Active sampling during tactile discrimination is modulated by the cardiac cycle

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Introduction

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- > Perception and reasoning vary according to changes inside the body. This has been shown by deliberately locking the presentation of brief stimuli to distinct phases of our bodily cycles; e.g., during the expansion or contraction of the heart (1,2,3).
- > Yet, task-relevant information is not usually encountered in such a phase-locked manner nor passively accessed, but actively sampled at one's own pace.
- > Recently, we have shown that visual sensory sampling (i.e., voluntarily encoding visual stimuli) fluctuates with the cardiac cycle (4, see also 5-6). Here we expand this research by exploring tactile sampling in a free tactile discrimination task.

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• Task: 50 participants performed a free tactile discrimination task. They were instructed to move their index finger up to touch a visually occluded tactile grating. Next, they had to report its orientation (vertical or horizontal: \mathbf{O} or \mathbf{O}). We varied the difficulty by using gratings with different width. · Importantly, participants were instructed to start and stop touching the grating whenever they felt like. Afterwards, they verbally reported the orientation. Meanwhile, we recorded the participants' ECG. While participants performed the task, we recorded the ECG. Next, we examined: Visually occluded grating 1. Whether subjects consistently started/ended/held the touch in a particular phase of the cardiac cycle.





Discussion

Methods

*while the preprocessing and analysis of the data is still ongoing, here some points to be considered.

The influence of the cardiac cycle upon stimulus processing has been reported in passive sampling with brief stimulus presentation. We allowed free active sampling at one's own tempo (in the range of seconds)

- > At the current stage of data analysis, We did not found evidence of phase-locking between participants' haptic behaviour and the cardiac cycle.
- > We only found some evidence of cardiac influence when considering the time of the initial touch (according to the beginning of the heartbeat).
- > The effect of the cardiac cycle might only affect quick biobehavioural responses. Otherwise, afferent cardiac changes might only represent a small influence in 'longer percepts'.

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