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Brainwaves and Intentions: The Readiness Potential and Its Relation to Free Will

Joanna Pak
Chapman University, jpak@chapman.edu

Aaron Schurger
Chapman University

Adina Roskies
Dartmouth College, adina.roskies@dartmouth.edu

Pengbo Hu
Pomona College, phaa2017@mymail.pomona.edu

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Comments

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The readiness potential (RP) originally challenged free will since it was believed to represent an unconscious decision to move. Criticisms of the RP, specifically how the RP is visualized, refute the RP's claim against the existence of free will.

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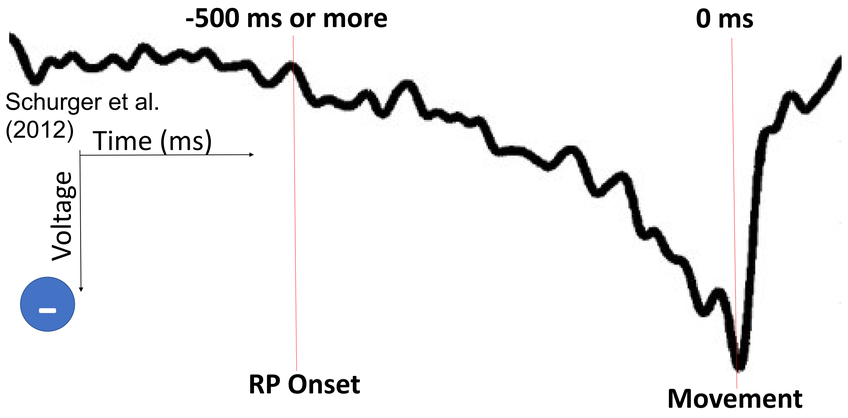
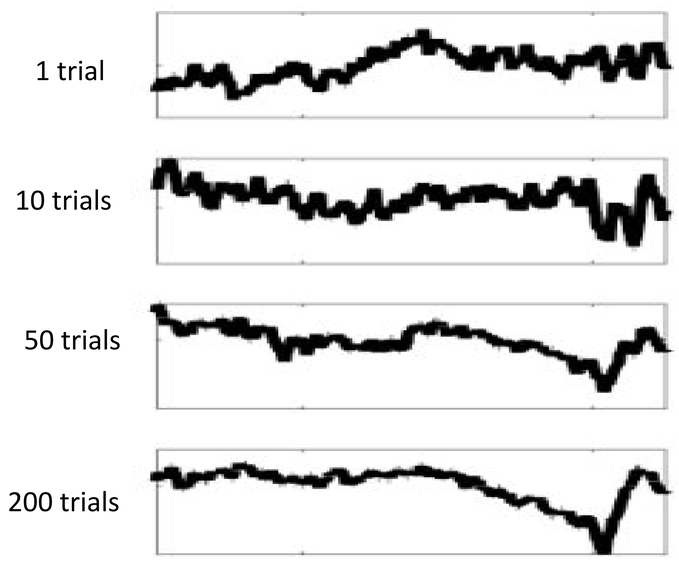
Background

- Kornhuber and Deecke (1965)



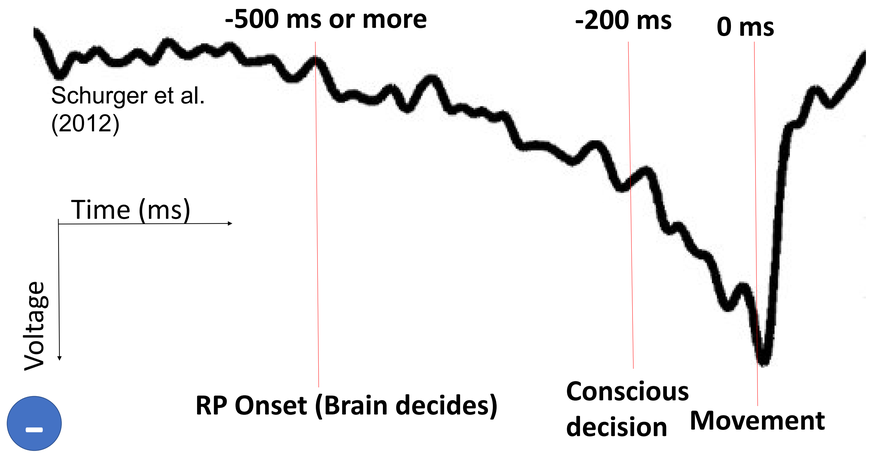
- Ways to measure RP
  - EEG (primary)
  - MEG
  - Single neuron
- Measurable in animals (primates, rodents, crayfish)
- Characteristics vary by individual
  - Some may present a weak RP (or none at all)
- Single trial RP analysis?
  - Difficult to visualize RP without averaging



Models of the Readiness Potential

Classic Model

- Proposed by Libet (1983)

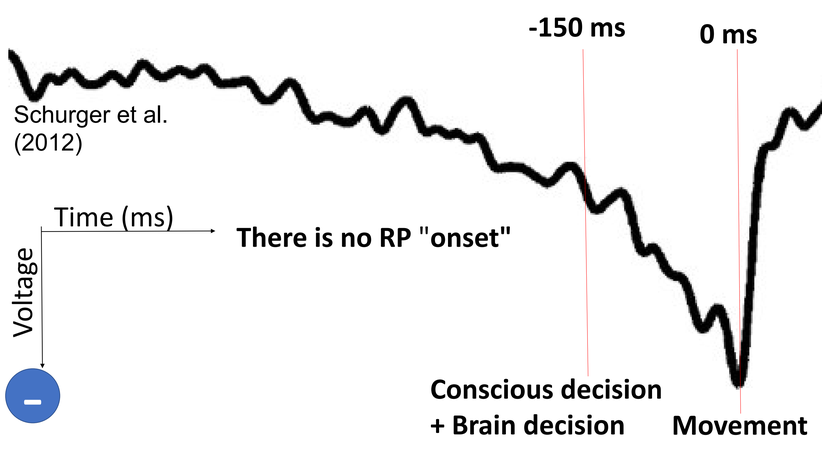


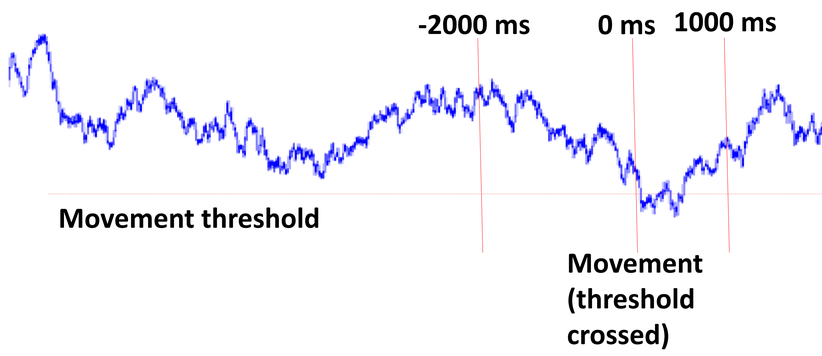
1. RP onset represents the **brain's decision to move**[2]
2. RP exists as **measurable marker** of unconscious brain activity that causes spontaneous movements[2]

- Challenged the existence of conscious free will
- Controversial in neuroscience and philosophy fields
  - Libet's paradox

Stochastic Accumulator Model

- Challenged the classic model





- RP is a product of noise and averaging (not a true predictor of movement)[3]
  - RP onset does NOT represent the beginning of any process [3]
- RP may contribute to the conscious experience of decision making [3]
- **Solution**: holistic measurement of RP
  - Rain example

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References

(1) Kornhuber, H. H. & Deecke, L. Pflügers Arch. 284, 1-17 (1965). **(2)** Libet. Electroencephalography and clinical Neurophysiology. 56(4), 367-372 (1983). **(3)** Schurger, A. PANAS, 109(42), 1-10 (2012).