Free Will and Neuroscience

I have what may be an irresistible urge to include in this book a chapter on neurobiologist Benjamin Libet's work on free will. This work has attracted a great deal of attention in a variety of fields, including philosophy. Psychologists Patrick Haggard, Chris Newman, and Elena Magno (1999, p. 291) describe an article by Libet and colleagues (Libet, Gleason et al. 1983) as "one of the most philosophically challenging papers in modern scientific psychology." A striking thesis of that 1983 article is that "the brain...decides to initiate or, at the least, prepare to initiate [certain actions] at a time before there is any reportable subjective awareness that such a decision has taken place" (p. 640; also see Libet 1985, p. 536). In a recent article, Libet pointedly asserts: "If the 'act now' process is initiated unconsciously, then conscious free will is not doing it" (2001, p. 62; also see 2004, p. 136).

Elsewhere, I have used some of Libet's results to shed light on some philosophical questions about self-control and akrasia (Mele 1997; 2003a, ch. 8). What I found useful were the data, not Libet's interpretation of them. To use his data without misleading my readers, I found it necessary to criticize a certain central element of Libet's interpretation of them that is directly relevant to the thesis I quoted from Libet, Gleason et al. 1983. In setting the stage for my own use of Libet's data in understanding our prospects for exercising self-control in the face of temptation at roughly the time of action, I argued that they fall well short of justifying his thesis, and I defended an alternative interpretation of them. Part of the problem is that Libet and his colleagues ignore a directly relevant conceptual distinction between deciding and intending, on the one hand, and motivational states like wanting, on the other.

Patrick Haggard, in his contribution to a recent discussion with Libet, says: "Conceptual analysis could help" (Haggard and Libet 2001, p. 62). Haggard is referring specifically to conceptual differences between "will (generation of action) and choice (selection of action)" (p. 61). My conceptual focus in this chapter is on another pair of phenomena: wanting and intending. Drawing partly from Mele 1997, I criticize Libet's defense of his thesis about decisions and extend the criticism to his conclusions about free will.

1. Conceptual Matters

Because Libet uses such terms as "intention," "decision," "wanting," "wish," and "urge" interchangeably, some conceptual preliminaries are in order in interpreting his work. I start with a distinction between wanting and intending. Its relevance to interpreting Libet's results will become clear in section 2.

Wanting to do something is distinguishable from intending to do it. One can want (or desire, or have an urge) to A without being at all settled on A-ing. Yesterday, I wanted to meet a friend at 7:00 movie and I wanted to join another friend at a 7:00 lecture. I knew that I could do either but not both. I needed to make up my mind about what to do. In forming an intention to go to the movie, I made up my mind to do that. To intend to do something is, at least in part, to be settled (but not necessarily irrevocably) on doing it (Mele 1992, chs. 9 and 10). Wanting to do something is compatible with being unsettled about whether to do it. In normal scenarios, the transition from wanting to A to intending to A is progress toward A-ing (Mele 1992, pp. 72–73 and chs. 9 and 10). For reasons of convenience, one may use the verbs want and desire interchangeably, and it is natural to treat the noun urge as a label for a kind of desire. If wanting and intending have importantly different functional roles in the production of intentional actions, as I and others have argued they do, failing to distinguish intending from wanting can lead to serious errors. It should also be noted that some of our decisions and intentions are for the nonimmediate future and others are not. I might decide on Tuesday to attend a meeting on Friday, and I might decide now to phone my father now. The intention formed in the former decision is aimed at
action three days in the future. (Of course, if I need to prepare for the meeting—or need to write a note on my calendar to remind myself of it—the intention may motivate relevant overt conduct sooner than that.) The intention I form when I decide to phone my father now is about what to do now. I call intentions and decisions of these kinds, respectively, distal and proximal intentions and decisions (Mele 1992, pp. 143–44, 158). Proximal decisions and intentions also include decisions and intentions to continue doing something that one is doing and decisions and intentions to start A-ing (e.g., start climbing a hill) straightforwardly.

A distinction between relatively specific and relatively unspecific intentions also is in order. Bob now intends to attend next week’s departmental meeting. That is a more specific intention than the intention he had, at the beginning of the academic year, to attend at least a few departmental meetings during the year. He had the latter intention without being settled on any specific meetings to attend. In another illustration, Cathy has agreed to be a subject in an experiment in which subjects are instructed to salute whenever they feel like it on at least forty occasions during a two-hour period. When Cathy begins her participation in the experiment she has a relatively unspecific intention to salute many times during the next two hours. At various times during the experiment, she has specific proximal intentions to salute.

I claimed that it is risky to ignore functional differences between wanting and intending. It is plausible that effective proximal intentions play roles in the initiation, guidance, and sustaining of intentional actions and that effective proximal desires to A help generate proximal intentions to A (Mele 1992, chs. 8 and 10). On this view of things, the primary causal contribution such desires make to the production of intentional actions is mediated by associated proximal intentions.

2. Libet’s Work

This section develops an interpretation of Libet’s work that is sensitive to the conceptual points just made. In some of his studies, subjects are instructed to flex their right wrists or the fingers of their right hands whenever they wish. Electrical readings from the scalp—averaged over at least 40 flexions for each subject—show a “negative shift” in “readiness potentials” (RPs) beginning at about 550 milliseconds (ms) before the time at which an electromyogram shows relevant muscular motion to begin (1985, pp. 529–30). Subjects are also instructed to “recall...the spatial clock position of a revolving spot at the time of [their] initial awareness” (p. 529) of something, x, that Libet variously describes as an “intention,” “urge,” “wanting,” “decision,” “will,” or “wish” to move (see n. 3). On the average, “RP onset” preceded what the subjects reported to be the time of their initial awareness of x (time W) by 350 ms. Time W, then, preceded the beginning of muscle motion by about 200 ms.

Diagram 1

<table>
<thead>
<tr>
<th>RP onset</th>
<th>-200 ms</th>
<th>0 ms</th>
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<tbody>
<tr>
<td>time W</td>
<td></td>
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<tr>
<td>muscle begins to move</td>
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(Libet finds independent evidence of a slight error in subjects’ recall of the times at which they first become aware of sensations [pp. 531, 534]. Correcting for that error, time W is −150 ms.)

At what point, if any, does a specific intention to flex arise in Libet’s subjects? Again, Libet, Gleason et al. write: “the brain...‘decides’ to initiate or...prepare to initiate the act...before there is any reportable subjective awareness that such a decision has taken place” (1983, p. 640). If we ignore the second disjunct, this quotation (given its context) apparently offers the answer that a specific intention to flex appears on the scene with “RP onset” about 550 ms before relevant muscular motion and about 350 to 400 ms before the agent becomes aware of the intention (see Libet 1985, p. 539); for to decide to initiate an act is to form an intention to initiate it. But are decision and intention the most suitable mental items to associate with RP onset? Again, Libet describes the relevant occurrence of which the agent later becomes aware not only as a “decision” and the onset of an “intention” to move but also as the onset of an “urge,” “wanting,” and a “wish” to move. This leaves it open that at −550 ms, rather than acquiring an intention or making a decision of which he is not conscious, the agent instead acquires an urge or desire of which he is not conscious—and perhaps an urge or desire that is stronger than any competing urge or desire at the time, a preponderant urge or desire. It is also left open that what emerges around −550 ms is a pretty reliable causal contributor to an urge.

I believe that if Libet himself were to distinguish between intending and wanting (including having an urge) along the lines I sketched, he might find it more credible to associate the readiness potentials with the latter than with the former. To explain why, I turn to another experiment reported in Libet 1985 (and elsewhere).
Libet proposes that "conscious volitional control may operate not to initiate the volitional process but to select and control it, either by permitting or triggering the final motor outcome of the unconsciously initiated process or by vetoing the progression to actual motor activation" (1985, p. 529; also see 1999, p. 54; 2004, pp. 139, 142–43, 149). "In a veto, the later phase of cerebral motor processing would be blocked, so that actual activation of the motoneurons to the muscles would not occur" (1985, p. 537). Libet offers two kinds of evidence to support the suggestion about vetoing. One kind is generated by an experiment in which subjects are instructed both to prepare to flex their fingers at a prearranged time (as indicated by a revolving spot on a clock face) and "to veto the developing intention/preparation to act...about 100 to 200 ms before the prearranged clock time" (p. 538). Subjects receive both instructions at the same time. Libet writes:

A ramplike pre-event potential was still recorded...resembling the RP of self-initiated acts when preplanning is present.... The form of the "veto" RP differed (in most but not all cases) from those "preset" RPs that were followed by actual movements [in another experiment]; the main negative potential tended to alter in direction (flattening or reversing) at about 150–250 ms before the preset time... This difference suggests that the conscious veto interfered with the final development of RP processes leading to action... The preparatory cerebral processes associated with an RP can and do develop even when intended motor action is vetoed at approximately the time that conscious intention would normally appear before a voluntary act. (1985, p. 538)

Keep in mind that the subjects were instructed in advance not to flex their fingers, but to prepare to flex them at the prearranged time and to "veto" this. The subjects intentionally complied with the request. They intended from the beginning not to flex their fingers at the appointed time. So what is indicated by the RP? Presumably, not the acquisition or presence of an intention to flex; for then, at some point in time, the subjects would have both an intention to flex at the prearranged time and an intention not to flex at that time. And how can a normal agent simultaneously be settled on A-ing at t and settled on not A-ing at t? That is, it is very plausible that Libet is mistaken in describing what is vetoed as "intended motor action" (p. 538, my emphasis).

If the RP in the veto scenario is not associated with an intention to flex at the appointed time, with what might it be associated? In the passage I quoted from Libet 1985 (p. 538), Libet compares "the 'veto' RP" with (a) "'preset' RPs that were followed by actual movements" and (b) "the RP of self-initiated acts when preplanning is present." The RP referred to in a is produced in experiments in which subjects are instructed to watch the clock and flex when the revolving spot reaches "a pre-set 'clock time'" (Libet et al. 1982, p. 325). "The subject was encouraged to try to make his movement coincide as closely as possible with the arrival of the spot at the pre-set time." The RP referred to in b is produced in two kinds of studies: (1) studies in which subjects instructed to flex spontaneously are not regularly encouraged to aim for spontaneity (Libet et al. 1982, pp. 324–26) and (2) studies in which subjects who did receive such encouragement reported that they experienced "some 'pre-planning,'" even if only in a minority of the 40 self-initiated acts that occurred in the series for that averaged RP" (p. 328). "Even when some pre-plannings were recalled and reported, subjects insisted that the more specific urge or intention to actually move did not arise in that pre-planning stage" (p. 329). Reports of "pre-planning" seem to include reports of thoughts about when to flex and reports of anticipations of flexing (pp. 328–29). Libet and his coauthors remark that "Subject S.B. described his advance feelings of pre-planning as 'pre-tensions' rather than pre-plannings to act" (p. 329). This subject may have meant that he occasionally experienced tension that he expected to result in flexing.

The RPs referred to in a and b have a very similar form (Libet et al. 1982, pp. 330, 333–34; Libet 1985, p. 532). RPs with that form are called "type I RPs" (p. 326). They have significantly earlier onsets than the RPs produced in studies of subjects regularly encouraged to aim for spontaneity who report that they experienced no "pre-planning"—"type II RPs." "The form of the 'veto' RP" is the form of type I RPs until "about 150–250 ms before the preset time" (1985, p. 538). What does the veto group (group V) have in common until that time with the three kinds of subjects who produce type I RPs: those with a preset time for flexing (group PS), those who are not regularly encouraged to aim for spontaneity (group N), and those who are regularly encouraged to aim for spontaneity but who report some "pre-planning" (group PP)?

Presumably, subjects in group PS are watching the clock with the intention of flexing at the preset time. But it certainly does not follow from that and the similar RPs in groups N and PP—and V for a time—that members of each of these groups are watching the clock with a similar intention to flex. For one thing, as I have explained, it is very
likely that group V—subjects instructed in advance to prepare to flex and then veto the preparation—are watching the clock without an intention to flex at the targeted time. Given that the members of group V lack this intention, we should look for something that groups V and PS actually have in common that might be signified by the similarity in the RPs until “about 150–250 ms before the preset time.” One possibility is that members of both groups have urges to flex (or to prepare to flex) soon—or undergo brain events that are pretty reliable relatively proximal causal contributors to such urges—that are associated with an RP and regularly play a role in generating subsequent flexings in the absence of “vetoing.” In the case of group V, perhaps a subject’s wanting to comply with the instructions—including the instruction to prepare to flex at the appointed time—together with his recognition that the time is approaching, produces a growing urge to (prepare to) flex soon, a pretty reliable causal contributor to such an urge, or the motor preparedness typically associated with such an urge. A related possibility is suggested by the observation that “the pattern of brain activity associated with imagining making a movement is very similar to the pattern of activity associated with preparing to make a movement” (Spence and Frith 1999). The instructions given to group V would naturally elicit imagining flexing very soon. Finally, the “flattening or reversing” of the RP “at about 150–250 ms before the preset time” might indicate a consequence of the subject’s “vetoing” his preparation.

What about groups N and PP? It is possible that they, along with the subjects in groups PS and V, begin acquiring urges to flex at a greater temporal distance from 0 ms than do subjects encouraged to flex spontaneously who report no preplanning. That difference may be indicated by type I RPs’ having significantly earlier onsets than type II RPs. Another possibility is consistent with this. Earlier, I distinguished proximal from distal intentions, and Libet himself recognizes the distinction (see Libet et al. 1982, pp. 329, 334; Libet 1989, pp. 183–84). Presumably, subjects in group PS respond to the instruction to flex at a preset time with an intention to flex at that time. This is a distal intention. As the preset time for flexing draws very near, that intention may become, help produce, or be replaced by a proximal intention to flex, an intention to flex now, as one naturally says (see Libet 1989, p. 183; 1999, p. 54; 2004, p. 148). That may happen around the time subjects in group V veto their urge to flex or closer to 0 ms. And it may happen at or around the time subjects in groups N and PP acquire a proximal intention to flex. They may acquire such an intention without having had a distal intention to flex soon: recall that members of group V probably had no distal intention to flex soon and that their RPs are very similar to those of groups N, PP, and PS until “about 150–250 ms before the preset time.” All this is consistent with the similarities in RPs in the various groups of subjects, on the assumption that no segment of the RPs before about −150 to −250 ms for subjects in group PS specifically represents subjects’ distal intentions to flex at the preset time—as opposed, for example, to something that such intentions have in common with distal urges to flex (or to prepare to flex) at the preset time—even though those intentions are present.

The main difference between type I and type II RPs, in Haggard’s words, is that the former have “earlier onsets than” the latter (Haggard and Libet 2001, p. 49). The earlier onsets may be correlated with earlier acquisitions of urges to flex soon—urges that may be brought on, variously, by the instruction to flex at a preset time (group PS), the instruction to prepare to flex at a preset time and to veto that later (group V), unsolicited conscious thoughts about when to flex (groups N and PP), or unsolicited conscious anticipations of flexing (groups N and PP). (Of course, it is possible that some such thoughts and anticipations are instead products, in part, of urges to flex soon.) These urge inciters (or perhaps urge products, in the case of some experiences in groups N and PP) are absent in subjects encouraged to flex spontaneously who report no “pre-planning”—at least, if their reports are accurate. If type I RPs indicate urges, or urges together with proximal intentions that emerge later than the urges do, the same may be true of type II RPs. The difference in the two kinds of RP may mainly be a matter of when the urge emerges—that is, how long before 0 ms. Once again, Libet describes in a variety of ways the mental item that is indicated by RPs. Even if “intention” and “decision” (to flex) are not apt choices, “urge” and “wanting” are still in the running.

If “RP onset” in cases of “spontaneous” flexing indicates the emergence of an urge to flex soon, proximal intentions to flex may emerge at some point between RP onset and time W, at time W, or after time W: at time W the agent may be aware only of an urge that has not yet issued in a proximal intention. Again, Libet asserts, “In a veto, the later phase of cerebral motor processing would be blocked, so that actual activation of the motoneurons to the muscles would not occur” (1985, p. 537). Perhaps, in nonveto cases, activation of these motoneurons is the direct result of the acquisition of a proximal intention (Gomes 1999, pp. 68, 72; Mele...
1997, pp. 322–24). Libet suggests that this activation event occurs between 10 and 90 ms before the muscle begins moving and apparently favors an answer in the 10- to 50-ms range (p. 357). Elsewhere, he asserts that the activation event can occur no later than 50 ms before the onset of muscle motion (2004, pp. 137–38).

Although I will not make much of the following point, it merits mention that urges that may be correlated with RP onset at −550 ms might not be proximal urges, strictly speaking. Possibly, they are urges to flex very soon, as opposed to urges to flex straightaway. And perhaps they evolve into, or produce, proximal urges. Another possibility is that urges to flex very soon give rise to proximal intentions to flex without first evolving into or producing proximal urges to flex. Some disambiguation is in order. A smoker who is rushing toward a smoking section in an airport with the intention of lighting up as soon as he enters it wants to smoke soon. That want or desire has a specific temporal target—the time at which he enters the smoking section. A smoker walking outside the airport may want to smoke soon without having a specific time in mind. Libet’s subjects, like the former smoker, might at times have urges or desires to flex that lack a specific temporal target. Desires to A very soon, or to A, beginning very soon, in this sense of “very soon,” are roughly proximal action-desires.

I have been using a (roughly) proximal urge to flex as an example of something that might be indicated by type II RPs beginning around −550 ms. The alternatives I mentioned are (roughly) proximal urges to prepare to flex, brain events that are pretty reliable relatively proximal causal contributors to such urges or to (roughly) proximal urges to flex, relevant motor preparedness, and imagining flexing very soon. It would be helpful to have a name for this collection of alternatives: I opt for the name (roughly) proximal urge*. What I dub the urge* hypothesis is the hypothesis that one or another of these things is indicated by type II RPs beginning around −550 ms. “Urge” sans asterisk continues to mean “urge”—not “urge*.”

Libet’s experimental design promotes consciousness of urges and intentions to flex, because his subjects are instructed in advance to be prepared to report on them—or something like them—later, using the clock to pinpoint the time they are first noticed. For my purposes, what is of special interest are the relative times of the emergence of a (roughly) proximal urge* to flex, the emergence of a proximal intention to flex, and consciousness of the intention. If RP onset indicates the emergence of proximal, or roughly proximal, urges* to flex, and if acquisitions of corresponding intentions directly activate the moto-neurons to the relevant muscles, we have the following picture of subjects encouraged to flex “spontaneously” who report no “pre-planning”—subjects who produce type II RPs:

Diagram 2

a. −550 ms: proximal or roughly proximal urge* to flex emerges
b. −90 to −50 ms: acquisition of corresponding proximal intention

Possibly, the intention is consciously acquired. My point here is simply that this diagram is consistent with Libet’s data on type II RPs and on time W.

I mentioned that Libet offered a second kind of evidence for “veto control.” Subjects encouraged to flex “spontaneously” (in nonveto experiments) “reported that during some of the trials a recallable conscious urge to act appeared but was ‘aborted’ or somehow suppressed before any actual movement occurred; in such cases the subject simply waited for another urge to appear, which, when consummated, constituted the actual event whose RP was recorded” (1985, p. 538). RPs were not recorded for suppressed urges. But if these urges fit the pattern of unsuppressed urges* in cases of “spontaneous” flexing, they appeared on the scene about 550 ms before the relevant muscles would have moved if the subjects had not “suppressed” the urges, and subjects did not become conscious of them for about another 350 to 400 ms. Notice that it is urges that these subjects are said to report and abort or suppress. This coheres with my urge* hypothesis about groups V, PS, N, and PP. In group V (the veto group), as I have explained, there is an excellent reason to believe that no proximal intention to flex is present, and the RPs for this group resembled the type I RPs for these other three groups until “about 150–250 ms before the preset time.” If it is assumed that these RPs represent the same thing for these four groups until the RPs for group V diverge from the others, these RPs do not represent a proximal intention to flex before the point of divergence, but they might represent a growing urge to (prepare to) flex or other items in the urge* collection. And if at least until about the time of divergence there is no proximal intention to flex in any of these groups, we would need a special reason to believe that the type II RPs of the spontaneous flexers indicate that proximal intentions to flex emerge in them around
In a recent article, Libet writes that “it is only the final ‘act now’ process that produces the voluntary act. That ‘act now’ process begins in the brain about 550 msec before the act, and it begins unconsciously” (2001, p. 61). “There is,” he says, “an unconscious gap of about 400 msec between the onset of the cerebral process and when the person becomes consciously aware of his/her decision or wish or intention to act.” (Incidentally, a page later, he identifies what the agent becomes aware of as “the intention/wish/urge to act” [p. 62].) Libet adds: “If the ‘act now’ process is initiated unconsciously, then conscious free will is not doing it.”

I have already explained that Libet has not shown that a decision to flex is made or an intention to flex acquired at −550 ms. But even if the intention emerges much later, that is compatible with an “act now” process having begun at −550 ms. Regarding processes of many kinds, it is hard to be confident when they begin. Did the process of my baking my frozen pizza begin when I turned my oven on to preheat it, when I opened the door of the preheated oven five minutes later to put the pizza in, when I placed the pizza on the center rack, or at some other time? Theorists who believe in determinism can argue about this, but I would prefer not to. One might say that “the ‘act now’ process” in Libet’s spontaneous subjects begins with the formation or acquisition of a proximal intention to flex, much closer to the onset of muscle motion than −550 ms, or that it begins earlier, with the beginning of a process that issues in the intention. I will not argue about that. Suppose we say that “the ‘act now’ process” begins with the unconscious emergence of a (roughly) proximal urge to (prepare to) flex—or with a pretty reliable relatively proximal causal contributor to such an urge—at about −550 ms and that the urge plays a significant role in producing a proximal intention to flex many milliseconds later. We can then agree with Libet that, given that the “process is initiated unconsciously, . . . conscious free will is not doing it”—that is, is not initiating “the ‘act now’ process.” But who would have thought that conscious free will has the job of producing urges (or causal contributors to urges)? In the philosophical literature, free will’s primary locus of operation is typically identified as deciding (or choosing), and for all Libet has shown, his subjects make their decisions (or choices) consciously.

Libet asks (2001, p. 62), “How would the ‘conscious self’ initiate a voluntary act if, factually, the process to ‘act now’ is initiated unconsciously?” In this paragraph, I offer an answer. One significant piece of background is that an “act now” process that is initiated unconsciously

3. Free Will

When Libet’s work is applied to the theoretically subtle and complicated issue of free will, things can quickly get out of hand. The abstract of Haggard and Libet 2001 opens as follows: “The problem of free will lies at the heart of modern scientific studies of consciousness. An influential series of experiments by Libet has suggested that conscious intentions arise as a result of brain activity. This contrasts with traditional concepts of free will, in which the mind controls the body” (p. 47). Now, only a certain kind of mind-body dualist would hold that conscious intentions do not arise as a result of brain activity.” And such dualist views are rarely advocated in contemporary philosophical publications on free will. Moreover, contemporary philosophers who argue for the existence of free will typically shun substance dualism. If Libet’s work is of general interest to philosophers working on free will, the source of the interest must lie elsewhere than the theoretical location specified in this passage.
may be aborted by the agent; that apparently is what happens in instances of spontaneous vetoing, if "act now" processes start when Libet says they do.15 Now, processes have parts, and the various parts of a process may have more and less proximal initiators. A process that is initiated by an unconscious urge* may have a subsequent part that is directly initiated by the conscious formation or acquisition of an intention.16 "The conscious self"—which need not be understood as something mysterious—might more proximally initiate a voluntary act that is less proximally initiated by an unconscious urge*. (Readers who, like me, prefer to use "self" only as an affix may prefer to say that the acquisition or formation of a relevant proximal intention, which intention is consciously acquired or formed, might more proximally initiate an intentional action that is less proximally initiated by an unconscious urge*.)

Recall that Libet himself says that "conscious volitional control may operate...to select and control ['the volitional process'], either by permitting or triggering the final motor outcome of the unconsciously initiated process or by vetoing the progression to actual motor activation" (1985, p. 529). "Triggering" is a kind of initiating. In "triggering the final motor outcome," the acquisition of a proximal intention would be initiating an action in a more direct way than does the urge* that initiated a process that issued in the intention. According to one view of things, when proximal action-desires help to initiate overt actions, they do so by helping to produce pertinent proximal intentions, the formation or acquisition of which directly initiates actions (Mele 1992, pp. 71–77, 143–44, 168–70, 176–77, 190–91).17 What Libet says about triggering here coheres with this.

4. Further Testing

I have shown that this line of thought is unpersuasive. A lot can happen in a causal process that runs for 550 ms, including a subject's moving from having an unconscious roughly proximal urge* to flex to consciously deciding to flex "now" or to consciously acquiring a proximal intention to flex. One can reply that, even so, 3 might be true. And, of course, I can run through my argumentation about the veto and related matters again to remind the imaginary respondent why 3 is improbable. But what about a test?

If making of proximal decisions to flex or acquisitions of proximal intentions to flex (or the physical events that realize these things) cause muscle motion, how long does it take them to do that? Does it take about 550 ms? Might reaction time experiments show that 550 ms is too long a time for this? Some caution is in order here. In typical reaction time experiments, subjects have decided in advance to perform an assigned task—to "A," for short—whenever they detect the relevant signal. When they detect the signal, there is no need for a proximal decision to A.18 (If all decisions are responses to uncertainty about what to do and subjects are not uncertain about what to do when they detect the signal, there is no place here for proximal decisions to A.)19 However, it is plausible that after they detect the signal, they acquire an intention to A now, a proximal intention. That is, it is plausible that the combination of their conditional intention to A when they detect the signal (or the neural realizer of that intention) and their detection of the signal (or the neural realizer of that detection) produces a proximal intention to A. The acquisition of this intention (or the neural realization of that event) would then initiate the A-ing.20 And in at least one reaction time experiment (described shortly) that is very similar to Libet's main experiment, the time between the "go" signal and the onset of muscle motion is much shorter than 550 ms. This is evidence that proximal intentions to flex—as opposed to (roughly) proximal urges* to flex—emerge much closer to the time of the onset of muscle motion than 550 ms. There is no reason, in principle, that it should take people any longer to start flexing their wrists when executing a proximal intention to flex in Libet's studies than it takes them to do this when executing such an intention in a reaction time study. More precisely, there is no reason, in principle, that the interval between proximal intention acquisition and the beginning of muscle motion should be significantly different in the two scenarios.21

The line of reasoning that I have just sketched depends on the assumption that, in reaction time studies, proximal intentions to A are at
work. An alternative possibility is that the combination of subjects’ conditional intentions to A when they detect the signal and their detection of the signal initiates the A-ing without there being any proximal intention to A. Of course, there is a parallel possibility in the case of Libet’s subjects. Perhaps the combination of their conditional intentions to flex when they next feel like it—conscious intentions, presumably—together with relevant feelings (namely, conscious proximal urges to flex), initiates a flexing without there being any proximal intentions to flex. (They may treat their initial consciousness of the urge as a “go” signal, as suggested in Keller and Heckhausen 1990, p. 352.) If that possibility is an actuality, then Libet’s thesis is false, of course: there is no intention to flex “now” in his subjects and, therefore, no such intention is produced by the brain before the mind is aware of it.

The reaction time study I mentioned is reported in Haggard and Magno 1999:

Subjects sat at a computer watching a clock hand... whose rotation period was 2.56 s... After an unpredictable delay, varying from 2.56 to 8 s, a high-frequency tone... was played over a loudspeaker. This served as a warning stimulus for the subsequent reaction. 900 ms after the warning stimulus onset, a second tone... was played. [It] served as the go signal. Subjects were instructed to respond as rapidly as possible to the go signal with a right-key press on a computer mouse button. Subjects were instructed not to anticipate the go stimulus and were reprimanded if they responded on catch trials. (p. 103)

“Reaction times were calculated by examining the EMG signal for the onset of the first sustained burst of muscle activity occurring after the go signal” (p. 104). “Reaction time” here, then, starts before any intention to press “now” is acquired; obviously, it takes some time to detect the signal, and if detection of the signal helps to produce a proximal intention, that takes some time, too. The mean of the subjects’ median reaction times in the control trials was 231 ms (p. 104). If a proximal intention to press was acquired, that happened nearer to the time of muscle motion than 231 ms and, therefore, much nearer than the 550 ms that Libet claims is the time proximal intentions to flex are unconsciously acquired in his studies. Notice also how close we are getting to Libet’s time W, his subjects’ reported time of their initial awareness of something he variously describes as an “intention,” “urge,” “wanting,” “decision,” “will,” or “wish” to move (−200 to −150 ms). If proximal intentions to flex are acquired in Libet’s studies, Haggard and Magno’s results make it look like a better bet that they are acquired around time W than that they are acquired around −550 ms.22 How seriously we should take his subjects’ reports of the time of their initial awareness of the urge, intention, or whatever is a controversial question, and I will say nothing about it here.23

5. Conclusion

In a recent article, after writing that “many of the world’s leading neuroscientists have not only accepted our findings and interpretations, but have even enthusiastically praised these achievements and their experimental ingenuity” and naming twenty such people, Libet adds: “It is interesting that most of the negative criticism of our findings and their implications have come from philosophers and others with no significant experience in experimental neuroscience of the brain” (2002, p. 292). Later in the article, he writes of one of his critics, “As a philosopher Gomes exhibits characteristics often found in philosophers. He seems to think one can offer reinterpretations by making unsupported assumptions, offering speculative data that do not exist and constructing hypotheses that are not even testable” (p. 297).24 When I first read the latter passage, I experienced an urge to point out that one does not need any “experience in experimental neuroscience of the brain” to realize that there is a difference between deciding and intending, on the one hand, and wanting—including having an urge—on the other. Also, one who understands Libet’s data and the studies that generate them can see that nothing warrants his claim that the RPs at issue are correlated with decisions or intentions rather than with urges strong enough to issue pretty regularly in related intentions and actions or relatively proximal causes of such urges. Incidentally, as is obvious, I eventually made the transition from having an urge to comment on the quoted remarks to intending to do so.

Recall Haggard’s assertion that “conceptual analysis could help” (Haggard and Libet 2001, p. 62). This chapter may be read as a test of his assertion. In my opinion, the result is positive. Attention not only to the data but also to the concepts in terms of which the data are analyzed makes it clear that Libet’s striking claims about decisions, intentions, and free will are not justified by his results. Libet asserts that his “discovery that the brain unconsciously initiates the volitional process well before the person becomes aware of an intention or wish to act voluntarily... clearly has a profound impact on how we view the
nature of free will” (2004, p. 201). Not so. That, in certain settings, (roughly) proximal urges to do things arise unconsciously or issue partly from causes of which the agent is not conscious—urges on which the agent may or may not subsequently act—is a cause neither for worry nor for enthusiasm about free will.

NOTES


2. In a later article, Libet writes: “The brain has begun the specific preparatory processes for the voluntary act well before the subject is even aware of any wish or intention to act” (1992, p. 263).

3. Some passages in which two or more of these terms are used interchangeably are quoted later in this section and in section 3. Libet, Gleason et al. report that “the subject was asked to note and later report the time of appearance of his conscious awareness of ‘wanting to perform a given self-initiated movement. The experience was also described as an ‘urge’ or ‘intention’ or ‘decision’ to move, though subjects usually settled for the words ‘wanting’ or ‘urge’ ” (1983, p. 627).


5. Our desires and intentions, in our view, are realized in physical states and events, and their causes are either realized in physical states and events. I forgo discussion of the metaphysics of mental causation, but see Mele 1992, ch. 2. I leave it open here that although desires and intentions enter into causal explanations of actions, the causal clout is carried, not by them (qua desires and intentions), but by their physical realizers.

6. For background on the generation, analysis, and use of electroencephalograms (EEGs) and “event-related brain potentials,” including readiness potentials, see Coles and Rugg 1995.

7. I say “apparently,” because an author may wish to distinguish an intention to flex one’s wrist from an intention to initiate a flexing of one’s wrist. I discuss initiation in section 3. For completeness, I observe that if we instead ignore the quotation’s first disjunct, it makes a claim about when an intention to prepare to flex—or to prepare to initiate a flexing of one’s wrist—arises.

8. For a more thorough discussion of the experiment, see Libet, Wright et al. 1983 or Libet, Gleason et al. 1983.

9. Try to imagine that you intend to eat some pie now while also intending not to eat it now. How would you act? Would you reach for it with one hand and grab the reaching hand with your other hand? People who suffer from anarchic hand syndrome sometimes display behavior of this kind (see Marcel 2003, pp. 76–81). Sean Spence and Chris Frith suggest that these people “have conscious ‘intentions to act’ [that] are thwarted by . . . ‘intentions’ to which the patient does not experience conscious access” (1999, p. 24).

10. Another is that they have an intention to prepare to flex, if preparing is understood in such a way that an intention does not entail intending to flex.

11. Recall that Libet suggests that the activation event occurs between 10 and 90 ms before the onset of muscle motion (1985, p. 537) and later revises the lower limit to 50 ms (2004, pp. 137–38).

12. In an alternative picture, the acquisition of a proximal intention to flex sends a signal that may be regarded as a command to flex one’s wrist (or finger), and that signal helps produce finer-grained signals that directly activate the motoneurons to the relevant muscles. This picture moves the time of the acquisition of a proximal intention further from 0 ms, but it does not move it anywhere near –550 ms. See section 4.

13. When does the action begin in all this—that is, the person’s flexing his wrist or fingers? This is a conceptual question, of course: how one answers it depends on one’s answer to the question “What is an action”? Libet identifies “the actual time of the voluntary motor act” with the time “indicated by EMG recorded from the appropriate muscle” (1985, p. 532). I favor an alternative position, but there is no need to disagree with Libet about this for my purposes here. Following Brand 1984, Frederick Adams and I have defended the thesis that overt intentional actions begin in the brain, just after the acquisition of a proximal intention; the action is proximally initiated by the acquisition of the intention (Adams and Mele 1992). (One virtue of this view is that it helps in handling certain problems about deviant causal chains; see Mele 2003a, ch. 2.) The relevant intention may be understood, in Libet’s words, as an intention “to act now” (1989, p. 183; 1999, p. 54; 2004, p. 148), a proximal intention. Of course, for Libet, as for me, “now” need not mean “this millisecond.” If I form the intention now to start running now, the action that is my running may begin just after the intention is formed, even though the relevant muscular motions do not begin until milliseconds later.

14. A central point of disagreement between Haggard and Libet is usefully understood as a disagreement about when the “‘act now’ process” begins (see Haggard and Libet 2001). Haggard apparently views the onset of lateralized response potentials (LRP), which happens “later than RP onset,” as the beginning of the process (Haggard and Libet 2001, p. 53; also see Trevena and Miller 2002).

15. Notice that in addition to “vetoing” urges for actions that are not yet in progress, agents can abort attempts, including attempts at relatively temporarily “short” actions. When batting, baseball players often successfully halt the motion of their arms while a swing is in progress. Presumably, they acquire or form an intention to stop swinging while they are in the process of executing an intention to swing.
16. Readers who believe that some item or other in the collection designated by “urge” cannot be unconscious should exclude that item from consideration when they read “unconscious urge.”

17. Those who view the connection as direct take the view that actions begin in the brain. See n. 13.

18. It should not be assumed that detecting the signal is a conscious event (see Prinz 2003).

19. In a reaction time study in which subjects are instructed to A or B when they detect the signal and not to decide in advance which to do, they may decide between A and B after detecting the signal.

20. Hereafter, the parenthetical clauses should be supplied by the reader. They serve as a reminder of a point made in n. 5.

21. Notice that the interval at issue is distinct from intervals between the time of the occurrence of events that cause proximal intentions and the time of intention acquisition.

22. In a study by Day et al. of eight subjects instructed to flex a wrist when they hear a tone, mean reaction time was 125 ms (1989, p. 653). In their study of five subjects instructed to flex both wrists when they hear a tone, mean reaction time was 93 ms (p. 658). The mean reaction times of both groups of subjects—defined as “the interval from auditory tone to onset of the first antagonist EMG burst” (p. 651)—were much shorter than those of Haggard and Magno’s subjects. Day et al.’s subjects, unlike Haggard and Magno’s (and Libet’s), were not watching a clock.

23. For an instructive review of the literature on this, see van de Grind 2002.

24. Incidentally, Gilberto Gomes has informed me that he works in a psychology department.

THREE

Libertarianism, Luck, and Control

A familiar claim made against various libertarian accounts of free action and action for which agents are morally responsible is that they subject agents to luck in a way that renders action of these kinds impossible (Nagel 1986, pp. 113-14; Strawson 1994). A more modest claim is that these accounts subject agents to luck in undesirable ways that do not promote free action and moral responsibility (Mele 1995, chs. 11-13; 1999a; 1999b). Sometimes these claims are elaborated in terms of control. For example, I have argued, on the basis of some points about luck, that certain libertarian accounts of free and morally responsible agency generate some undesirable limitations on agents’ control that are unnecessary for agency of these kinds (Mele 1995).

Randolph Clarke, the author of an important body of work defending a kind of agent-causal libertarianism against various objections, has replied to these claims in several places (2000, 2002, 2003, 2005a). An examination of some themes linking Clarke’s replies with work by Robert Kane (1996, 1999b), an event-causal libertarian, and Timothy O’Connor (2000), an agent-causal libertarian, will help clarify issues about luck and control that are central to the debate between conventional libertarians (agent causationists and others) and their critics. Such clarification is the aim of this chapter. As matters come into focus, it will become clear that luck poses an as yet unresolved problem for conventional libertarians.

Agent-causal accounts of free action and moral responsibility often are motivated partly by arguments that event-causal libertarian