

Stimulating compassion: Using transcutaneous vagus nerve stimulation (tVNS) to probe compassionate behaviour

ABSTRACT:

Background

Mind-body practices like mindfulness- and compassion-oriented meditation, rely on interoceptive attunement and a capacity to regulate interoceptive signals. The vagus nerve (VN) modulates and conveys these bodily signals to and from the brain and may, therefore, have a role in generating physiological states favourable to contemplative practices.

Aims

We tested the putative role of the VN in modulating self-compassion (and related outcomes) using transcutaneous Vagus Nerve Stimulation (tVNS).

Method

In a factorial randomized controlled clinical trial (NCT05441774), community-dwelling adults ($n=120$) were evenly assigned to eight daily sessions of tVNS *or* sham stimulation, *plus* Self-Compassion Mental Imagery Training (SC-MIT) *or* closely matched control training. Acute effects of stimulation and training were assessed in the lab on days 1 and 8, and remotely, between the lab sessions (days 2-7).

Results

In contrast to the other experimental conditions, tVNS-plus-SC-MIT showed large acute increases in state self-compassion ($d=0.99$, $p<0.001$) and state mindfulness ($d=0.68$, $p=0.003$) on day 1, and further increases in state mindfulness between days 1 and 8 ($d=0.84$, $p<0.001$). Irrespective of stimulation condition, SC-MIT was associated with an increase in oculomotor attentional bias to compassionate faces, and reductions in self-criticism and heart rate, but no change in heart rate variability.

Conclusions

tVNS may augment contemplative capabilities and may therefore have utility as a method for enhancing the efficacy of meditation-based therapies. However, the specific role of the VN in augmenting these competencies remains uncertain given the absence of an easily employed and reliable positive control for vagal stimulation.

Keywords

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Researcher's Contacts:

Sunjeev Kamboj
Research Department of Clinical, Educational & Health Psychology
University College London
Gower St
London WC1E6BT
Phone: 0207 679 1958
Email: Sunjeev.kamboj@ucl.ac.uk