Effects of transcutaneous vagus nerve stimulation on gastric rhythm during caloric load

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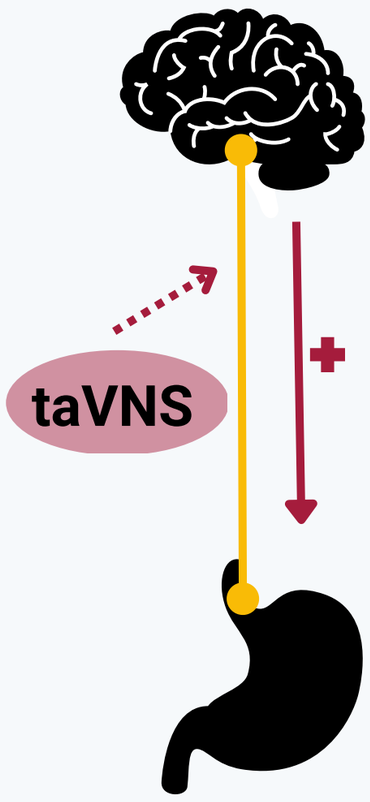
Introduction



Vagus nerve stimulation[1] is known to increase **stomach-brain coupling**

Previous studies show **altered gastric motility** (frequency, power) after **taVNS**

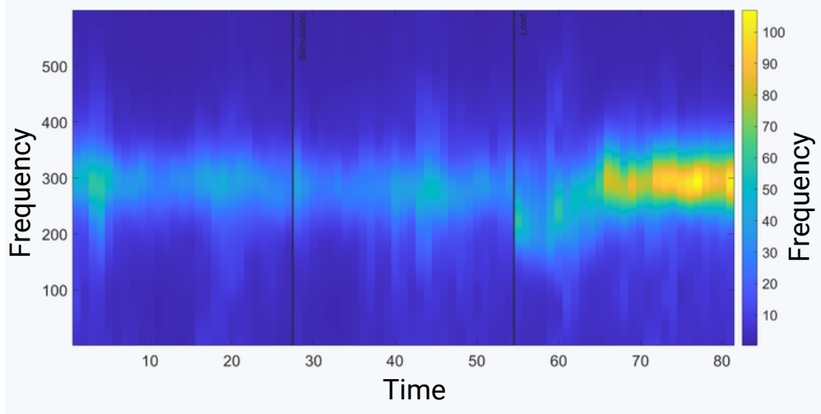
Metabolic state
Interoception
Stimulation side

Research Question:

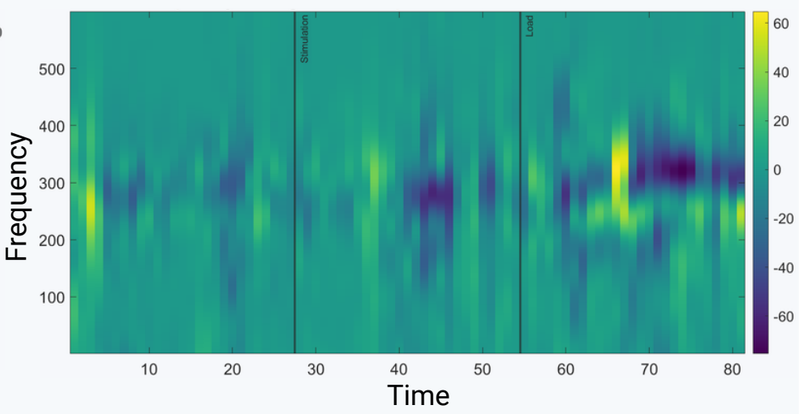
Does non-invasive vagus nerve stimulation (taVNS) alter gastric motility before and after a caloric load?

Results

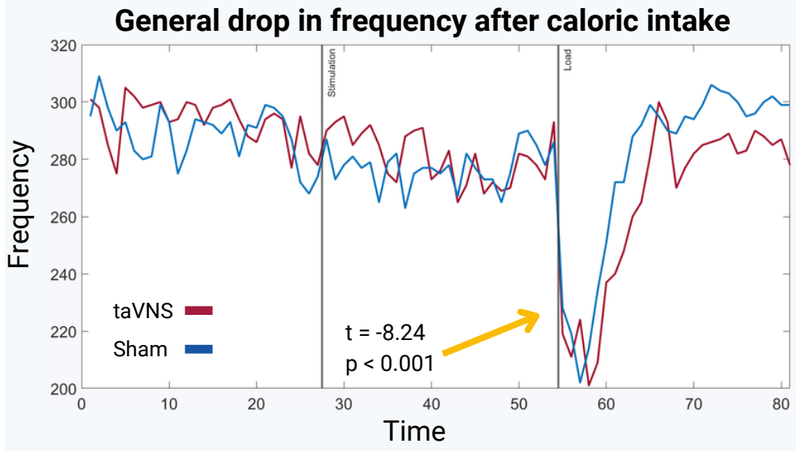
Stronger power in the normogastric range across conditions, with an increase after caloric intake



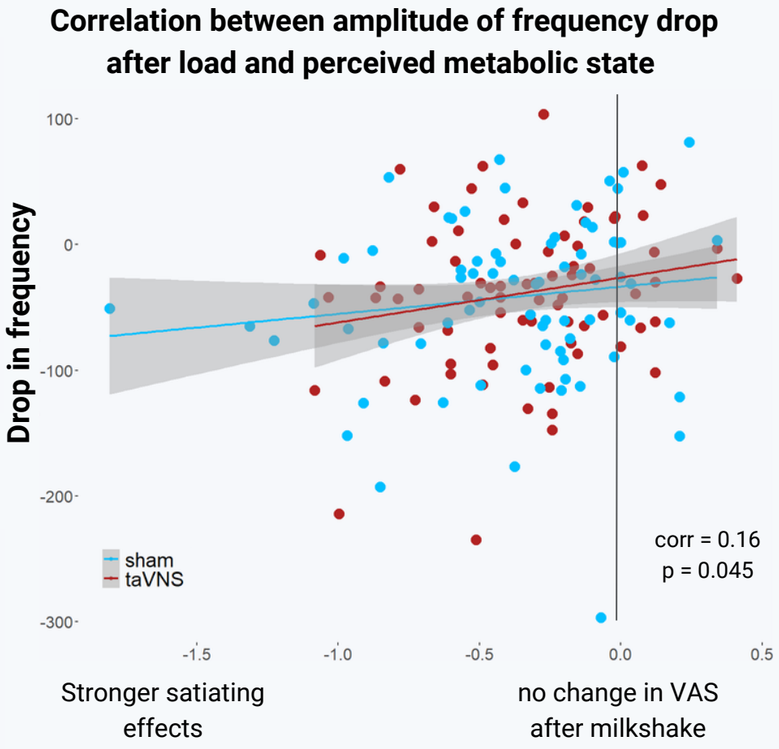
Differences between taVNS and Sham stimulation



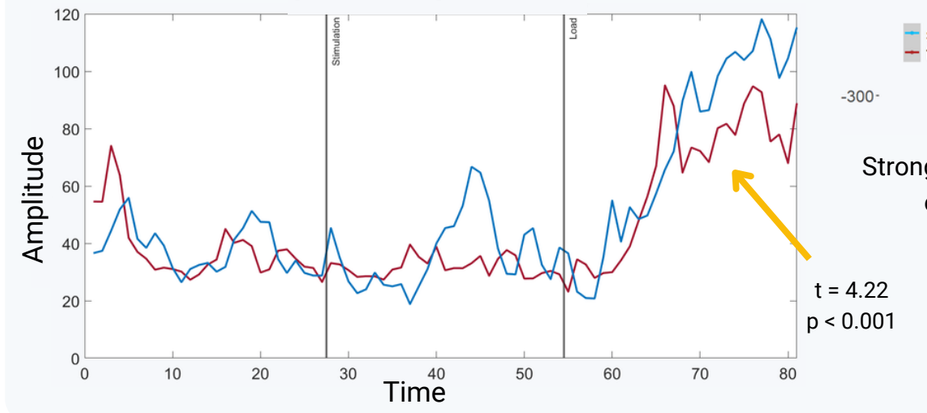
General drop in frequency after caloric intake



Correlation between amplitude of frequency drop after load and perceived metabolic state

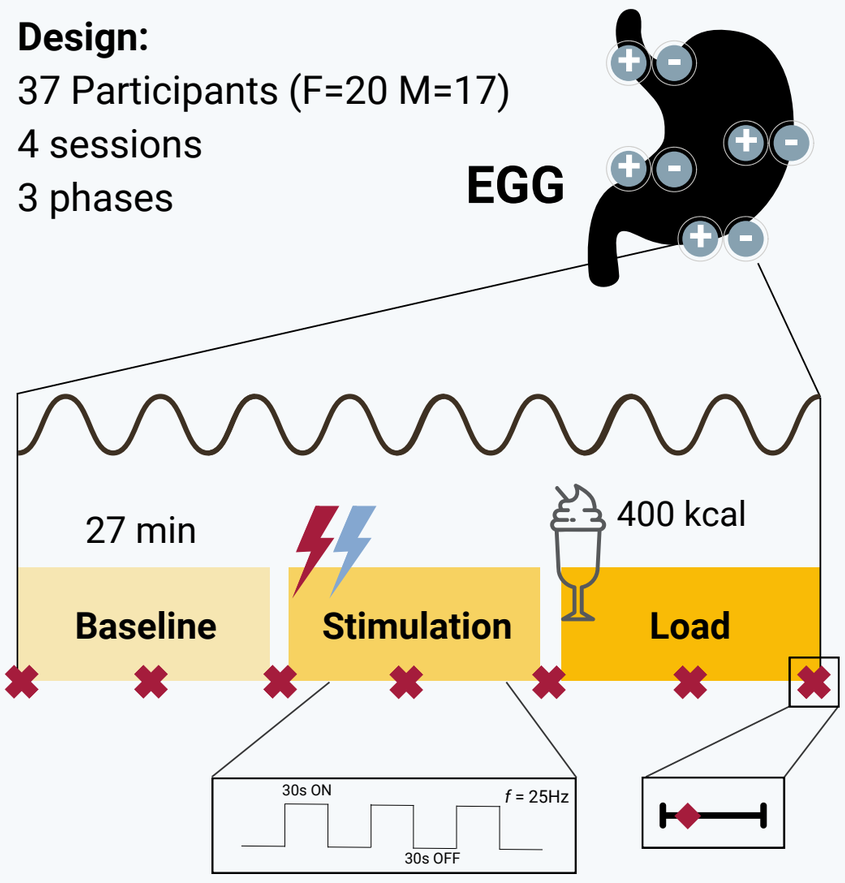


taVNS leads to a plateau in power after initial increase



Methods

Design:
37 Participants (F=20 M=17)
4 sessions
3 phases



Sessions:
Left taVNS
Right taVNS
Left sham
Right sham

taVNS device

VAS:
Hunger
Thirst
Tiredness
Satiety

Discussion

- **EGG** successfully detected the expected **drop in frequency** and **increase in power** after a caloric load [2]
- **taVNS** reduced the **load-induced increase in power** regardless of stimulation side, in line with previous findings suggesting altered gastric motility due to vagal afferent stimulation [1,3]
- **Metabolic state correlates with the drop in frequency** registered after caloric intake, showing that changes in frequency are predictive of perceived metabolic state
- **Future directions**: further investigation of robust measures of power

Conclusions

Electrogastrography (EGG) is an important tool to accurately detect changes in gastric motility. Here, EGG shows that these changes are correlated with interoceptive **feelings of hunger and satiety**, and that **taVNS** plays a role in **modulating gastric motility**.

References

Müller, S. J., Teckentrup, V., Rebollo, I., Hallschmid, M., & Kroemer, N. B. (2022). Vagus nerve stimulation increases stomach-brain coupling via a vagal afferent pathway. Brain Stimulation, 15(5), 1279-1289.

Parkman HP, et al. Electrogastrography: a document prepared by the gastric section of the American motility society clinical GI motility testing task force. Neurogastroenterology & Motility. 2003;15(2):89–102.

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You can find the study preregistration here

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