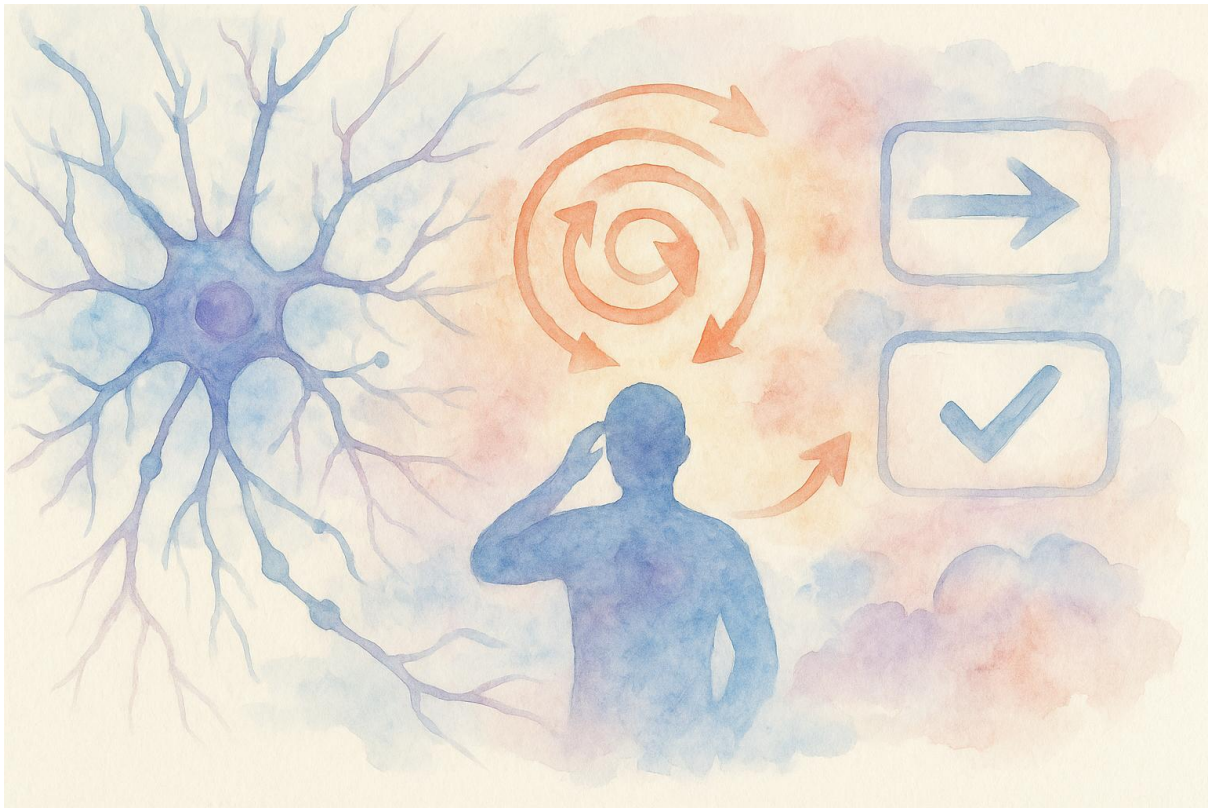


The Brain Doesn’t Wait for Permission: What Timing, Prediction, and Neuroscience Reveal About Human Decision Making

By David Slater —

Most decisions feel like they happen in the moment we notice them. We sense, decide, and act — often so quickly that the experience feels immediate and intentional. But the more we learn from neuroscience, the clearer it becomes that the mind we *experience* is not the first point of action; it’s the last layer in a multi-stage timing architecture.

In other words:
we think we decide, and then act — but in biological time, the sequence often runs the other way around.

This emerging framework comes from multiple strands of research — neural oscillations, predictive processing, voluntary-action experiments, and strategic decision theory — and they are beginning to converge on a single idea:

The brain predicts first, and reasons only when prediction fails.

If the environment matches expectation, behaviour is fast, fluent, and largely unconscious.
If something deviates from the expected pattern, the entire tempo of cognition shifts. Everything slows down — not because we have become indecisive, but because the nervous system is updating its internal model before committing to action.

Prediction Before Perception

At the edges of the nervous system, sensory receptors act less like microphones and more like **filtering gates**. They only send information inward when something crosses a threshold of relevance — intensity, novelty, or mismatch. Most of what is stable and predictable simply doesn't make it through.

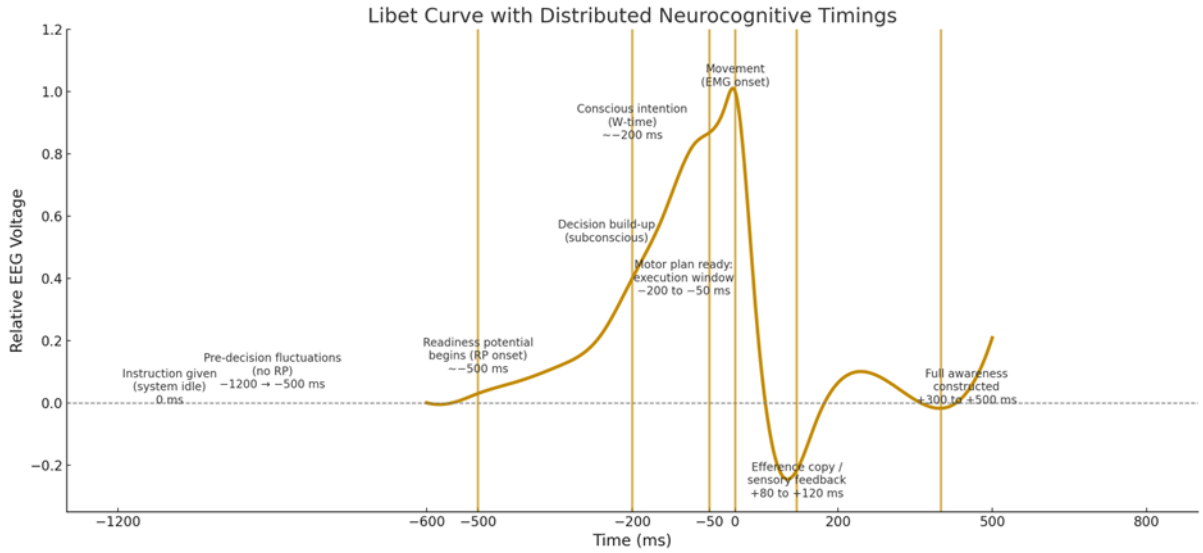
So perception is not a feed. It's an exception report.

The brain runs on efficiency. When the world behaves the way it expects, there is little benefit in burning metabolic resources double-checking the obvious. Instead, internal models handle prediction and execution, and behaviour flows automatically.

Only when sensory evidence contradicts expectation does the brain escalate processing.

That moment — the gap between "everything matches" and "wait, not quite right" — is where timing becomes visible.

The Fast Path: Action Without Deliberation



"Neural preparation precedes conscious awareness — the baseline fast pathway."

When Benjamin Libet demonstrated that the brain prepares voluntary movement before subjects report deciding to act, it seemed to challenge our belief in conscious agency. The neural readiness signal began rising roughly half a second before movement — long before participants noticed the intention forming.

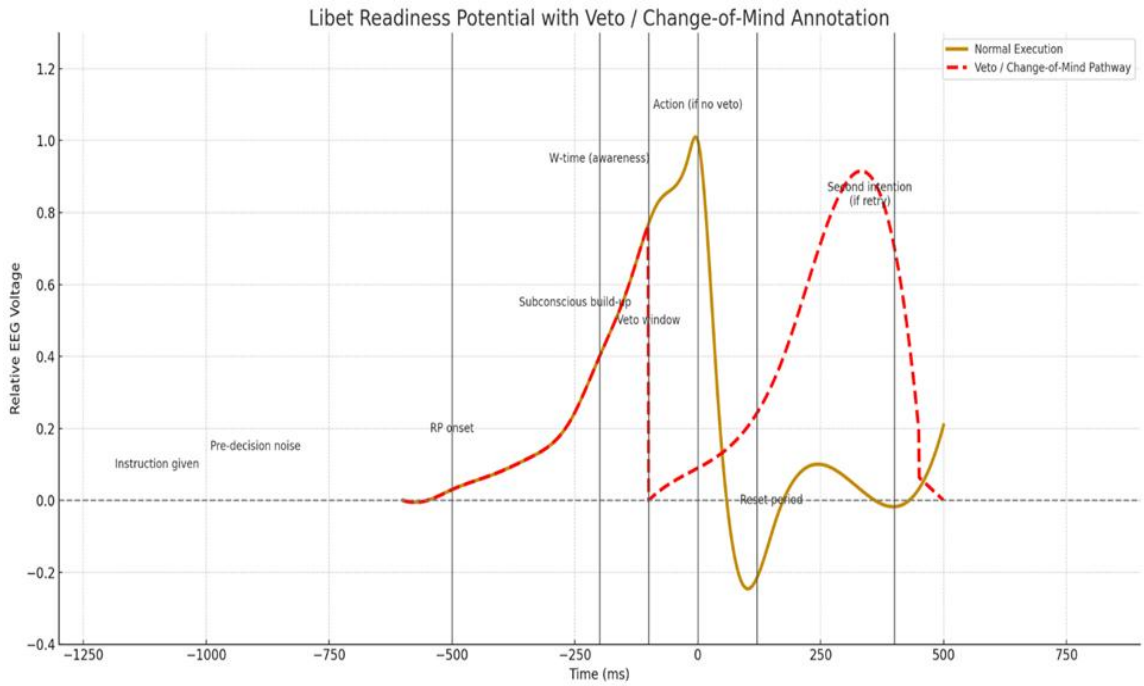
The subjective experience of "I choose now" appeared only around 200 ms before movement. Meaning: by the time we *feel* we've made a decision, the nervous system has already committed.

This fast pathway matches real-world behaviour where confidence is high and prediction error is low. Skilled athletes, musicians, drivers, surgeons, and pilots don't *think before acting* — they act, and thought follows as a confirmation.

When the world aligns with expectation, the loop from perception to action can complete in **100–250 milliseconds**. That timing is too fast to be fully deliberative. It is prediction turning directly into execution.

It feels like intuition, but biologically it is something more precise:
pre-validated action, already rehearsed and already trusted.

When the Unexpected Appears: Time Expands



(Prediction-Error / Second-Curve Veto Model — Libet Extended)

"When prediction fails, the neural pathway diverges and timing stretches."

The rhythm breaks when the environment delivers something novel, ambiguous, or contradictory.

In these moments, a measurable delay of **300–500 milliseconds** emerges. This additional window is where the nervous system:

- suppresses the first impulse,
- evaluates competing possibilities,
- updates the predictive model,
- and only then — selects a revised action.

This pattern maps directly onto Kahneman's description of System 2 thinking: slow, effortful, reflective. But here, it is not a metaphor — it is timing.

Even more striking is the discovery that people can **cancel or redirect a prepared action in the final 50–150 milliseconds** before movement — but only if the brain has already entered the slower mode first. The circuitry responsible for this late correction involves the right inferior frontal gyrus, anterior cingulate cortex, and subthalamic nucleus — the neural "stop system."

In everyday experience, this is the moment behind phrases like:

- "I nearly said something I'd regret."
- "I caught myself."

- “I was going to—but something made me pause.”

That “something” is the brain detecting prediction error and stepping out of automatic mode.

Rethinking the OODA Loop — Not as a Model, but as Timing

Boyd’s OODA loop was never meant as a rigid cycle — it was designed as a tool for understanding advantage in rapidly changing environments. And viewed through the lens of neural timing, it becomes clear why it works:

- When prediction holds, **Observe → Decide → Act** collapses into a single rhythm.
- When prediction fails, the **Orient** phase expands — costing time, but enabling adaptability.

Boyd suggested that the winning actor is not the fastest mover, but the one who updates their internal model fastest. Modern neuroscience agrees.

A Biological Reading of the OODA Loop

Boyd’s insight now becomes measurable in milliseconds:

OODA Phase	Neural Process	Timing
Observe	Sensory input → prediction comparison	~80–120 ms
Orient	Internal model update (only if needed)	+300–500 ms
Decide	Action commitment / inhibition resolved	+50–150 ms
Act	Execution and feedback	Immediate → +120 ms

The person, system, or organism that can **shift modes most efficiently** — automatic when the world fits, reflective when it doesn’t — gains the advantage.

So Where Is Free Will?

Libet’s early conclusions were interpreted as proof that conscious will doesn’t exist. But the newer picture is more subtle — and more interesting.

Consciousness doesn’t appear to initiate most actions.
Instead, it steps in when:

- ambiguity is present,
- prediction is wrong,
- or a different outcome matters.

Our strongest experience of agency is not in starting behaviour — but in changing, stopping, or revising it.

If there is a meaningful seat of free will, it sits not at the beginning of action, but in the **gap between automatic execution and correction** — the biological pause where reflection becomes possible.

And that pause — consistently, across experiments — takes **roughly 300–500 milliseconds.**

Human cognition appears to be a **two-speed predictive engine**.
Fast when the world behaves as expected.
Slow when the world forces revision.

That extra half-second — neither long nor short, but just enough — is where learning happens, strategy forms, emotional control appears, and where something recognisably human quietly lives.

We don't always choose the first action.
We choose whether to let it proceed.

And in that moment — the pause before commitment — we find the beginnings of thought, adaptation, and agency.