FREE WILL VS. SCIENCE

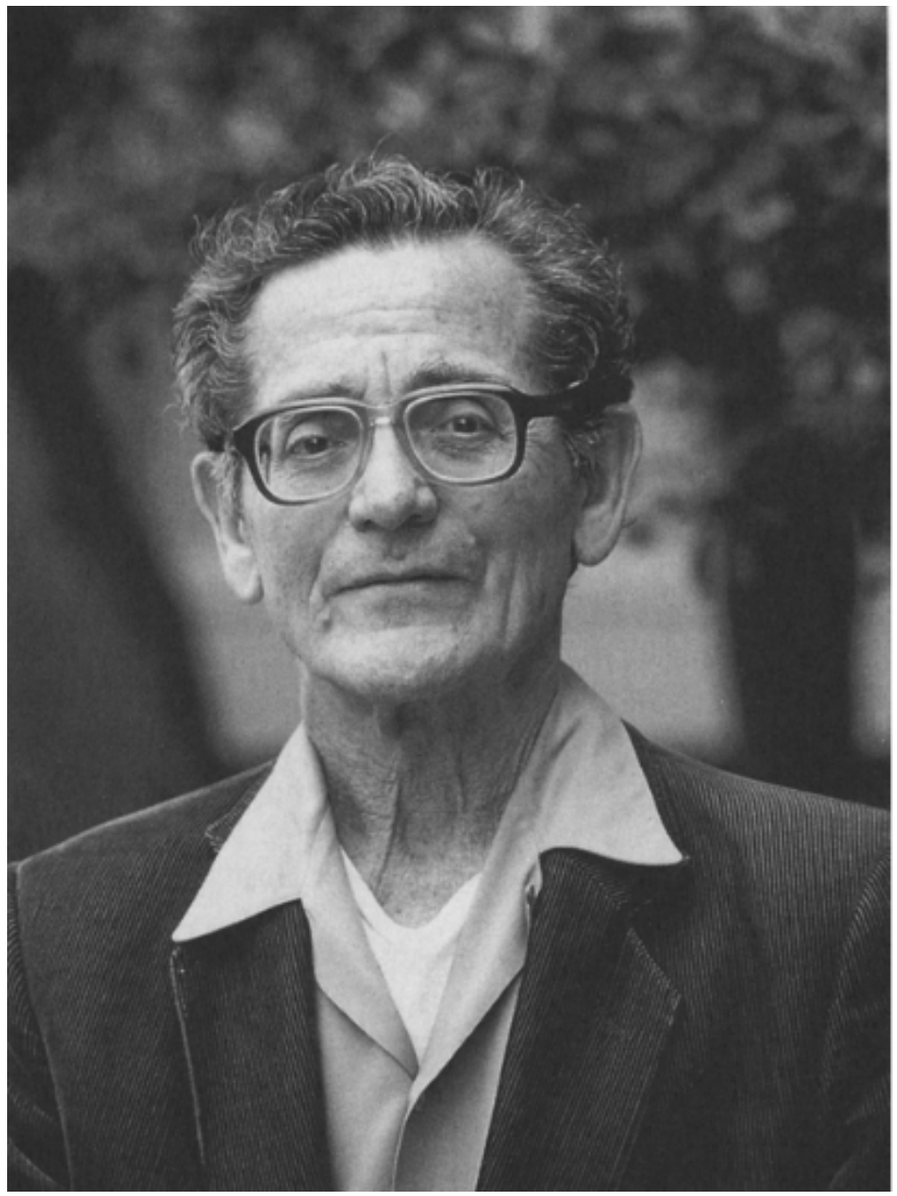
the Libet experiments

replies to Libet

is free will an important good?

In ancient times, philosophers worried about the challenge to free will from fate. After the birth of modern physics, many worried about the challenge to free will from determinism. Our topic today is a much more recent challenge: the challenge to free will posed by contemporary neuroscience.

In particular, our focus will be on some groundbreaking experimental results obtained by the late American neuroscientist Benjamin Libet.



Libet's work was on the neuroscience of consciousness. Since Libet thought, not unreasonably, that free choices had to be conscious, he thought that we could try to design experiments which would show whether or not people had free will.

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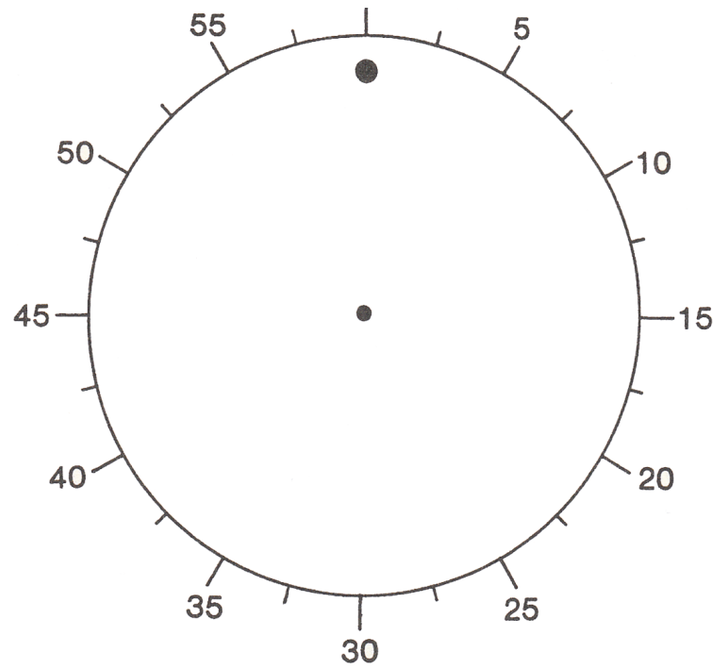

Here is how Libet describes the instructions given to these subjects:

> The subject was asked to wait for one complete revolution of the CRO spot and then, at any time thereafter when he felt like doing so, to perform the quick, abrupt flexion of the fingers and/or the wrist of his right hand (*see* Libet *et al.*, 1982). An additional instruction to encourage 'spontaneity' of the act was given routinely to subjects in Group 2 and only in the latter half to two-thirds of sessions with Group 1. For this, the subject was instructed 'to let the urge to act appear on its own at any time without any preplanning or concentration on when to act', that is, to try to be 'spontaneous' in deciding when to perform each act; this instruction was designed to elicit voluntary acts that were freely capricious in origin.

Subjects were then asked to note where the spot on the clock was when they had the urge, or desire, to flex. This was used to record the time of, as Libet thought of it, the subject's conscious willing to flex his or her hand. Libet called this the "W time."

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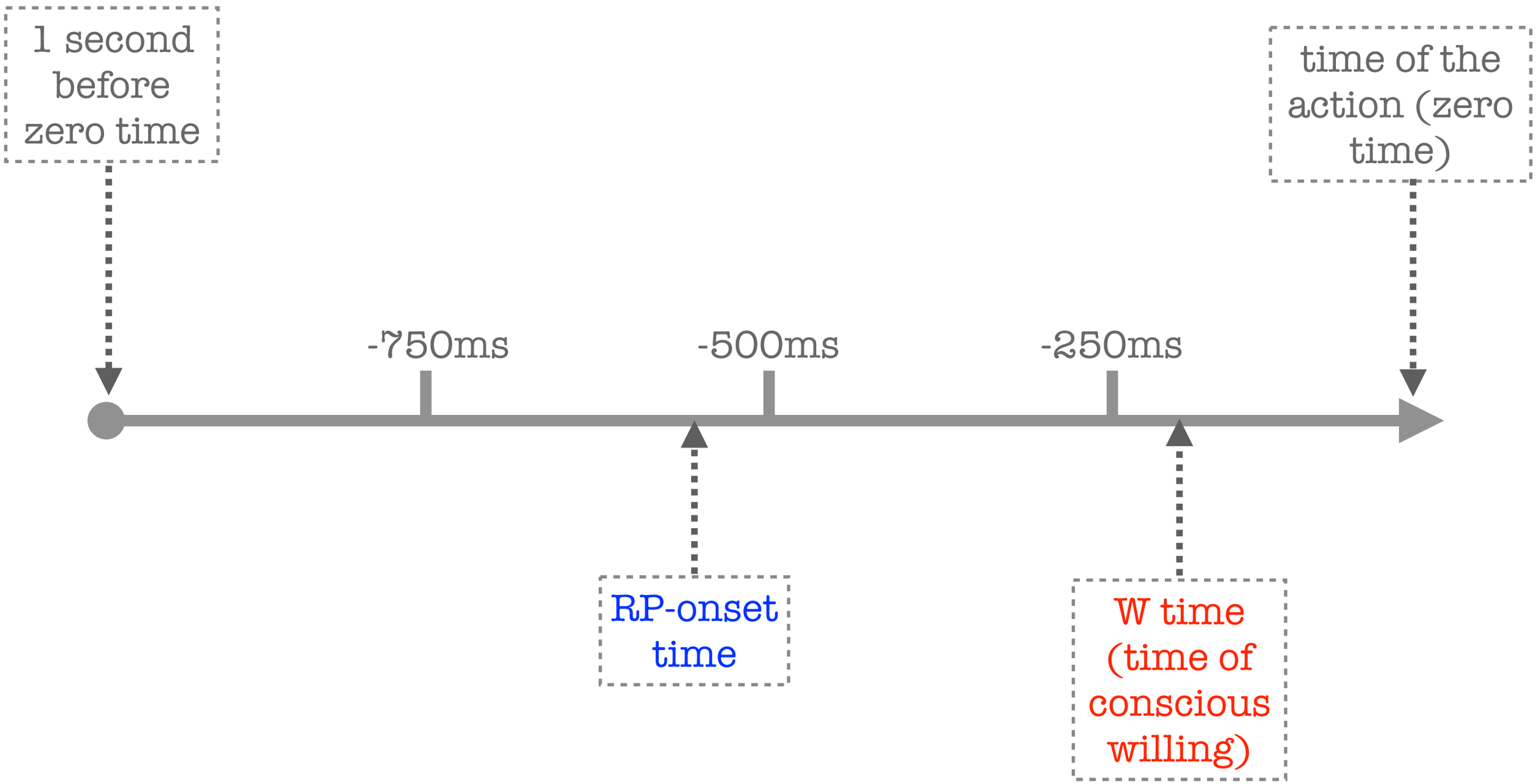
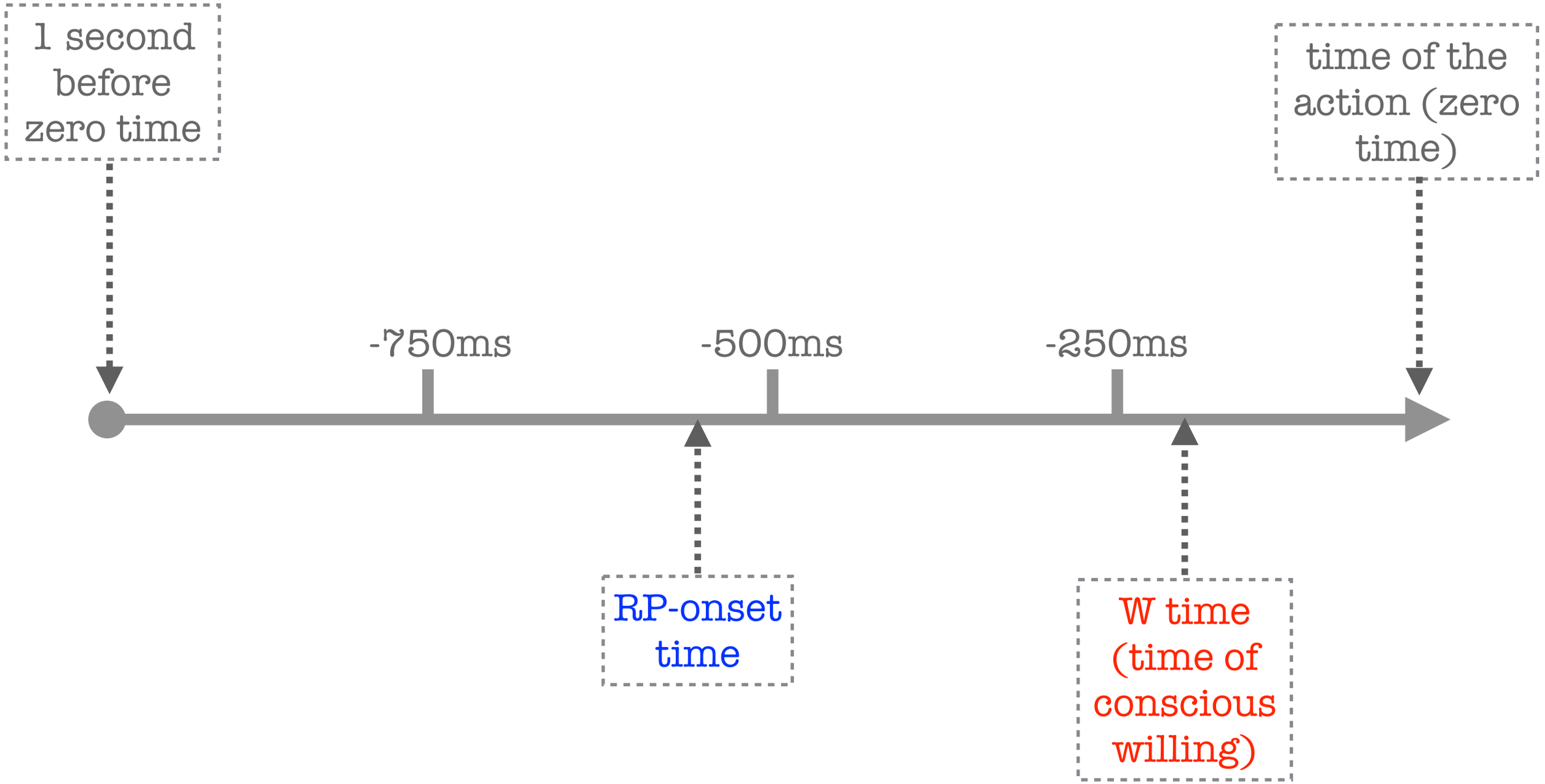
This was then compared with the time at which certain brain events, measured by EEG, occurred in the subject. These were brain events which other experiments had shown to precede certain intentional actions. The increased brain activity which occurs prior to a certain sort of intentional action is called that action's readiness potential. Libet called the times at which subjects showed a readiness potential for flexing their hands "RP-onset times."

The W time and the RP-onset time were then compared with the "zero time" — the time at which the subject's hand actually flexed.

When Libet compared these times, he found something remarkable.





It appears that the subject's brain is ready to flex the hand about 350ms before the subject's experience of consciously deciding to flex his or her hand.

This makes it seem as though the conscious "decision" to flex one's hand is not really a decision at all — that decision has already been made, unconsciously, by the brain.

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And, Libet thought, an unconscious decision made in the brain, prior to any conscious act of deciding, cannot be free; free decisions must be consciously made.

Does this show that there is no space for conscious free will? Libet thought not.

> There could be a conscious 'veto' that aborts the performance even of the type of 'spontaneous' self-initiated act under study here. This remains possible because reportable conscious intention, even though it appeared distinctly later than onset of RP, did appear a substantial time (about 150 to 200 ms) before the beginning of the movement as signalled by the EMG.

Libet thought that, in the time between W time and the time of the action, the subject may be able to block the execution of the action which had already been decided on, unconsciously, by the brain.

And in fact Libet carried out further experiments which he took to show that this is indeed possible.

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In these experiments, subjects were instructed to do two things. (1) Prepare to flex at a specific target time — say, when the dot is at "30." (2) Do not flex at that time.

In these experiments, Libet observed higher EEG readings — and thus readiness potential to flex — about a second before the target time. These EEG readings were remarkably similar to those at about -500ms in the original study.

However, the EEG readings decreased around 200ms before the target time — not far off of the W time from the previous experiment.

Libet took this to mean that the subjects in the "veto" experiment decided to flex at the target time, but were able to exercise conscious free will to veto this decision about 200ms before the action.

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Is this good news for free will? Yes and No. Yes, because it appears to make room for conscious free will. No, because it gives conscious free will a disappointingly limited role to play.

In another paper, Libet described the situation as follows:

> Assuming that one can extrapolate these results to volitional acts generally, they do not exclude a possible role for free will, even though the volitional process starts with unconscious cerebral activity. However, the potential role of free will would be constrained; it would be changed from being an initiator of the voluntary act to one only of controlling the outcome of the volitional process, after the individual becomes aware of an intention aware of an intention or wish to act now. In a general sense, free will could only select from among the brain activities that are a part of a given individual's makeup.

From Libet et. al., "The Neural Time-Factor in Perception, Volition, and Free Will"

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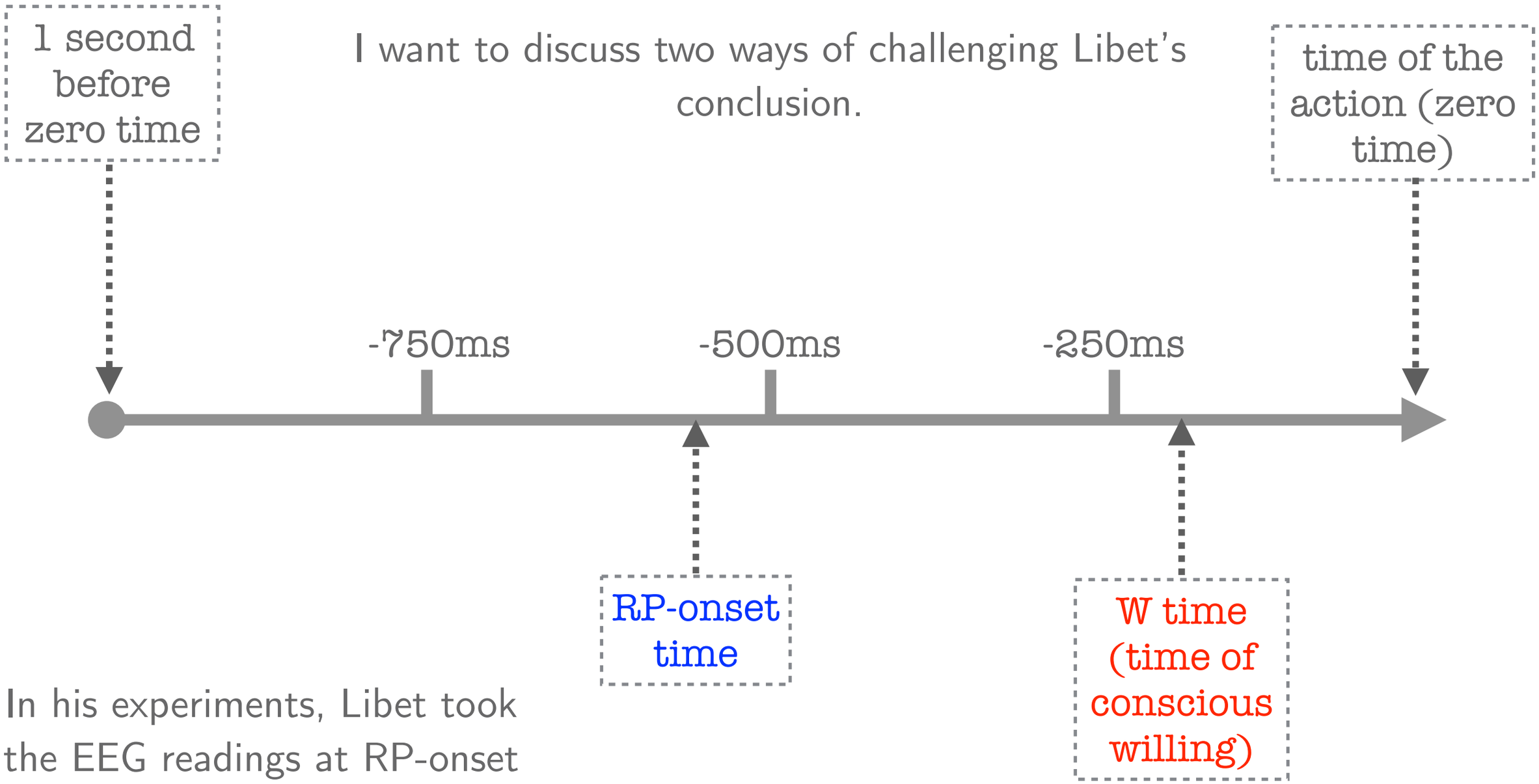
The Libet experiments are a nice example of the interconnectedness of science and philosophy. Often in the history of philosophy, philosophers have formulated a deep and interesting question, which then inspired scientists (who, in many cases, were themselves philosophers) to formulate experiments which promised to answer the question.

Our question is: do Libet's experiments show that free will is limited in the way that he suggests?

I want to discuss two ways of challenging Libet's conclusion.



In his experiments, Libet took the EEG readings at RP-onset time to indicate an unconscious decision to act. This leads to two questions.

Is RP-onset an unconscious decision?

If RP-onset is an unconscious decision, does that limit our free will?

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Is RP-onset an unconscious decision?

There is wide experimental confirmation of the fact that the sort of increased brain activity which occurs at RP-onset is correlated with actions. But that does not mean that it is an unconscious decision. Perhaps, for instance, RP-onset is a process which sometimes leads to a decision, rather than the decision itself. Maybe it just shows that the action is being considered, or imagined.

Some aspects of Libet's experiments, in fact, suggest that RP-onset is not a decision.

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Is RP-onset an unconscious decision?

Recall the "veto" experiment, in which subjects were asked to prepare to flex their hands at a certain time, but then not flex them at that time.

In that case, the electrical activity in the brain was extremely similar to that observed at RP-onset in the original experiment.

But did subjects in the veto experiment ever decide to flex their hands?

Suppose that I asked you to prepare to sing the Fight Song in 2 minutes, but not do it. Would you have decided to sing the Fight Song?

Indeed, it seems impossible to decide to do something that you have also decided not to do. If I offered you a large reward to for deciding, at will, to sing the Fight Song and then not do it, you would not be able to claim the reward.

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Is RP-onset an unconscious decision?

But did subjects in the veto experiment ever decide to flex their hands?

If subjects in the "veto" experiment never decided to flex their hands, and their brain activity was very similar to that observed at RP-onset, that strongly suggests that RP-onset is not a conscious decision.

This is also suggested by the timing of the original experiment.

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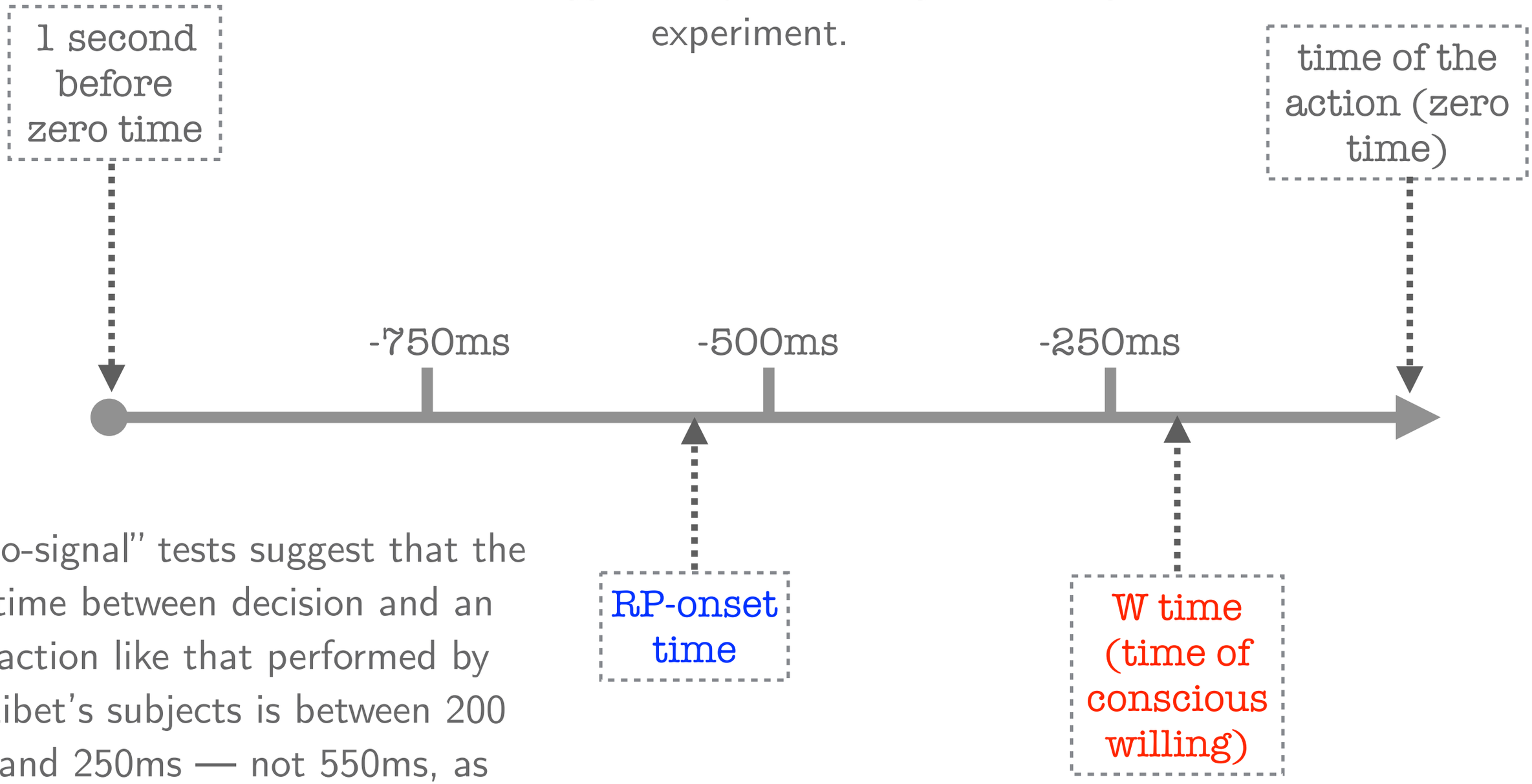

"Go-signal" tests suggest that the time between decision and an action like that performed by Libet's subjects is between 200 and 250ms — not 550ms, as would be the case if RP-onset were a decision.

This also fits nicely with the alternative hypothesis that the decision does not take place at RP-onset time, but at W time.

If RP-onset is an unconscious decision, does that limit our free will?

These are serious worries about Libet's argument. But let's set them aside and ask: if RP-onset is an unconscious decision, how damaging is that to our belief in freedom of the will?

One might think that it is not very damaging, on the grounds that the actions subjects perform in the Libet experiments are in some ways different than paradigm examples of free action.

Libet seems to disagree with this:

> The present evidence for the unconscious initiation of a voluntary act of course applies to one very limited form of such acts. However, the simple voluntary motor act studied here has in fact often been regarded as an incontrovertible and ideal example of a fully endogenous and 'freely voluntary' act. The absence of any larger meaning in the simple quick flexion of hand or fingers, and the possibility of performing it with capriciously whimsical timings, appear to exclude external psychological or other factors as controlling agents. It thus invites the extrapolation that other relatively 'spontaneous' voluntary acts, performed without conscious deliberation or planning, may also be initiated by cerebral activities proceeding unconsciously.

If RP-onset is an unconscious decision, does that limit our free will?

This is not unreasonable — we do often use simple acts, like deciding to scratch one's nose, as an example of a free action.

But Libet's subjects are in one central respect different than subjects of ordinary free actions: they are asked to be as spontaneous as possible, and avoid planning when they will flex their fingers.

That is not how most free actions work; in the case of most free actions, we consciously consider pros and cons of the action, and plan when to carry the action out.

This fact leads to a possibility that is worth considering.

Consider your decision to come to Notre Dame. Here is one way things could have gone:

The decision

You consciously thought about it for a long time. You weighed the pros (great academic reputation, football, wonderful philosophy professors) and the cons (weather, the university theology requirement). Finally, after months of stewing, you decided to come to Notre Dame. That decision involved a brain event and a conscious awareness of the decision. The brain event (RP-onset) occurred about 300ms before the conscious awareness.

Would the fact that that the brain event occurred 300ms before the conscious awareness make your decision unfree? If not, then why should we think that Libet's data — even if RP-onset is an unconscious decision — tells us much about free will?

Is RP-onset an unconscious decision?

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Libet's experiments are fascinating. But one can challenge both his views about when unconscious decisions occur, and his views about the significance of the timing of unconscious decisions.

There is much ongoing work in neuroscience and social science about the will and freedom of the will. If you'd like to know more, a good overview is the philosopher Alfred Mele's book *Free.* Many of the critical points made above are due to his work.

We are near the end of our discussion of freedom of the will. Free will is an important topic in its own right; but as we have seen, questions about free will are also closely intertwined with questions about the existence of God.

Our discussion of the free will defense identified two important assumptions which someone hoping to explain evil in terms of free will must make.

We have free will.	Free will is a great good.	Even God could not have given us free will while ensuring that we never used that free will to bring about evil.

We have talked at length about the first. Has our discussion of free will shed any light on the second two assumptions?

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Even God could not have given us free will while ensuring that we never used that free will to bring about evil.

The first topic we discussed in connection with free will was the question of whether free will is compatible, or incompatible, with determinism.

A good case can be made that the above assumption requires that free will be **incompatible** with determinism.

For suppose that free will was compatible with determinism. Then presumably God could have determined us to freely choose the good on every occasion.

That, if you recall, was exactly Mackie's objection to the free will defense.

So it looks like the free will defense requires, not just that we have free will, but that free will be incompatible with determinism.

Free will is a great good.

Let's turn to the last assumption that the free will defense requires: the assumption that free will is a great good.

Many people think that it is; many think that life would not be worth living, or at least would be considerably worse, if we did not have free will.

Here's one way to call that assumption into question:

> It is very important that we **feel** as though we have free will. Life would not be worth living if I did not feel as though my decisions were up to me. But it does not matter to the value of my life whether I really have free will; I would be just as well off if I were convinced that I had free will, but really didn't.

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Suppose that this were true. Why would that matter?

Well, God could presumably have given us the **feeling** of free will while ensuring that we never brought about evil. So if the feeling or illusion of free will is really all that matters, it seems like it would have been better for God to create a world in which we have the feeling of free will but in which there is no evil. But then why wouldn't a perfectly good being have created **that** world?

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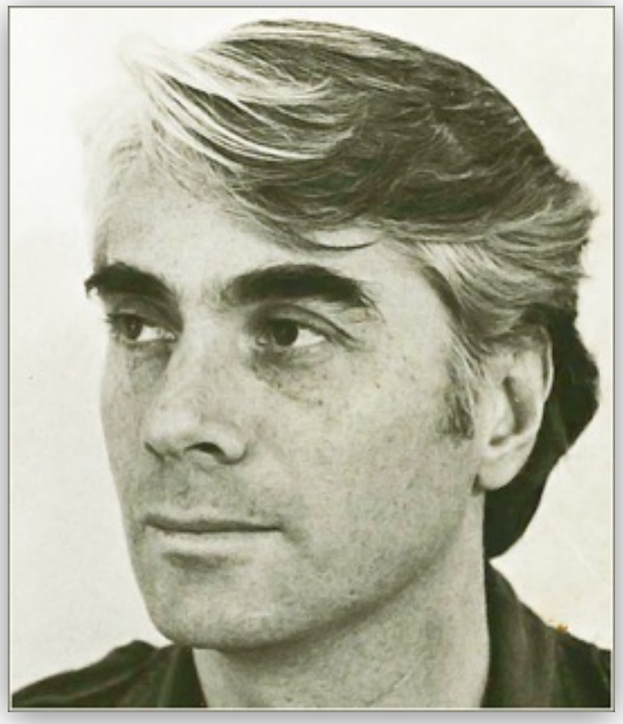
The question we are raising is related to a famous thought experiment from the philosopher Robert Nozick.



> "Suppose there were an experience machine that would give you any experience you desired. Superduper neuropsychologists could stimulate your brain so that you would think and feel you were writing a great novel, or making a friend, or reading an interesting book. All the time you would be floating in a tank, with electrodes attached to your brain ... Would you plug in? What else can matter to us, than how our lives feel from the inside?

Presumably the experience machine would also give you the illusion of free will. You would have the feeling that you were making decisions, an accomplishing things on your own. (Of course, while you were in the experience machine you would not know that you were in the experience machine — that would ruin the illusion.)

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If given the choice, would you plug in? (You needn't worry about your friends and family — they would have the opportunity to plug into their own machines.)

Nozick thought that, on consideration, people would choose not to plug in:

> "We learn that something matters to us in addition to experience by imagining an experience machine and then realizing we would not use it. ... Perhaps what we desire is to live ourselves, in contact with reality. (And this, machines cannot do for us.)"

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Naomi is married with children, and has many friends. She loves her spouse, children, and friends, and they love her too.

Susan is married with children, and has many friends. She loves her spouse, children, and friends. But they do not love her. Her spouse has been having an affair for many years, and her children resent her. Her friends complain about her to each other. But her spouse, children, and friends conceal this from Susan; they act toward Susan just as they would have if they genuinely loved her. Susan never finds out that this is just an act.

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Does Naomi have a better life than Susan? Which would you choose? Many are inclined to favor Naomi's life.

But if that is right, then perhaps friendships and other loving relationships — and not just the illusions of friendships and loving relationships — matter to the value of your life.

Does Naomi have a better life than Susan? Which would you choose? Many are inclined to favor Naomi's life.

But if that is right, then perhaps friendships and other loving relationships — and not just the illusions of friendships and loving relationships — matter to the value of your life.

If that is right, perhaps a similar thing should be said about free will. Your life being up to you — and not just the illusion of your life being up to you — matters to the value of your life.

That may explain the resistance that some feel to plugging in to the experience machine. If that is right, that lends some support to the idea that free will, and not just the feeling of free will, really is an important good.