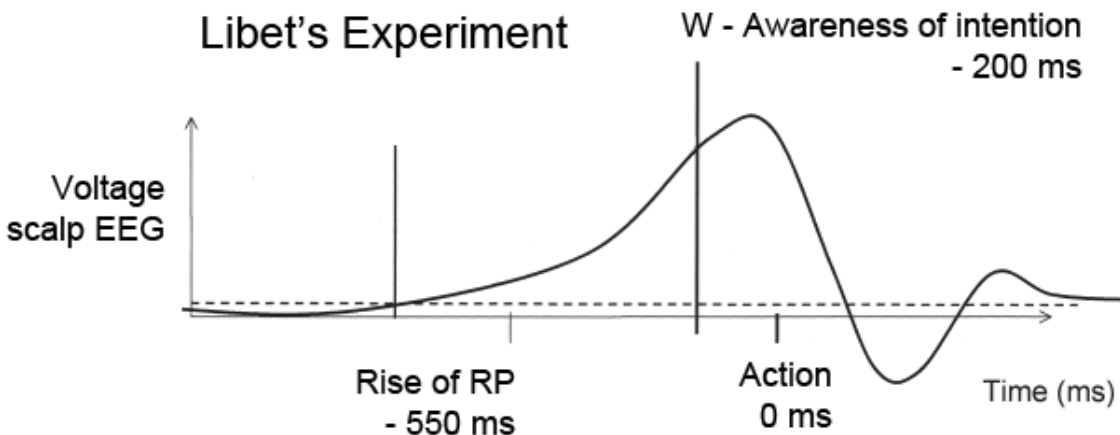


Free Will and Neuroscience

More recently, experiments in neuroscience have claimed to demonstrate that decisions are actually made in the brain prior to us being consciously aware of them. If that is right, then this seems to undermine the possibility of free will.

1. The Libet Experiment: The most famous of these experiments is that of Benjamin Libet. In [that experiment](#), test subjects were hooked up to a brain scanner and asked to flex their wrists whenever they wanted to. They were also asked to watch a special clock and record the time at which they made each decision to flex. ([Here](#) is a gif of what the clock looked like).

What Libet found is that test subjects reported that they made a decision to flex, on average, about 0.15 seconds before their muscles actually flexed (after correcting for the 0.05 second error of subjects). However, their brain showed signs of “ramping up” to flex (he calls this the “Readiness Potential”, or RP), on average, about .55 seconds before their muscles flexed. Graph depicting this:



Conclusion: The brain shows signs of being about to produce muscle motion about 0.4 seconds before we report that we are AWARE of having made a decision to move our muscles.

What this means for free will: The results seem to indicate that what may seem to be a freely made decision is actually a decision that is made *unconsciously* BEFORE one is consciously aware of having made it. If that is correct, then there seems to be no room to say that we are consciously in CONTROL of our decisions. Libet writes,

The initiation of the freely voluntary act appears to begin in the brain unconsciously, well before the person consciously knows he wants to act! Is there, then, any role for conscious will in the performance of a voluntary act? (51)

2. Some Distinctions: Al Mele criticized this interpretation of Libet's experiments, claiming that it rests on a confusion over a number of important distinctions:

- (a) Actions, Intentions, Wants, and Urges: We often get *urges* to do things. But, urges are not always for things that we even WANT to do; for instance, I sometimes get the urge to steer my car off of a cliff (though I don't actually want to, nor do I form the intention to do it, nor do I act on it, thankfully).

We often *want* things. But, we don't always pursue what we want. For instance, every night I find myself wanting to eat ice cream (though I seldom actually act on it, or even form the intention to act on it).

We often form the *intent* to act in certain ways. But, we don't always follow through with action. For instance, I intended to get a lot of work done today. What I actually did was get distracted and did hardly any work at all.

So, actions can be preceded by lots of different things, none of which seem to guarantee the action.

- (b) Distal vs. Proximate Intentions: We can form intentions to do things immediately or at some time in the future. For instance, I can form the intention to call my sister NOW (a proximate intention), or the intention to attend a lecture NEXT WEEK (a distal intention).
- (c) Specific vs. (Relatively) Unspecific Intentions: Our intentions can also be more or less specific. For instance, I can form the intention to buy a car some time this year (relatively unspecific), and later form the intention to buy THIS particular Tesla (specific).

Now, what is interesting about the original Libet experiments is that it was designed ONLY to record data when the subject's wrist flexed. But, then, there might have been instances of RP (the brain ramping up to flex) that were NOT recorded, because the wrist was never flexed. If this were true, then this would be evidence that the brain activity was not a guaranteeing cause of action.

In fact, Libet performed a separate experiment where he asked subjects NOT to flex their wrists, but merely "get ready" to do it at a particular time, and then not actually do it. In these trials, RP was still recorded.

Mele asks: So, what is RP recording? Surely not an INTENTION to flex. For, in the latter test, the subjects did NOT intend to flex. One can't intend to flex and also not intend to flex at one and the same time. However, note that wants and urges don't follow these same rules. It IS possible to both want ice cream and not want ice cream at one and the

same time (for instance, perhaps I want it because it will taste amazing, but I don't want it because I am trying to lose weight). So, RP must really be capturing something more like an URGE than an intention to act.

Mele believes that this interpretation of the data is supported by reflex studies. For instance, in one study, test subjects are told to get ready to press a button when they hear a first tone. Then, when they hear a second tone, they are to press a button immediately. Mele believes that this study can give us a picture of how long it takes for movement to occur after a PROXIMATE INTENTION is formed (rather than simply an urge or want). It turns out that test subjects pressed the button, on average, .231 seconds after the tone. Adjusting for the time it takes for the tone to vibrate the eardrums, and for this signal to reach the brain (less than a tenth of a second), it turns out that the time between the proximate intention and the action falls almost exactly at the 0.15 second mark... Which is exactly where Libet's subjects report becoming aware of the intention to flex.

3. Free Won't: Interestingly, Libet himself has come around to Mele's way of thinking, and now believes that his experiments leave some room for free will. Or, rather, "free won't". The point of no return doesn't occur until about .05 seconds before muscle activation; i.e., if the brain is sending out a signal to move a muscle, it cannot be stopped within .05 seconds of the muscle movement. Given that agents become aware of the decision to move .15 seconds before muscle activation, this leaves 0.1 seconds, or a one-tenth of a second window during which Libet thought that the agent had the ability to "veto" the urge to move.

So, perhaps the URGES are delivered outside of our control, but WHICH urges we give in to and which ones we don't ARE within our control (due to our veto power).

As a side note, he points out that we should not view bad urges as sinful, since we are not responsible for them. They simply "bubble up" in the brain, entirely outside of our control. What agents should be held accountable for are their ACTIONS (i.e., their conscious decision to either allow what bubbles up to occur, or veto it instead).

Criticism: However, many do not agree with Libet here, claiming instead that even the apparent "veto" action must also be something that bubbles up, unconsciously, in the brain before we are consciously aware of it.

4. Other Criticisms: There are several other criticisms of Libet's experiments as well:

The Data: Keep in mind that Libet is reporting AVERAGES of all of his data. The 0.55 second number is an average of many numbers, which range wildly all over the place. Many get the impression that, in practice, Libet could just look at your brain scan and predict exactly when you were going to flex. But, this is not the case.

Meta-Cognition: Adina Roskies points out that there is a difference between being aware of something and being aware THAT you are aware of something. For instance, she gives an example of stopping at a red light. If there is free will, then you are aware of the red light and freely, consciously, form the intention to stop. But, how often are you aware OF this intention? Much of what we are aware of seems to occur sort of on "auto-pilot", or at a lower level. It takes more concentration to become aware OF the fact THAT you are aware of something. Obviously, if there is such a distinction, then awareness will occur BEFORE meta-awareness; so, perhaps, the -0.55s number is a report of awareness, and the -0.15s number is a report of meta-awareness.

Significant Decisions: Flexing a wrist isn't a very significant decision. Nothing rests on it. It is unimportant. So, even if we AGREE with the interpretation of the Libet experiment which says that the actions in that experiment were not free—this does not settle the question of whether or not we EVER act freely. For instance, with more important decisions, there is a long deliberation process which precedes the decision, where we consider various possibilities and weigh our options, thinking long and hard about it (e.g., which school to attend, who to marry, which candidate to vote for, etc.). Libet's experiment does nothing to show that THESE sorts of actions cannot be free.

5. The 7-10 Second Experiment: A more recent experiment by Max Planck Institute neuroscientist John Dylan-Haynes has also made some waves. In his experiment, test subjects are told to push one of two buttons, whenever they wanted. By examining patterns in the brain via fMRI, the experimenters were able to predict which button the subject would push next, **7 to 10 seconds before they did so!**

At least... This is how the media reported the results (e.g., [here](#)); and this is how Dylan-Haynes himself reports his findings [here](#) (he describes this experiment from 9:00-11:42).

In reality, scientists were only able to predict with 55% accuracy which finger would be moved next. But, if you were just RANDOMLY guessing 'button1' or 'button2', you'd have a 50% chance of being right. So, the Dylan-Haynes experiment only showed that, by scanning the brain, we have a *slight* prediction advantage over chance. Really, not very exciting.