

No 30 BENJAMIN LIBET (II)

Gerald Foley 22 February 2010

1. Last time I told you about the neuroscientist Benjamin Libet and his scientific interest in the nature of consciousness.
2. In the twenty years up to 1978 when he was collaborating with the neurosurgeon Bertram Feinstein in California, he carried out a remarkable series of experiments on fully-conscious patients with electrodes stuck into their brains.
3. One of his most interesting findings was that while it only takes about 20 milliseconds – two hundredths of a second – for the brain to register a weak stimulus to, say, the skin of the hand, it is only after about half a second of brain activity that the person becomes aware or conscious of it.
4. One of the consequences of this is that we are able to respond to stimuli before we become aware of them. The sprinters in a race get going before they are aware of the sound of the gun. We withdraw our hand from something hot before we are aware that it is too hot. And so on.
5. This was all very interesting in its own specialist way. Libet was continuing in a long tradition of measuring how long it takes things to happen in the body. William James has plenty to say about reaction times in his *The Principles of Psychology* which was published in 1890.
6. But though Libet's work was interesting I do not think it would have been particularly noticed if the next stage of his career had not happened in the way it did.
7. That phase began in 1978 when Feinstein died. Libet no longer had a sympathetic brain surgeon who would allow him to carry out his consciousness experiments on patients while he was operating on them.
8. Instead, Libet had to rely on the more conventional electrodes on the scalp to measure the level of brain activity during his experiments. This second phase of Libet's work is covered in the second half of his book *Mind Time*.
9. Before going any further I must confess that I am not at all convinced by this work. But I am not alone in having my doubts.
10. When the neurobiologist Steven Rose reviewed Libet's book *Mind Time* in the *New Scientist* in 2004 he said that Libet had produced a non-solution to a non-problem. He also said that

Libet was naïve: *But then if he weren't naïve, he probably wouldn't have done his experiments in the first place, and neuroscientists would have been even freer to speculate beyond their remit.*"

11. The reason we as AT teachers have to think about Libet is that he has to a certain extent been taken up by the AT community. Quite a few AT teachers believe he is saying something of relevance to our work and you will see plenty of references to him on websites. I remember being told by a rather cross AT teacher at a workshop that Libet's work had "...proved the scientific basis of the Technique."
12. So what was this work? As I told you last time, Libet was basically interested in the relationship between the subjective sense of consciousness and what is actually happening in the brain.
13. As a means of investigating this, he decided it would be very interesting to find out what goes on in the brain when we make a conscious and freely determined decision to perform an act.
14. It is an important question. As functioning human beings, we are constantly making big and small decisions. We decide to become Alexander teachers, to begin and end relationships, to change our hairstyle, to have a croissant with our coffee or stick to the diet, and so on.
15. The problem is that it is difficult to devise satisfactory experiments in which we can measure what is going on in the brain when we are making these decisions. Libet needed something quite simple which he could observe and measure in a laboratory.
16. In the experimental set-up he devised the only action the subject had to perform was to gently bend one wrist at a time of their own choosing. As the *New Scientist* review said, this is about as near to free will as we get in a lab.
17. The subjects were put sitting in an easy chair in front of a computer screen showing a dot going clockwise round a circle on it like a clock.¹
18. The subjects were told not to plan anything – just to sit there. Then, when they felt the urge to do so, they were to bend their right wrist gently but quickly. They were also asked to note the

¹ (Sheppard)p7 says they were not even to blink but Libet (Libet (1985)p530) says they were free to do so if they wished.

position of the dot on the circle at the moment they decided to bend their wrist.

19. On their head, they had a pad with electrodes in it which was connected to a machine which recorded the level of brain activity. They also had electrodes attached to the wrist to measure when the wrist muscles acted.
20. There was a lot of what scientists call noise in the recordings of these experiments since it is difficult to sit there with nothing going on in your brain while you are waiting for the urge to flick your wrist. So each subject did the experiment forty times and the results were averaged.
21. The results surprised Libet. He said
It has been commonly assumed that in a voluntary act, the conscious will to act would appear before or at the start of the brain activities that lead to the act.²
22. What he actually found is that when the experimental subject was just sitting there, there was a low level of brain activity. Then for no apparent reason there was an increase in the level of brain activity of which the subject was completely aware.
23. It was only when this brain activity had built up that the person became aware of the fact that they were going to bend their wrist. The person noted the position of the dot on the circle on the computer screen and bent their wrist as they had agreed to do.
24. The sequence of events, moving backwards from the time at which the wrist muscles begin to contract was as follows. There is a tiny interval of 50 ms from the first sign of muscle activation to the actual contraction; this is the time for the muscle to perform the action.
25. At 200 ms before the action there is the moment at which the decision to act is made or willed. This is given by position of the rotating dot noted by the subject when they decide to act. On his diagram, Libet labels this the W moment.
26. Back a further 350 ms – a third of a second – is the peak of brain activity which Libet calls the Readiness Potential (RP).
27. The whole thing, from the Readiness Potential to the actual bending of the wrist takes 550 ms – just over half a second.

² Libet (2004)p123

28. This raises lots of technical questions to which I will come back in a few moments.
29. But Libet's take on this was philosophical. He must also have been fully aware of the amount of controversy it was going to cause.
30. The question he asked was: If we only become aware we are going to perform an act when our brain has already and unconsciously prepared itself for it, can we say we have any freedom in the matter?
31. He also wanted to know what were the implications of this for the whole idea of free will – and where it left moral and religious systems like the Ten Commandments.
32. Having raised the question of free will in this way, Libet decided that, despite anything his experiments might suggest, the notion that we have free will needed to be preserved. His solution was to say that in the time interval between deciding to bend the wrist and the actual moment when the movement begins, we have the opportunity to veto or inhibit the decision. We could reverse our decision.
33. This means that even if our decision to bend our wrist is a product of unconscious brain processes, we have the possibility of not following through on them. As someone said, we may not have free will, but at least we have free won't.
34. There are major problems with this idea. One of the main ones is the timing involved. The interval between will the act, the W moment – and the wrist beginning to move is 150 ms, a sixth of a second.
35. One of Libet's findings from his previous work is that it takes us half a second – 500 ms – to become consciously aware of something. So having willed something, how can we become aware that we don't want to do it and exercise a veto in a period of 150 ms?
36. This is a major problem. Libet gets out of it by suggesting that perhaps

The conscious veto may not require, or be the direct result of, preceding unconscious processes. The conscious veto is a control function, different from simply becoming aware of the wish to act...there is no experimental evidence against the possibility that the

*control process may appear without specific development by prior unconscious processes.*³

37. Given such a control function, he then asks how it might be implemented by the brain. He suggested that there is what he called a Conscious Mental Field (CMF) which is not in the category of known physical fields, such as electromagnetic, gravitational and so. He says

*...it is not describable in terms of any externally observable physical events or any known physical theory as presently constituted.*⁴

38. There is, in other words, a something unknown to science which acts instantly and mysteriously upon the body. He even goes on to suggest a brain operation which would show what part of the brain was involved in the functioning of this Conscious Mental Field. It is all suspiciously like the idea of the soul and brings to mind Descartes' idea that the pineal gland in the centre of the brain is the site of the soul.

39. We could go on for a long time discussing this. When the editors of the journal *Behavioural and Brain Sciences* published Libet's article in 1985, they solicited commentaries by various neuroscientists and philosophers. Most of them picked holes in Libet's philosophical and technical ideas or put forward their own ideas about what might be happening.

40. The debate has rumbled on. There was a book published in 2000 called *The Volitional Brain; towards a neuroscience of free will* - edited by Libet, Freeman, and Sutherland. Libet was the only scientist among them. Anthony Freeman is a Anglican priest and theologian, and Keith Sutherland is the head of a publishing firm called Imprint Academic which published the book.

41. I hoped that reading this book would help clarify things for me. In fact, it didn't.

42. The debate on free will has been going since the time of Aristotle who was born in 384 BC. Emmanuel Kant who was one of the greatest European philosophers said in 1788 that "freedom of the will" is one of the metaphysical problems which lie beyond the power of the human intellect.

43. So I don't think I'm going to crack it in the next five minutes.

³ Ibid.146

⁴ Ibid.169

44. At the same time, I think it is possible to get out of the Libet's philosophical hothouse and rely on our normal notions – however philosophically ill-founded they may be – that we actually do have a certain amount of free will in the way we go about our lives and that this is not restricted to the last fifth of a second before we perform our actions.
45. As far as I can see, there is nothing to prevent any of the experimental subjects saying as they come into the lab, “Actually Dr Libet, having thought about it, I have changed my mind and I don't want to participate in your free-will experiments today – how about tomorrow?”
46. Nor during the experiments themselves, do I see any problem if the subjects decide to exercise their free will and not bother looking at the clock when they feel the urge to act – or even deliberately giving the wrong time if they feel like it.
47. Another major point that Libet does not address is the role of intention. If people were not told anything but just sat there in the booth, there would never be a readiness potential leading them to decide to bend their wrist.
48. But Libet's subjects knew long in advance what they were going to do. When they agreed to participate and received their instructions they must have formed an unconscious intention and parked in their memory or subconscious. This is something we do all the time. Our intentions to do various things are there waiting to emerge when we give them an opportunity.
49. One could therefore argue that simply sitting in the booth watching the dot going round eventually triggers the intention to do what we had planned to do. In that case, what Libet was measuring was the brain activity involved when the previously formed intention was emerging into consciousness.
50. The important thing from our point of view is that we do not need to get into the detail of these arguments. Our question is what is the relationship between Libet's work and the classic AT inhibition procedures as developed by Alexander.
51. This was of course what attracted the attention of AT people in the first place. Was Libet describing in scientific terms what Alexander had discovered the best part of a century earlier?
52. It is when we look at *The Use of the Self*⁵ where Alexander gives his most detailed description of the procedure for the use

⁵ Alexander (1932)p44

of inhibition to change an habitual response, we find he is working on scales of time and complexity which are totally different from those of Libet.

53. On p46, Alexander says, for example, “...*while still continuing to project the directions for new use, I would stop and consciously reconsider my first decision, and ask myself Shall I after all go on to gain the end I have decided upon and speak the sentence or shall I not?*”⁶

54. He goes on to say on the next page, that in adopting his new procedures

*...my original end was not only inhibited at the start, but remained inhibited right through, whilst my directions for the new use were being projected.*⁷

55. Later on, when he was talking about the stutterer he says

*...I made a point of giving my pupil day after day the experience of receiving a stimulus to gain a certain end and of remembering to refuse to gain that end, since this refusal meant that at one fell swoop he inhibited all the wrong habits of use associated with his habitual way of gaining that end.*⁸

56. This conscious and deliberate decision-making is on an altogether longer time scale than the fractions of a second being timed in Libet’s experiments. Alexander was looking at a much broader picture and dealing with much more complex and deep-rooted habitual patterns of behaviour than the deliberately superficial wrist-bending analysed by Libet.

57. To sum it up, I think that Libet did some really nice scientific experimental work with Feinstein’s patients. As far as I can see, he has made a major contribution with his work on the timing of conscious awareness – the need for a stimulus to last 0.5 sec before we are aware of it.

58. I also think his later work raised interesting neurological questions which other scientists like Patrick Haggard are investigating. But I don’t know of anything emerging from this work that has any significant bearing on anything we do.

⁶ Ibid.46

⁷ Ibid.47

⁸ Ibid.79

59. On the main point of AT interest concerning the possibility of using the last sixth of a second after we have decided to do something to become aware of it and decide not to do it, I don't think Libet has shown how such a thing can be done. In any case, it is completely different from Alexander's idea of inhibition.

As said earlier, I am not impressed by Libet's later work nor, I might add, his skills as a philosopher.

60. I would not try to discourage anyone from reading Libet but if your reading time is limited, I think *The Use of the Self* is a lot more relevant to our work than *Mind Time* or *Unconscious cerebral initiative and the role of conscious will in voluntary action*.

References

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