

MODULATION OF BRAIN-BODY INTERACTIONS USING NON-INVASIVE BRAIN STIMULATION

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The past decade there has been emerging evidence for the role of aberrant brain-body bidirectional communication in several stress-related affective and somatic health issues. Crucially, non-invasive brain stimulation (NIBS) techniques, such as transcutaneous vagus nerve stimulation (tVNS) and transcranial direct current stimulation (tDCS), can be used to enhance brain-body interactions in both healthy and clinical samples.

In this symposium, researchers from the Universities of Ghent (Belgium), Guglielmo Marconi University (Italy) and German sport University of Cologne (Germany), will present up-to-date research on the use of NIBS to modulate brain-body interactions with the aim to improve cognitive and emotional functioning and related clinical phenomena. Moreover, novel perspectives regarding the use of different types of NIBS interventions to modulate brain-body interactions for research and clinic purposes will be presented.

In the first presentation, Marie-Anne Vanderhasselt (University of Ghent, Belgium) will present state-of-the-art bottom-up and top-down interventions to increase vagus nerve activity and stress resilience.

In the second presentation, Maximilian Schmauß (German sport University Cologne, Germany) will discuss meta-analytical evidence for the modulation of autonomic nervous activity, including vagally-mediated heart rate variability, using different NIBS techniques.

In the third presentation, Stefanie De Smet (University of Ghent, Belgium) will discuss the effects of transcutaneous vagus nerve stimulation (taVNS) on psychophysiological correlates of perseverative cognition following psychosocial stress.

In the fourth presentation, Giuseppe Salvo (Guglielmo Marconi University, Italy), will present his work on the effects of tDCS on disgust, moral rigidity and heart rate variability, and its implications for interventions in patients suffering from obsessive-compulsive disorder.

Finally, Marie-Anne Vanderhasselt (University of Ghent, Belgium) will serve as discussant of the symposium. All speakers will give their views on future research directions on the use of NIBS to modulate brain-body interactions.

Key words: *brain-body interactions - vagus nerve - psychophysiology - transcutaneous vagus nerve stimulation (tVNS) - transcranial direct current stimulation (tDCS) - repetitive transcranial magnetic stimulation (rTMS)*

COMBINING ELECTRICAL STIMULATION AND LIFESTYLE INTERVENTIONS TARGETING THE VAGUS NERVE TO INCREASE RESILIENCE

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Chronic stress has dramatically increased over the last years and is one of the major health concerns of the 21st century. Crucially, bodily functions have received little attention to increase mental health, despite increasing evidence on the impact of mind-body interactions on resilience. An exemplary model is constituted by accumulating empirical support on the longest cranial nerve, the vagus nerve, which enables two-way communication between heart and brain, enabling the ability to engage in an adaptive stress response in a context-appropriate manner. Yet, research on such bidirectional communication so far is mainly correlational. I propose to consider resonant breathing, physical exercise, or transcutaneous vagus nerve stimulation (tVNS) (bottom-up approach, heart > brain), and prefrontal neuromodulation (top-down approach, brain > heart) as evidence-based ways to increase vagal nerve inhibitory control and hence increase flexibility and stress resilience. These promising, likely cost-effective and easily employable techniques can be used alone or in combination, harnessing neurobiological scientific advances to select treatment options with the greatest likelihood of success.

Key words: *resilience - vagus nerve - heart rate variability - resonance breathing - non-invasive brain modulation*