

Drawn to the rhythm

Citation for published version (APA):

Kemmerer, S. K. (2022). *Drawn to the rhythm: measuring and modulating brain oscillations during visual attention and learning*. [Doctoral Thesis, Maastricht University]. Gildeprint Drukkerijen. <https://doi.org/10.26481/dis.20220131sk>

Document status and date:

Published: 01/01/2022

DOI:

[10.26481/dis.20220131sk](https://doi.org/10.26481/dis.20220131sk)

Document Version:

Publisher's PDF, also known as Version of record

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Propositions of the thesis

Drawn to the rhythm

Measuring and modulating brain oscillations during visual attention and learning

1. Left dorsal parietal transcranial alternating current stimulation (tACS) at alpha frequency induces a task-specific leftward bias in visuospatial attention performance.
2. The effect of left dorsal parietal tACS on alpha power lateralization and endogenous visuospatial attention performance is more pronounced when the stimulation frequency is tuned to the individual alpha frequency (IAF).
3. Whereas dorsal parietal tACS at alpha frequency specifically modulates endogenous visuospatial attention, ventral temporoparietal tACS affects neither endogenous nor exogenous attention, arguing against a dorso-ventral double dissociation of alpha oscillations for these attentional functions.
4. Oscillatory power changes in the anterior thalamus predict reaction times to visual stimuli during an attention task on a trial-by-trial basis and local deep brain stimulation (DBS) slows these reaction times.
5. Perceptual training leads to a pre-stimulus alpha and beta power decrease and late post-stimulus beta power increase, specifically for the trained but not for a control stimulus orientation, which underlines the role of top-down processes in stimulus-specific perceptual learning.
6. To increase the reliability and validity of their research, scientists should repeatedly challenge their findings through exact or conceptual replication attempts and rule out alternative explanations by including additional control conditions.
7. Individualization of non-invasive brain stimulation parameters might enhance the effectiveness of brain stimulation interventions by reducing variability.
8. We need more fundamental tACS research to better understand the physical and physiological mechanisms underlying electrical brain stimulation.
9. tACS may have potential as a treatment for neurological disorders such as hemineglect.
10. 'If you want to find the secrets of the Universe, think in terms of energy, frequency and vibration.' (Nikola Tesla)