion—seems to rest on the tenets of philosophy of action and language. A proposition such as “Ann has decided to write to the pope” is only a description which may, meant as a verbal rendering of the mental situation, be misleading as to what a decision really involves; put shortly, in text a decision resembles a commitment. However, that we can describe and categorise this as meaning a decision taken, does not imply that not acting

¹ Though this is debated, Aristotle may be thought to assert that “the conclusion ‘I have to make a cloak’ is not drawn unless I actually make a cloak.” (Clark 2001, p. 487)

accordingly is a breach of a promise, a characteristic moment of weakness of will, with all that hangs on that idea, freedom and determinism.

This confusion is aggravated by the fact that some propositions, such as “I apologize” are special in that “the uttering of the sentence is, or is a part of, the doing of an action.”² These are the well-known *performative utterances* Austin introduced. In these, the verbal decision-assertion constitutes the action, and consequently the actual decision. Therefore, they are actual verbal decision. But these are special cases: quite simply, “Ann has decided to apologize” is not a performative sentence.³

Unfortunately, performatives typically appear in the juridical domain, which not coincidentally gives the field important terminology (“deliberation”, “judgement”) and theories.⁴ But it’s not because decision has been mostly studied in these formal, performative-type situations, that we should carelessly import the conclusions to everyday decision. Furthermore, it is not because decision seems to work in a courtroom or operating theatre that it even *should* be the same in our everyday life.

1.3 Decision as a deliberative process

The definition of action as the true decision moment then supersedes “a decision”, but “deciding” still makes sense: the continuous *process* by which one changes her state of mind and her disposition regarding a certain topic or planned action. As long as that process has an impact on a possible forthcoming action, and steers movements preceding it, deciding constitutes an effective event.

Clearly, this idea evokes what we usually mean by “deliberation”. However, this word again has a linguistic connotation: at first glance it does not mean much to deliberate without speaking, at least internally. But it seems possible to decide without actively engaging in a communicative verbal process. As such, this meaning of “to decide” would have a broader sense and encompass situations where the agent is indeed deciding, but not discussing, even

² (Austin 1962), p. 5. Though Austin’s original rendition of performatives (Austin 1963) may be deprecated or disuted (see e.g. Searle 2002), it will suffice for the present article.

³ Obviously, except when the decision is understood as over and done, such as “I hereby decide to name this ship *Liberté*.” Examples inspired by (Austin 1963).

⁴ One may find the deeper roots in the medieval juridical *decisio* and the accompanying medieval interest for the effectiveness of words (See Rosier-Catach 2004). Decision is also well-defined in the medical and military domains.

solipsistically.⁵ Deliberation is thus the main component of decision, though its meaning can be expanded in everyday language to refer to decision in general.

This leads us to suggest that decision is rather like a process which runs through time, a repeated tentative state. Instead of understanding decision as the end point of deliberation, it can be described as a series of decisional steps or decisional changes occurring throughout deliberation. Alternatively, decision could be described as a variable, or vector, adjusted during deliberation. In either of these cases decision is a process, not an instant.

This process turns decision into a state of mind, prone to elicit action. At some juncture, and according to the then status of the decision, action may be taken. Necessarily and sufficiently, it is at the time of action (pertaining to that process) that the decision, in the usual linguistic understanding, is truly set in stone. A decision is truly “reached” only at that point.⁶

As a consequence of this definition, indecisiveness, or lack of resolve to decide, becomes a form of decision. Indeed, it is to be understood as a weak decision-process, and the subsequent action will be prone to either delays or constraints by external factors.⁷

1.4 A satisfying but atypical definition of decision

At the same time that it is close to our experience and estranged from common sense it is important to keep in mind this definition of a decision. The boundaries in the usual deliberation-decision-action scheme become blurry as decision reoccurs or is reviewed throughout deliberation; it is also strongly determined by the ensuing action. Though this definition fits more conveniently with our experience of what decision is about, it clashes with the usual verbal description of how the decision process works.

⁵ We are assuming that the decision process is simple and straightforward. However, it somehow takes place inside one's stream of thought - a widely uncharted expanse of conscious and not-so-conscious mental events and experiences. See for example (Martin & Tesser 1989) or (Shanon 1989).

⁶ “In hindsight, decisions appear to occur at fixed points in time; but before they are made, their timing is not necessarily fixed or even predictable. That being the case, one is led to wonder how choice situations do come to take place and what determines when choices will get made.” (Corbin 1980, p. 47)

⁷ While articulating what a conclusion is, Tukey arrives at a similar observation: “If that does not seem convincing, consider decision as a means to a conclusion and ‘doing nothing’ as a valid conclusion” (Tukey 1960, p. 210). Also see (Schwartz and Griffin 1986) who define decision as “‘a resolution to behave in a certain way’ [...] So long as behavior is interpreted broadly to include internal thoughts as well as external actions and so long as it also includes resolving to do nothing at all...” (p. 9)

An agent, indeed, never decides in the sense of making up her mind firmly enough so as to guarantee her resolve towards a given action. *Speaking* of an irrevocable decision, however, is possible and even common, but it would in fact describe nothing more than a strongly committed posture.

It is therefore important for the following discussion to keep in mind what I mean by “decision”: a process involving deliberation, several decision-making moments, and a liberal dose of so-called weakness, that is a failure to select the best decision even if envisioned, failure to pursue deliberation towards an improved decision, and/or failure to act upon a decision once it is formed. This definition may be deemed obvious. This is precisely what decision is about and what has been lost in the attempt to analyse and dissect the (linguistic) aspects of what it encompasses.

1.5 Summation of the argument

It seems acceptable to assume as if it were obvious that there is something as an effective decision, namely a definite state which necessarily leads to attempts at performing the action contained in the decision with the aim (not to say 'the intention') of completing it. I argue that this definition has no basis other than the theoretical need for such a concept. The trouble is, it appears around the corner that this object is problematic: action does not necessarily follow. Now what to do with that? Most answer to that challenge by bringing an additional concept, that of weakness of will, to account for these so-called “special cases”: decision necessarily leads to action *except* when weakness of will shows up. Clearly this is the worm in the root, for the cause of weakness cannot be far from the cause of strength of will. Searle goes as far as to suggest that this weakness may be freedom and that it may be consciousness.

Of course we want to ask: isn't decision consciousness as well? Here we see where the problem comes from: in the history of ideas the very notion of such a decision was not possible until we understood ourselves as fully free. For an agent who isn't really free, decision is void, an illusion at best. For a strictly rational agent, playing by strict economic or game-theory rules, there is no akrasia and therefore decision appears totally unproblematic as it were. It is no wonder, though, that the renewed concept of decision spawned by the idea of agents with limited rationality, a mix of conscious and unconscious cognitive processes, emotions and affects, be born flawed.

This leads to our own definition and answer to the challenge: instead of patching the concept, ditch it. Something is wrong with it, and we claim this is its being now solely resting on language, manners of speech. Because the grounding on rationality or mindlessness has been removed, decision now hangs

on linguistic hooks. Here is my alternate proposal. We *do* utter sentences such as "I will do such and such" with a (disputable) inner belief that we will do it. But instead of stopping at the mere sentence and positing that, "internally", we are indeed bound to do such and such, I suggest we rather consider the stance and the experience of decision, of which the sentence is merely a by-product. As one can see, I put my position under the auspices of pragmatism and real-life action.

It is very much dubious that forming sentences that truly convey our inner thoughts and convictions is our normal *modus operandi*. But, I hear, how in inner thought could we fool ourselves? Simply, we don't, as long as we don't transfer speaking habits to inner thought. As soon as propositions are deployed internally, I believe we fall prey to the same mechanism of fooling our (linguistic-)selves. This isn't as outrageous as it seems, for the vast majority of actions are undertaken without any kind of (inner) verbal deliberation. Now a surface examination of the stance, rather than the sentence (the stance as of I claim and feel I will do such and such) reveals that, at the very least, we have varying actual inner commitments ranging from "I stand resolute to do this and I do not envision failure as a possibility" to "all in all this seems unlikely to obtain but I will try". Now here's the definition of decision I put forward: "a claim about an action I will perform". Some would say that this definition is weak and fuzzy. I argue that it is decision which is weak and fuzzy.

Though my aim is not to launch any kind of attack on Searle, because I am partisan to his final conclusions about consciousness, I will now reuse one of his thought experiments for my own purpose. He asks us to consider the possibility that weakness of will may be eliminated altogether. It would mean that action would always, automatically proceed from a decision. This proposal serves to show what akrasia is and where it fits. I have nothing against it but I will ask a question, a question directed at the subject of this experiment, the feeling of which I am really curious about. What would she feel after completion of an action pertaining to their decision? If we follow Searle's line of thought, that subject would say something like "As soon as I formed that decision, I just did it!", and he goes on to vindicate the role of weakness in our consciousness. Now I'd like to point out that in our experience we in fact rarely feel like taking decisions, simply because we usually act without much deliberation at all. So to speak, we usually act "on our decisions" immediately, and deliberative actions are pretty much the exception. In any case I only need to convince you that we *sometimes simply act* (if you fear this is merely a redefinition, please read below). So there's something like acting without really deciding. Well then the cure for weakness of will is not to surgically remove it as Searle suggest, but rather to remove decision, and see: that's exactly the case as we speak. If you follow my thought, then you see how the change the un-akratic subject would

feel is not that he would not *have to act upon decisions* anymore, but that he would not *have to decide* anymore. He would just act, all of the time, and never deliberate. His experience would rather be "I do act but I never get to decide, I feel constantly impulsive".

Hence I have conceptually moved weakness from Searle's gap between a decision point and action, and towards deliberation. Therefore the closest thing I can conceive to Searle's un-akratic subject is someone who would never deliberate, or put simply, never think. Now you can see the whole argument: to remove weakness of will is to remove decision (after all I present this kind of decision as being born out of the concept of weakness); and a subject who does not decide but still act is nothing out of the ordinary. In removing weakness of will, Searle is in fact gutting his own concept of decision of its elusive content.

Now of course some would argue that this is all a matter of redefinition: what I would describe as a decision is in fact a segment of deliberation put forward as a mock decision and that true decision in fact does not occur or occurs later in the process—what *they* refer to as decision is that state which actually unerringly leads to an appropriate attempt. Well those contradictors I thank warmly for this is precisely my next step: their deliberation is my decision, and their decision is my action. Let me explain. The first step is to recognize that our streams of deliberative thought are punctuated with moments where we reach conclusions, some being convincingly definitive, some pertaining to future action and therefore qualifying for being a decision. Plural *decisions*, for none has the virtue of being necessarily terminal; I need not and will not suppose that any of these decisions (i.e. the latest) is final. Second, that if an end point for deliberation there must be, it can be action itself; therefore it should, for it seems to be the most economical answer available to the question: When is the decision truly taken? Indeed, if the answer is: "When a decision is reached—though it can fail to obtain", we haven't answered anything (please remember that we are not concerned here with cases where external factors prevent the action from being completed, rather cases of weakness and "change of mind"). Such a concept of decision seems weak to the point of being useless: obviously a coercive decision hadn't been reached at this point. In replacing the deliberation-decision-action model, I simply suggest to shorten it to deliberation-action, with several, weak, purely linguistic decisions steps possibly occurring during the deliberation, and the action which ends the deliberation, one way or another, and retrospectively sets the decision. How else can a decision be described except by a description of the action to which it gives rise?⁸

⁸ The structure of this sentence is a direct copy of Peirce's statement, though regarding *habits* instead of decision, as it appears in MS 318, 1907.

2. Why we would rather decide

2.1 Gap with a vengeance: Searle vs. Davidson

A few paragraphs earlier, I suggested how in general Searle may be using an unsatisfying definition of decision. However, he deploys this definition with a definite goal in mind: to address the issue of weakness of will and its relationship with consciousness and freedom. He criticizes Davidson's approach of decision, for a very simple reason. According to Davidson, and contrary to Searle, decision always leads to action, but the agent may fail to form an adequate decision (or “unconditional judgement⁹”). By putting forward the definition of decision in such a way, Davidson puts the emphasis on intention to weaken its foundation, for to form those intentions one has to adjudicate, and by placing the burden of weakness on adjudication, Davidson turns the issue of weakness into one of freedom.¹⁰ The trick here is that it seems much more acceptable for an agent to choose a non-optimal solution than to choose an optimal one and not act on it. Basically this turns weakness of will into simple reasoning issues. Searle refutes this view, but for reasons pertaining to freedom, not to philosophy of action. I will now have a look at what he really has to say about the gap.

Up until now, I have been rather ambiguous as to the cognitive status of deliberation. Interestingly, Searle provokes a merge of considerations that belong typically to the philosophies of language, action, and mind. This moment of hesitation between a decision and a possible subsequent action is where, he says, we find the possibility for freedom and a cradle for consciousness. In lieu of a keystone, between the two voussoirs of the philosophy of action and that of mind he installs a literal metaphysical gap.

It is this gap that is credited with supporting the conscious part of the process. The way Searle presents his ideas evokes a separation between an unconscious decision and the actual decision-in-consciousness. This last idea, not developed as his main argument, is now worth examining.

⁹ “an agent is incontinent only if he fails to reason from a conditional 'all things considered' judgment that a certain course of action is best to the unconditional conclusion that that course of action is best.” (Davidson 1985, p. 206)

¹⁰ “[Searle's] diagnosis of what is going on is this: what looks like an empirical claim—all cases of weakness of will are case of conditional value judgments—is not in fact empirical [...]. One often makes an all-out unconditional judgment and then does not do the thing one judges to be the best thing to do.” (Searle 2001, p. 226). Also see Dennett's "clutch" example (Dennett 2003, p. 109).

2.2 Be here, or be there, or be square

Unconscious cognitive processes are a topic of great current interest. However, what concerns us here is precisely that such unconscious processes beg the question as to why there should be a conscious decision moment at all. What does it mean to be a volitional, conscious agent? Where does freedom fit in the decision process?

Decision has the feature of being compulsory: one cannot waive the obligation to decide (that is, at least deliberate). As such, decision is a burden, since at first glance it seems that we would rather not have to decide nor act on decisions. I would therefore like to consider a “magical decision” model, whereby mere wanting would be enough to guarantee that the action eventually takes place. Deciding to perform a task (say, write an article) would unerringly lead to the performing of that action without delay.

Strikingly, this does not mean that anyone would gladly accept such an apparent relief. In fact, decision seems to be a burden we don't want to be relieved from. To illustrate this point, consider being offered a “decision pill” to relieve you of part, or all, of the decision process. Depending on which theory of decision is endorsed, one could swallow the pill after forming a decision to ensure subsequent action, or earlier to cause as well the spontaneous formation of the decision. In any case, the point is that though it may seem appealing at first, abuse of this wonderful drug would turn one into some kind of zombie.

Why is it so? To use a less fictive example, consider some hypnotic technique that would produce the same result. That option is interesting because it does not imply being deprived of reason, identity or mind by some psychotropic substance or illness—the pill or technique is apparently a boon, not a curse, for it relieves us of a burden. Why is it then that even though at first glance a “motivator” drug or technique seems welcome, we would not want to be consistently under its influence?

2.3 To decide is to decide freely

In trying to understand this strange state of affair, I note that the apparent reason why we do not want to be deprived of the task of deciding is that, experientially, it is linked to the feeling of freedom, and freedom is something we value. Then not only a decision under constraint is not really a decision and an imposed choice is not a decision at all, but furthermore the very act of deciding is in itself an expression of freedom. Granted, few would straightaway define “to be free” as “to decide” rather than “not having constraints”; additionally, “to never have to decide” usually evokes “to be totally free”. But that is an interesting simplification, because for that state to feel like freedom it

would have to be itself a decision (like freely deciding to never decide anything anymore by virtue of some power) and not a condition (like being put into the situation of never having the opportunity to decide). A decision that is not free is not a decision.

2.4 Decisions are conscious

In turn, this “decision pill” scenario is intriguing and will help us show the strength of the link between decision and consciousness. Indeed, I will stress the fact that a decision is always conscious. Of course, in a much wider understanding of a choice, a decision can be made unconsciously. But we don't refer to these choice-actions as decisions except by analogy. Another example is the reflex actions one may make, such as the tennis player's move to return with a backhand; no one would actually believe this to be the result of a conscious deliberation, nor call it a decision except by analogy.

Casually we know that those quick and simple decisions can in fact be highly complex; therefore we could envision that all other kinds of decisions be unconscious. In other words, if we're able to unconsciously take a snap decision to move one's arm according to complex tactical and physical constraints, why wouldn't we be able to do the same for say, a decision to buy a car? What difference does it make that the decision be consciously taken? On this corner of Chalmers' “Hard Problem”¹¹ I will try to shed some light.

Interestingly, I notice that a decision taken for us by someone else is not satisfying. We always express decisions as something we do, as in: “I (or we) have taken that decision.” Some proposal such as “I have taken your decision” or “You have taken my decision” do not make sense literally speaking, except as orders. However obvious this observation may appear, it is in contradiction with the notion that we would rather not have to decide.

Now what is the status of a (fictive) decision that would be taken by me but without consciousness of it? What about “I did decide to tell you this, but I don't know why”, or “After three bottles of gin, I bet all my money.”¹² Now it seems to be taken by someone else; is it still a decision proper? These fictive or abnormal situations serve to illustrate the crucial importance of being conscious of the decision process.

¹¹ (Chalmers 1995)

¹² Remember that decision encompasses deliberation as well as taking action.

2.5 Decision and freedom

Having to be instantiated in the medium of consciousness, slowly articulated in reflexive patterns of thought, across the network of hopes and desires, decision inherits the property of being arguably laborious. But what would an unconscious decision be like anyways? If it were a matter of “having a conscious flavour” then that question would be much intriguing — why would we exhibit such an unnecessary feature? But there is a simple and more satisfying way to describe decisions as taking place in the medium of consciousness, a medium which gives them their characteristic traits, specific workings and dynamic.¹³

That dynamic, one of a dialectic, biographic and self-governed process is tightly linked to the feeling of freedom. Unconscious processes are billed as “automatic” or “reflex” and bear little in the way of freedom. But the mere articulation of decisions in consciousness deploys the ontology the feeling of which we refer to as “free¹⁴”.

If decisions were unconscious we would not suffer, but we would not feel free (if we were conscious elsewhere). If we did not have to decide, nothing would matter; if we weren't conscious at all, we would not care. But we are conscious, and we have to decide.¹⁵ Those decisions form our freedom. Therefore, to feel free entails forming decisions and acting upon them, a kind of chore that seems to be the stuff of which conscious experience is made of.

We thus attain a characterization of decision as a conscious expression of freedom; being conscious and free is about forming decisions as much as deciding is about expressing consciousness and affording freedom. Accordingly, an unconscious decision doesn't feel free.

¹³ On the slightly more general topic of articulating thoughts in consciousness, see (Shanon 1998).

¹⁴ They need not be metaphysically free, for here we are only concerned with our experience and action, not ethics nor considerations which would transcend the inner point of view.

¹⁵ Though it is outside of the scope of this article, it is crucial to note that this coincidence is not accidental. As we'll see in the next section, decision comes from our complex interactions—so does consciousness.

3. Why we decide at all

3.1 The adaptive stance

The next question I have to ask is: why decide in the first place? To address this I want to propose an evolutionary answer, pertaining more specifically to the development of decision in the species.

When faced with a new challenge in the environment, a species is put under a pressure to evolve. This leads to the apparition of novel traits selected for their adaptive value. However, some of these useful traits may prove over-engineered, and useful for other purposes. Of special interest are those traits that are under-determined with regards to the issue at hand and could therefore serve other uses. Some traits, such as hands or the upright posture, may open up large avenues for future adaptation.¹⁶

As such, it is possible for a species to be, more than simply adapted, rather steered towards an adaptive stance, a position in the interaction between the environment, the individual, the species and the evolutionary process where ontogenic adaptation is the main factor in fitness. We could gather these traits under the catch-all term of *flexibility*. Flexibility is a behavioural stance, just like getting a larger toolbox rather than a larger tool.

3.2 Natural decision

Now¹⁷, the argument here is that a more flexible physical or cognitive make-up makes it necessary to possess a new cognitive attitude, that to choose the best tool, the best behaviour from a large repertoire. This is the basis for decision.

In fact, decision seems inevitable in any complex enough species. Not deciding would be possible, but that would require an even more complex and highly streamlined cognitive system that would be able to replace flexibility, creativity, with unerring systematic behaviour making for each and every situation.¹⁸ This is actually, by far, the most widespread case but, and that is a crucial difference, for organisms with far simpler interactions. Quite simply, this *modus operandi* does not scale to more complex organisms.

To decide, then, is to have to adjudicate in the context of our complex, adaptable, flexible behaviour. These decisions are a chore, because it is intrinsically what having a flexible behaviour is about. Therefore, I find here the

¹⁶ What I allude to is close to the idea of *pre-adaptation* but I carefully wish to avoid any idea of forethought on the part of evolution, which sometimes seep into that concept.

¹⁷ Considering we live in an environment with limited resources.

¹⁸ Note that this is called a reflex, and has no reason to be conscious as we usually mean it.

connection between the laborious experience of decision and its evolutionary roots. Our being is that of an agent, a (subjective) locus of decision.

From an even broader point of view, as individuals and species, decision is imposed on us by the way our species developed through the blind process of evolution. And we may not find solace in a grander scheme, for not only decision is a mere consequence of a path taken, but in addition decision itself does not belong to Nature's vocabulary of phenomena. Being a human being — there is no decision involved here, neither from our point of view nor from Nature's; hence ours is a path taken, not chosen.

Conclusion: being decision

Though it is not a topic of great interest in philosophy, decision nicely sums up the workings of selected cognitive traits, from evolution to experience. So what is decision about? In the end, a type of global interactional behaviour we have to put to work; a work because, intrinsically, it does not operate automatically and blindly — it is neither an energy nor a force but, almost in a physical meaning, it is a labour. Maybe it is an evolutionary shortcut, maybe a dead end, or maybe the logical best trick — in any case it pushes our species further into the realm of existence; as individuals, into the necessity of being¹⁹.

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CHAPTER TWO

EEG TIMING AND LIBERTARIANISM

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1. Introduction

Neuroscience and cognitive psychology study our brain and the mental processes that lead to behavior, respectively. In this paper, I will address some experiments drawing on these sciences which seem to have an impact on philosophical accounts of free decision making and its role in morality.

The experiments I will discuss have provoked considerable philosophical discussion by scientists and philosophers. They are based on a psychophysical paradigm with the addition of one of the oldest forms of investigation into the workings of the brain - electroencephalography (EEG). This technique provides continuous recording of electrical fields generated by synaptic activity, providing excellent temporal resolution. However, due to the inverse problem (see, e.g. (Gazzaniga et al. 2002, 133-135)), only approximate spatial resolution can be accomplished.

Benjamin Libet is well known for two separate series of experiments conducted over decades which, he claims, argue for a particular model of human consciousness. One of these series involved direct stimulation of the medial lemniscus and somatosensory cortex. The issues here are deep, both methodologically and philosophically. I will limit my discussion here to the other set of experiments he has conducted which purport to show surprising, powerful results based on timing properties of EEG experiments. In what follows, I describe the experiments as summarized in a recent review article by Libet.

Then, I discuss attempts to replicate and extend Libet's results. My goal is to show that Libet's and related experiments have philosophical significance. On certain views in the philosophy of free will, these experiments have a negative consequence - they show that no account which satisfies the usual desiderata for the types of view discussed can work, if the experiments establish the conclusions that they seem to. Also, I will claim that despite objections to

the contrary, the experiments do not have any easy way of being dismissed as supporting a conclusion relevant to the metaphysics of decision making.

2. The Libet Experiments

In Libet's original 1985 experiment, subjects were presented with a visual stimulus: a 'clock' divided into 24 sections, on which a projected spot of light completed a revolution once every 2.56 seconds. Through a stimulus and judgement of onset time task it was established that subjects could accurately identify points on the clock with about a 50 msec error, on average.

For the test trials, subjects were asked to flex their wrist at times which were 'spontaneously chosen'. An electromyogram (EMG) recorded the moment at which muscle contraction began, and subjects reported the time that they decided to move by observing the location of the point of light on the clock at the moment they made their decision.

Event related potentials, that consisted of electrical activity at the midline vertex for 2000 msec prior to muscle activation, were averaged within subjects. An observed increase in negative charge was observed, on average, approximately 500 msec prior to muscle movement in each subject; this is referred to by Libet and in what follows as the 'readiness potential', or RP. Correcting for the error obtained by the stimulus timing condition, the time that subjects reported making their decision to move was approximately 150 msec prior to their actual muscle movement. (See for example (Libet 1985) and (Libet 2002b)).

3. Discussion of Libet's Results

Libet gives a succinct account of the philosophical import of his findings in an article entitled "Do We Have Free Will" (Libet 2002a). As he notes, the findings are, on their face, surprising. Taken literally, his experiment seems to show that our brain 'knows' that we will undertake some supposedly free action before we are aware of any conscious decision to do so.

Traditionally, there are two philosophical accounts of what it means to take a free action. One tradition, the compatibilist one, says that free action is one in which there are no constraints preventing a person from doing what they desire. This view takes its name from its compatibility with any theory according to which the universe operates deterministically.

On the other hand, the libertarian view denies compatibility between free will and a determined universe. Having free will is usually defined by libertarians not in terms of ability to satisfy desires, but by implying that an agent could have done otherwise, in some metaphysically rich sense. So, a

libertarian might say, although Bob chose tuna salad for lunch, his action was free insofar as given all the facts being the same as they were, Bob could have chosen something else.

So, do the results deny the existence of free will according to both views? Clearly not. On the desire satisfaction model, properties of my brain immediately prior to my action cannot, in general, constrain me from acting according to my wishes (except, say, in aberrant circumstances in which doors are rigged to close and lock just in case I possess a certain readiness potential on my scalp). However, consider the libertarian view, along with a naive interpretation of the data. Suppose first that the readiness potential is a sufficient condition, outside of external interruption, for the supposedly spontaneous hand movement, at about a half second prior to that movement. Also, suppose that subjects report making their decision to move about a seventh of a second before they do move. Two things follow, both hostile to the libertarian view. First, subjects could not do otherwise at the time they make their decision - this follows from the sufficiency of the readiness potential. Second, subjects reflect in their reporting a systematic self-deception. That is, in general, they report having made a free choice after their ability to do otherwise disappeared.

According to Libet, libertarians have a way to accept the data, and maintain that free choice under their definition is still available. Libet says we can view the role of conscious will as a vetoing one with respect to potential actions. That is, the brain constantly produces necessary conditions for actions, which if unchecked, are sufficient for bodily movement. However, conscious will can suspend these unfolding predecessors of movement and prevent activity from taking place.

This is an counterintuitive account of how decision making works. First, we often suppose that we can choose which action to pursue. According to Libet, however, we can never choose which movement we execute; rather, we may only choose which ones we won't undergo. However, Libet can respond to this within the confines of a veto role for conscious will. He could claim that, in a given circumstance, a healthy brain provides all of the rational, relevant options for action, given the character and desires of the individual. So, the limitation of freedom, to veto actions that the nervous system provides as options, is not itself, necessarily, a limitation on freedom.

Notice that if we accept Libet's data as sound, the veto function of free will is the best we can do, as libertarians. Consider the 2 seconds of recorded data which precede the subject's supposedly free action. For most of those two seconds, the recorded electrical activity does not show any obvious patterns. However, a half second before the action takes place, we observe a spike of electrical activity. That spike reliably precedes the action taken by the subject within the observed time frame. For the change in electrical activity to be

merely necessary, but not sufficient for action, it must be the case that it occurs at times at which no decision to move takes place. In that case, there is a necessary precondition to movement which sometimes is not satisfied, and conscious will (if it exists) can take advantage of such preconditions only when they occur - thus implying a veto power.

In the next section we examine critically the evidence that Libet gives that such a veto effect in fact exist. I argue that Libet's results should give the libertarian cause for worry in three ways. First, I argue that the evidence Libet gives for a veto function of conscious will in decision making is weak. Second, I review other related experiments to claim that the naive interpretation of Libet's experiment hold up to further empirical scrutiny. Last, I argue that the veto power of free will is sub ject to a traditional criticism of compatibilist views by libertarians.

4. Evidence for a 'Veto' Function of Conscious Will

In a special issue of Consciousness and Cognition, more than ten articles appear discussing, criticizing, and defending Libet's conclusions and methodology (in addition to many others discussing a separate set of experiments involving the direct stimulation of the brain). However, only one author mentions the veto function of free will - and he is aware of this fact: "The implications of Libet's veto results are not discussed in (Pockett 2002b), (Gomes 2002), or (Trevena and Miller 2002b). I feel that any in-depth discussion of Libet's volition experiments should not ignore this point that is so important to Libet's framework"(Klein 2002, 276). Libet takes the results to be conclusive. He claims that "the existence of a veto possibility is not in doubt" (Libet 2002a, 557). However, the evidence for the possibility of a conscious will vetoing unconscious volitions is shaky. Let us look at the reasons he cites for making this rather strong claim.

First, there is purely anecdotal evidence from sub jects' reports that urges often appeared in their conscious awareness which they decided not to act on. Second, sub jects were given a third condition, in which they were instructed to pick a time at which to move, and then 'change their mind' 100-200 msec prior to the chosen time (as indicated by appropriate intervals on the observed clock) , so that no movement took place. An "operator in another room" (Libet 1985, 537, figure 2 explanation) triggered the EEG recordings in these cases, in the absence of an EMG onset to trigger recording. As Libet points out, this 'veto condition' provides a significant RP compared to the stimulus condition.

This evidence is circumstantial at best. We can readily discount the anecdotal evidence - this is precisely what is at issue, and introspectionist