Cardiac Interoception and Motor Preparation in Libet's task

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Résumé

The Somatic Marker Hypothesis, introduced by Antonio Damasio in 1994, emphasizes the essential role of perceiving 'body states' in decision-making processes. This theory links interoceptive processing to specific brain areas, such as the insula and somatosensory cortex, suggesting their primary function is emotional evaluation of action outcomes. Later, motor initiation was shown to be influenced by the phases of the cardiac cycle (Palser et al., 2021; Al et al., 2023), and even motor agency was suggested to depend on cardiac input (Herman & Tsakiris, 2020). Here, we further explore this perspective on cardiac input for motor preparation, advocating for its possible incentive role in movement execution. We implemented the classical Libet's paradigm with W- and M-experimental condition and 40 self-paced movements per each of the two conditions in naïve participants (n = 41) (Bredikhin et al., 2023). Behavioral data were aligned with the cardiac cycle. We observed a non-uniform distribution of button presses along the cardiac cycle in the W-experimental condition. Button presses predominantly occurred during the diastolic phase of the cardiac cycle, which provides a link between cardiac input and motor initiation. These findings suggest that cardiac interoception relates to motor preparation under conditions of uncertainty, offering a novel interpretation of the W-condition in Libet's task. Moreover, our results reinforce the association between cardiac interoception and the experience of volition in tasks that involve self-paced movements. Overall, our results challenge traditional interpretations of the W-condition and presents an alternative perspective on the 'urge to move' phenomenon.

Mots-Clés: motor execution, volition, cardiac interoception

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