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# Unlocking the Brain's Clock: the effects of transauricular vagus nerve stimulation on time processing.

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## Abstract

It has been highlighted that non-invasive stimulation of the auricular branch of the vagus nerve (taVNS) have a neuro-modulatory effects on several cognitive functions. In-fact, the vagal system is central for the organism's homeostatic regulation and it has widespread connections with various cortical and subcortical areas. Hence, our focus on studying the impact of this technique on a multifaceted cognitive process essential in human experience, time perception. Healthy subjects underwent explicit (duration discrimination) and implicit (prediction) temporal tasks during two distinct experimental sessions of stimulation with taVNS: a sham condition (offline stimulator) and an active stimulation condition. Participants' cardiac activity (Heart rate variability) was monitored throughout the experiment. Preliminary results show improved performance during the active stimulation condition, particularly for predictive temporal tasks. TaVNS may enhance brain activity in areas crucial for implicit timing (e.g. upper temporal cortex, lower parietal cortex) and supporting the adjustment process of temporal prediction errors.