

Neuromodulating Moral Emotions: Effects of tVNS and tDCS on Gastric and Cardiac Rhythm, Disgust, and Dishonest Behavior

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Disgust plays a critical role in shaping moral behavior, particularly in situations involving violations of social or bodily norms. While traditional cognitive-behavioral approaches often struggle to modulate maladaptive disgust responses, recent neuromodulation techniques offer promising alternatives. In a series of studies, we investigated whether transcutaneous vagus nerve stimulation (tVNS) and cathodic transcranial direct current stimulation (tDCS) over the left Insula could attenuate the emotional and behavioral consequences of disgust.

In two different experiments, 60 healthy participants completed two sessions, in which they received either active or sham tVNS (study 1) or tDCS (study 2) while listening to audio narratives designed to elicit neutral, physical disgust (PD), or moral disgust (MD). Gastric activity was continuously recorded using electrogastrography (EGG), while cardiac activity was recorded with electrocardiogram (ECG). After each induction, participants rated their emotional responses (disgust, shame, guilt, etc.) and completed a behavioral task measuring dishonest behavior (Temptation to Lie Card Game).

Our preliminary findings indicate that active tVNS significantly reduced gastric rhythm, and this reduction was associated with lower emotional arousal and reduced immoral behavior in both PD and MD conditions. These results suggest that modulating interoceptive signals via tVNS may reduce the affective impact of disgust and promote more honest behavior.

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No

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