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The Timing of a Conscious Decision: From Ear to Mouth.

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Brain potentials and volition

Libet, Gleason, Wright, & Pearl (1983) asked participants to report the moment at which they freely decided to initiate a pre-specified movement, based on the position of a red marker on a clock. Using event-related potentials (ERPs), Libet found that the subjective feeling of deciding to perform a voluntary action came *after* the onset of the motor “readiness potential,” RP). This counterintuitive conclusion poses a challenge for the philosophical notion of free will. Faced with these findings, Libet (1985) proposed that conscious volitional control might operate as a selector and a controller of volitional processes rather than as an initiator of them.

Methodological issue

Because Libet’s findings rely more than necessary on introspection, we designed a more controlled task in which participants listen to random sequences of digits presented at (1) fixed (1-sec.) vs. (2) variable (c. 1-sec) rates, with instructions to choose spontaneously at some point to repeat a digit they have just heard. The conscious act is assumed to occur somewhere between digit-onset and vocal response. The timed-digit series replaces Libet et al’s clock and the need to both choose and note the time of choosing.

Results and discussion

RP onset occurred earlier in the fixed rate condition. When averaged on the stimulus’ onset, this motor preparation precedes the presentation of the repeated digit (hence, presumably also the decision to respond) in the fixed rate condition, but follows it when the timing is not predictable (though this does not necessarily mean that RP onset does not precede the decision to respond in both conditions).

From these two conditions alone we cannot yet ascertain whether the observed difference is a nonspecific premeditation effect based on the predictability of the interstimulus interval in the fixed-rate condition or the onset of a digit-specific decision. However, these results suggest that it may be possible to triangulate on the instant of a decision by systematically manipulating the task constraints through a series of approximations from a non event-related voluntary action to a forced-choice task, thereby controlling for the potential artifacts, resolving some of the ambiguities, and getting a more fine-grained chronology of conscious decision than is possible in Libet’s original paradigm.

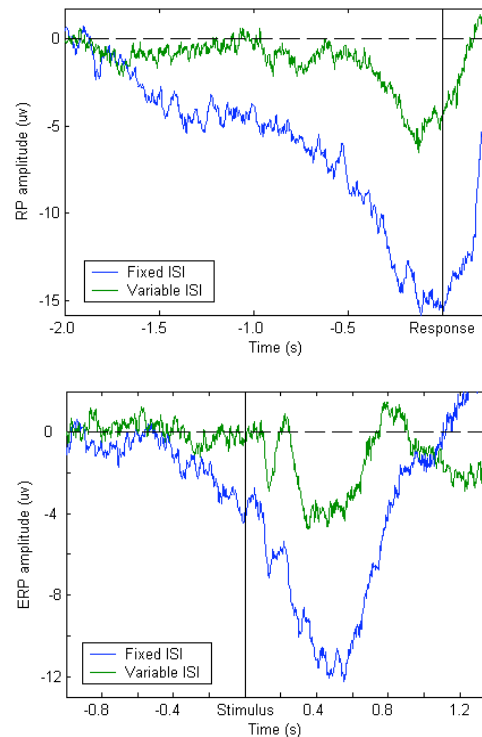


Figure 1: RP’s (Top panel) and ERP’s (Bottom panel) from selected subjects in the fixed and variable rates conditions.

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References

- Libet, B., Gleason, C.A., Wright, E.W., & Pearl, D.K. (1983). Time of conscious intention to act in relation to onset cerebral activity (readiness-potential). The unconscious initiation of a freely voluntary act. *Brain*, 106, 623-642.
- Libet, B. (1985). Unconscious cerebral initiative and the role of conscious will in voluntary action. *Behavioral and Brain Sciences*, 8, 529-566.