

University of Groningen

## Neuroscientific insights into executive functions

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DOI:  
[10.33612/diss.987834322](https://doi.org/10.33612/diss.987834322)

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*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2024

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*  
Smit, D. (2024). *Neuroscientific insights into executive functions: From brain waves to behavioral improvements through neurofeedback*. [Thesis fully internal (DIV), University of Groningen]. University of Groningen. <https://doi.org/10.33612/diss.987834322>

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Propositions of the PhD thesis:  
**Neuroscientific insights into executive functions**  
*From brain waves to behavioral improvements through neurofeedback*

Diede Smit

1. The underlying neurophysiological markers of executive functions related to theta oscillations (i.e., frontal-midline theta power and functional theta connectivity) are not affected by self-reported executive function complaints (Chapter 2).
2. Neurofeedback is an effective neuromodulation technique for the upregulation of frontal-midline theta offering potential therapeutic benefits for executive function enhancement (Chapters 3 and 4).
3. In adults with self-reported executive function complaints, with or without a psychiatric disorder, frontal midline-theta neurofeedback can induce long-term improvements in performance on objective executive function measures (Chapter 3).
4. Adults self-reporting executive function complaints in their daily lives are less successful in upregulating frontal-midline theta through neurofeedback, as compared to healthy adults without such complaints (Chapter 4).
5. Factors related to psychiatric disorders (e.g., morphological differences in underlying brain structures, changes in neuroplasticity, alterations in reward sensitivity, etc.) contribute to non-response to frontal-midline neurofeedback (Chapters 3 and 4).
6. Clinicians should take personality traits and negative affective states like depressive symptoms into account when dealing with adults who present self-reported executive impairment complaints (Chapter 5).
7. Interventions to improve executive functions should be tailored to individual characteristics and take into account biological, psychological, and social factors.
8. A vegetarian diet is associated with numerous health and environmental benefits, emphasizing the need to promote and facilitate its integration into mainstream diets.
9. Every PhD student should have a vegetable garden for their mental sanity.
10. The more I learn, the more I realize how much I do not know (Albert Einstein).