

Complexity of Life in Basic
Research and Innovation

Field of Excellence
University of Graz

KARL-FRANZENS-UNIVERSITÄT GRAZ
UNIVERSITY OF GRAZ



„Deciphering neurorights “hype” – from neuroenchantment to real risks“

Guilherme M. de O. Wood
Neuropsychologie & Neuroimaging

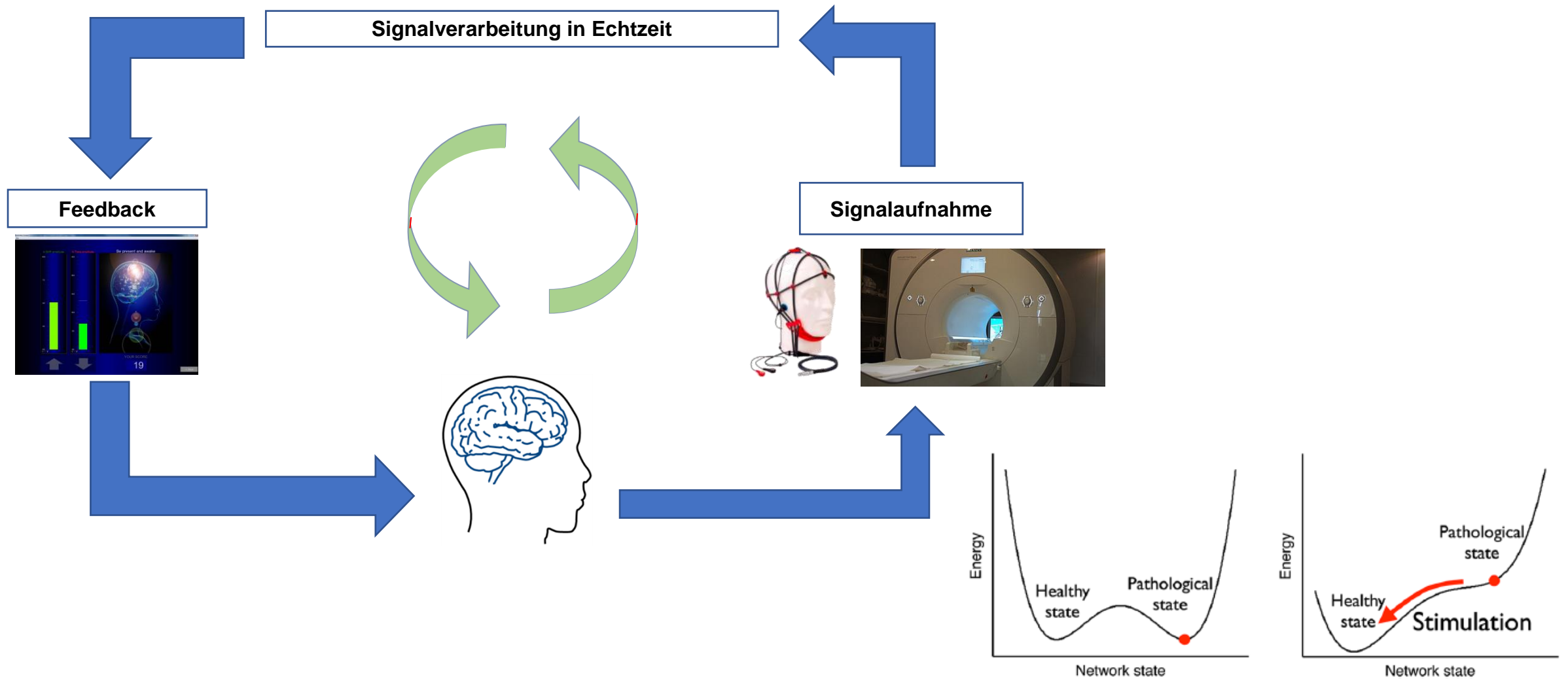


Neuropsychologie Graz

- (i) hochtechnologische Werkzeuge für die neuropsychologische Rehabilitation zu entwickeln
- (ii) diese in Rehabilitationsprogramme einzubetten
- (iii) Ihre Wirksamkeit bei der Erregung und Ansteuerung von neuronaler Plastizität klinisch zu überprüfen,
- (iv) die Mechanismen der Erregung und Ansteuerung von neuronaler Plastizität zu beschreiben und
- (v) psychosoziale Einflüsse auf Behandlungen, Rehabilitation und das allgemeine Verständnis des Gehirns zu verstehen.

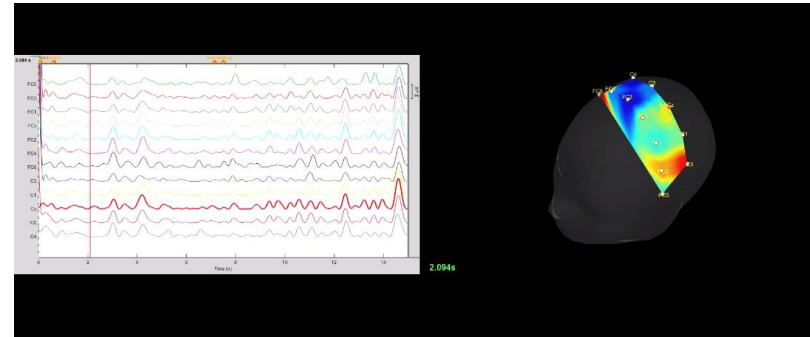
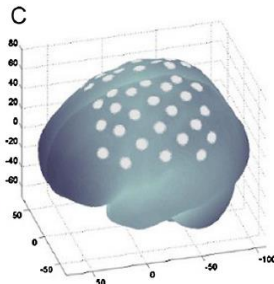
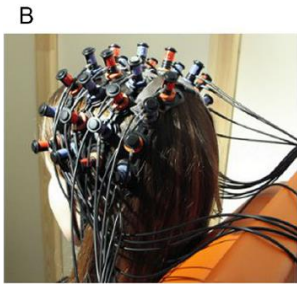
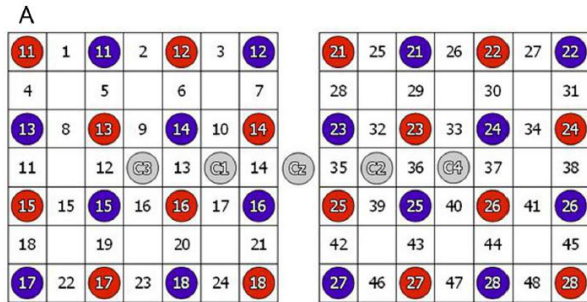


Neuropsychologie Graz

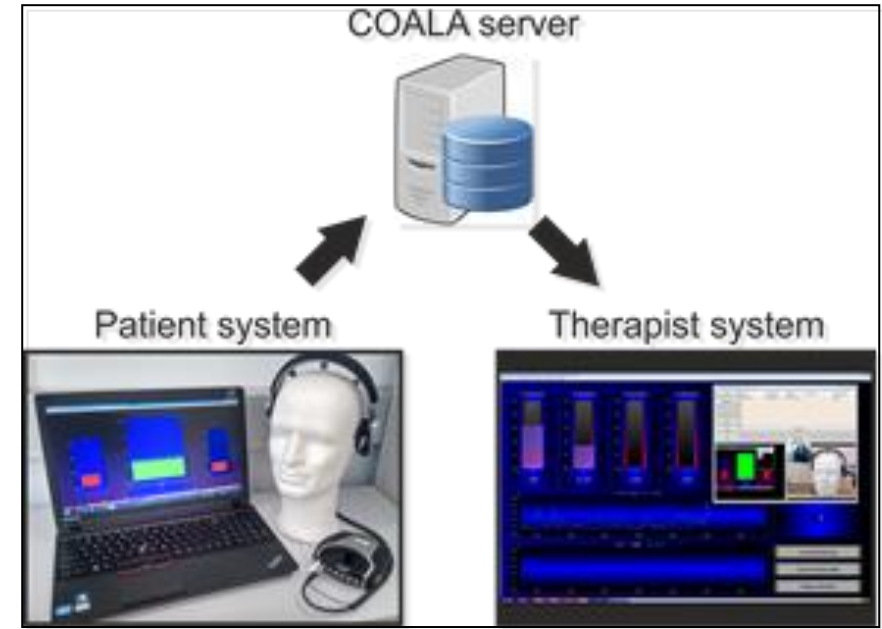


Neurofeedback Modalitäten

Near-infrared spectroscopy



Electroencephalogram



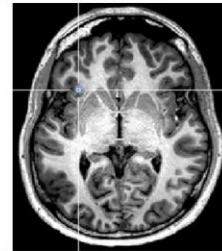
Session 1

Emotion imagery



4 blocks/rest à 40 sec. emotion imagery

ROI Definition



ROI coordinates were determined individually

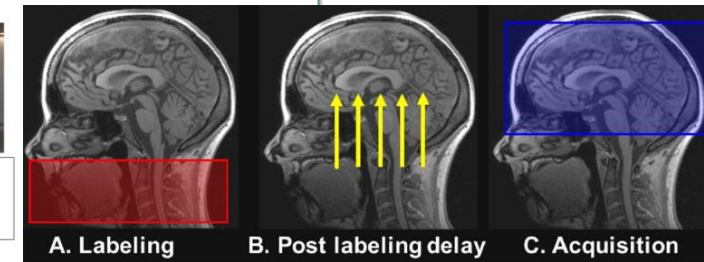
Session 2

Emotion imagery + rt-ASL Neurofeedback



6 blocks/rest à 40 sec. up-regulation

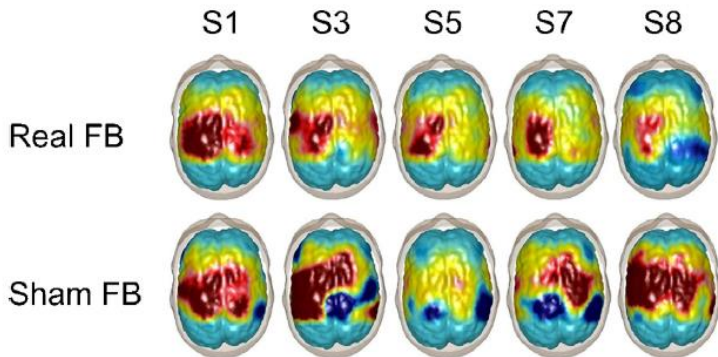
Functional magnetic resonance tomography



A. Labeling

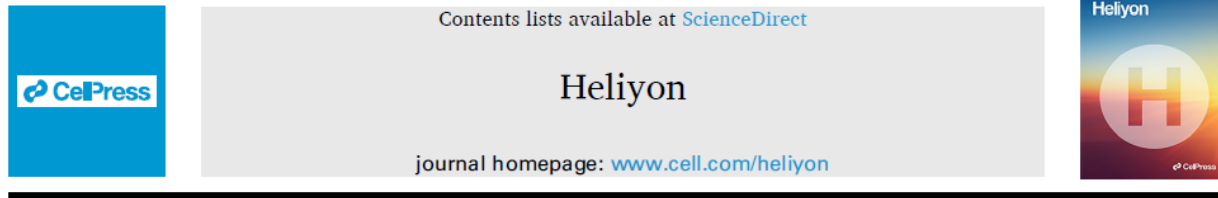
B. Post labeling delay

C. Acquisition



Kommunikation über Neurofeedback

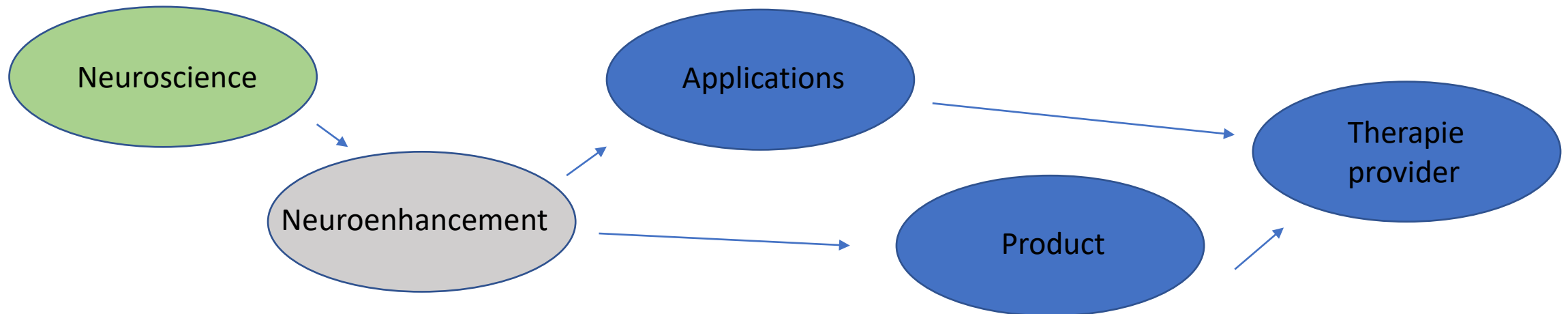
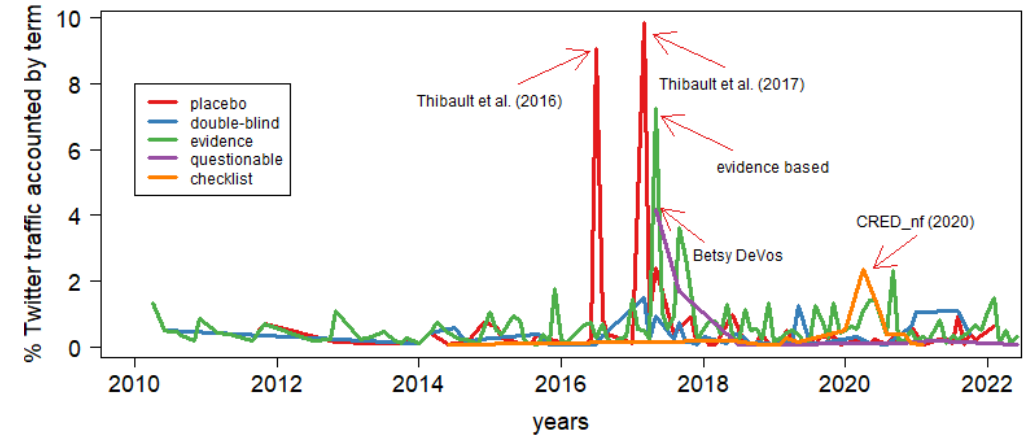
Heliyon 9 (2023) e18931



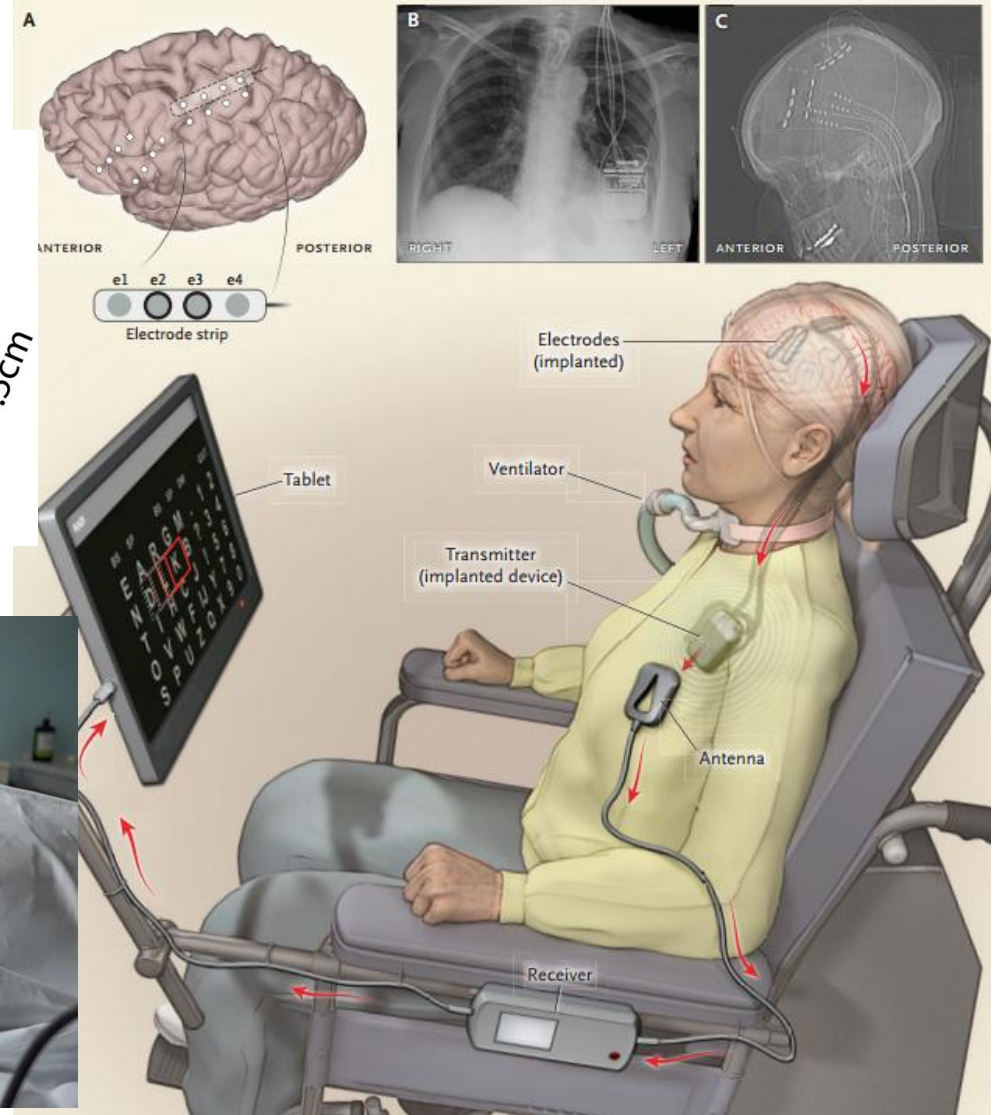
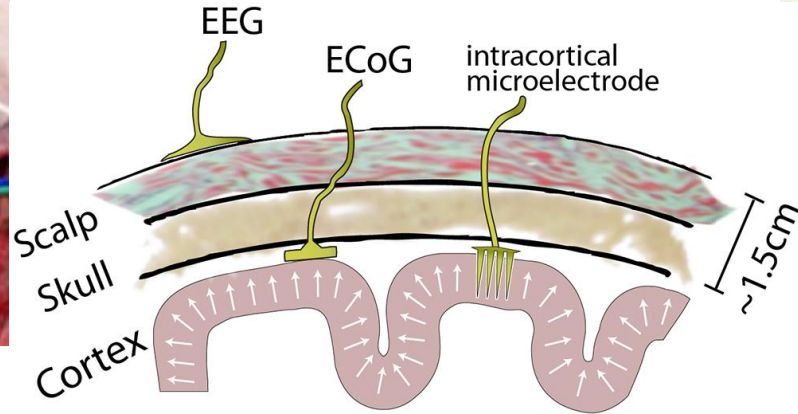
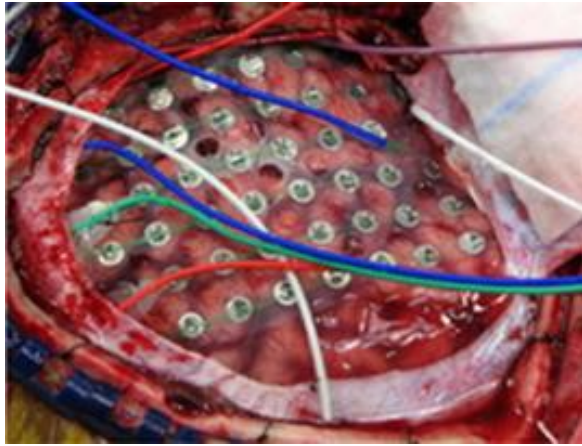
Neurofeedback on twitter: Evaluation of the scientific credibility and communication about the technique

Silvia Erika Kober, Finn Buchrieser, Guilherme Wood*

Department of Psychology, University of Graz, Austria



Invasive Technologien sind invasiv



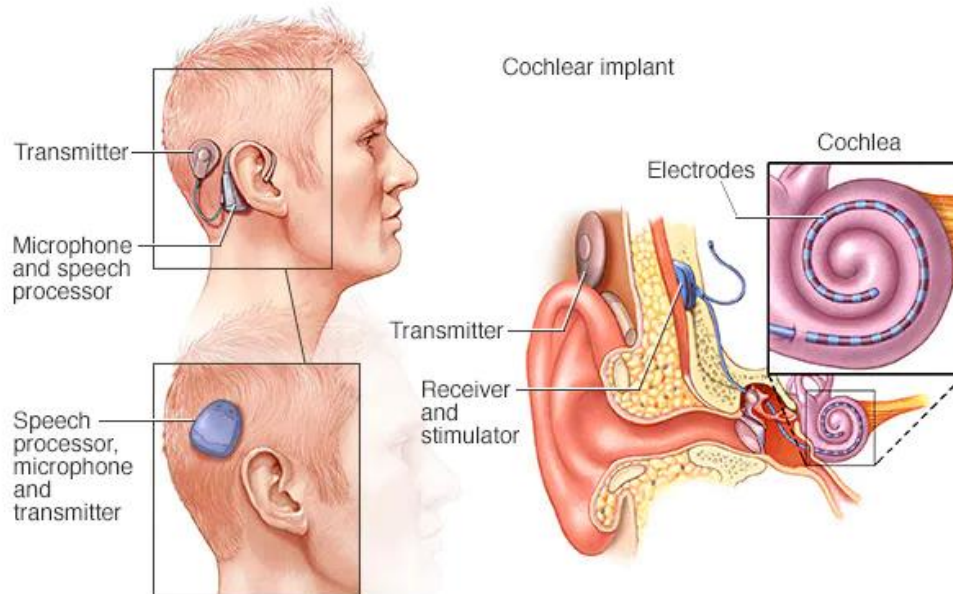
Invasive Technologien sind invasiv

Ethics Inf Technol (2016) 18:117–129
DOI 10.1007/s10676-016-9398-9

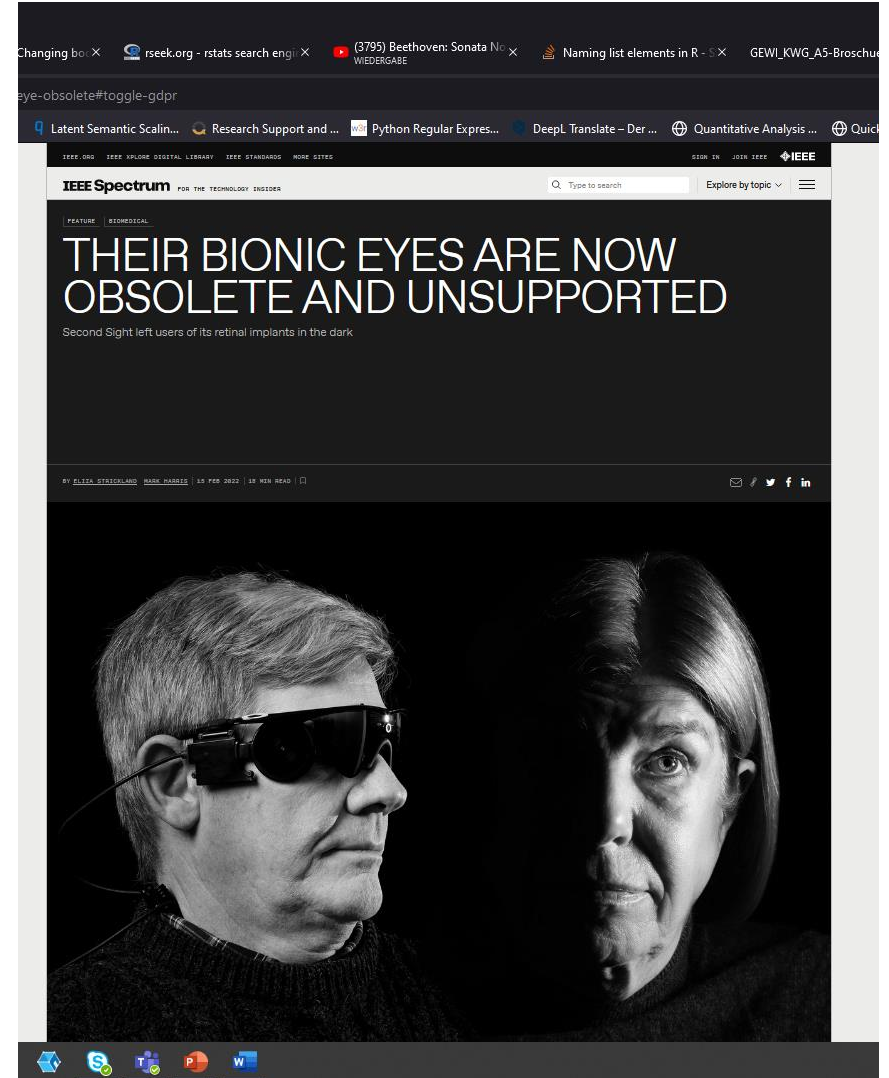
ORIGINAL PAPER

Hacking the brain: brain–computer interfacing technology and the ethics of neurosecurity

Marcello Ienca¹ · Pim Haselager²



© MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH. ALL RIGHTS RESERVED.



Wir sind unabhängig und wollen es bleiben. Unterstützen Sie uns dabei?

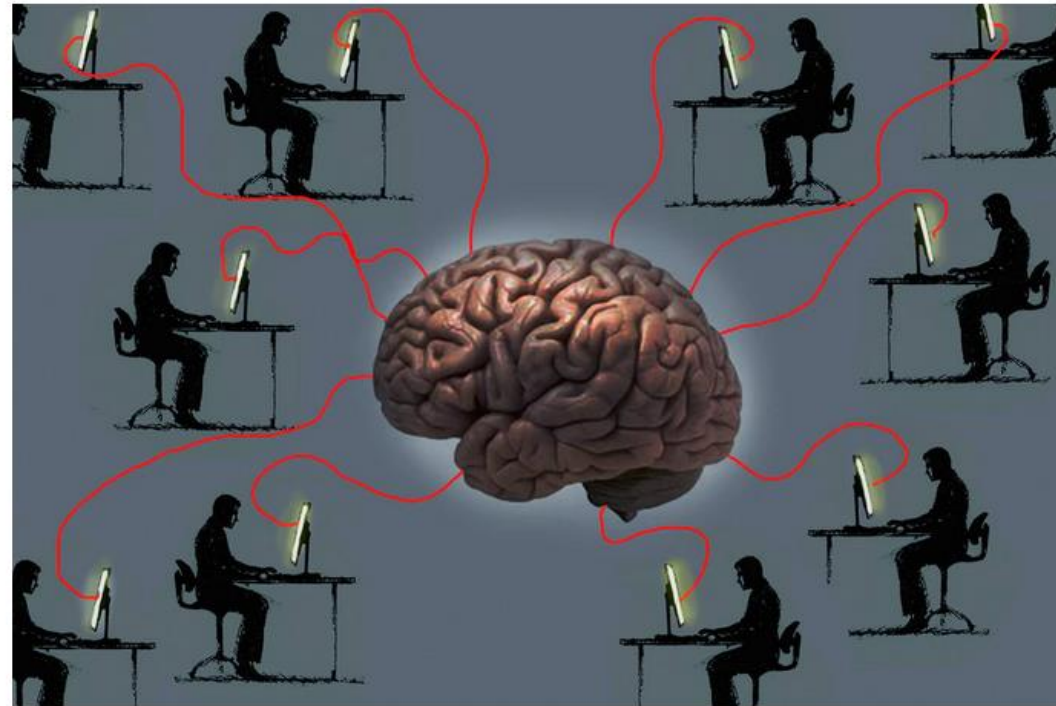
 Interview

Biotechnologe: „Ohne Gehirnchip wird man ein Mensch zweiter Klasse sein“

Per Gedanken E-Mails schreiben und das Gehirn mit dem Internet verbinden – in Zukunft wird der Mensch immer technologisierter, meint Forscher Markus Schmidt.

[Elena Matera](#), 22.7.2021 - 12:01 Uhr

Artikel anhören 



imago

Das Gehirn mit dem Computer verbinden – das könnte schon bald Realität werden.

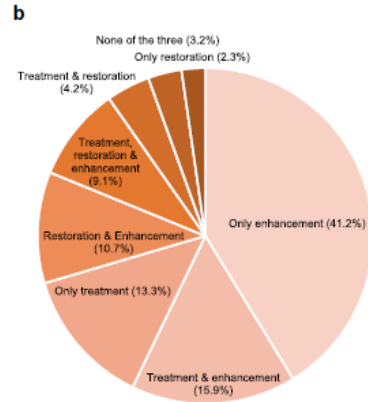
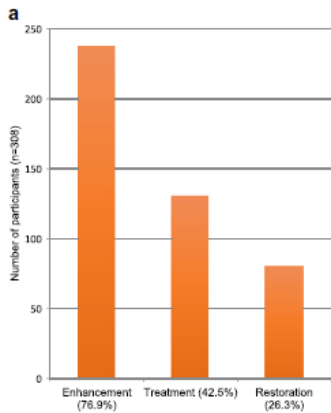
Berlin – Ein Mensch ohne Gehirnchip könnte in Zukunft Nachteile haben, meint der Wiener Biotechnologe Markus Schmidt. In dem internationalen Forschungsprojekt



RECENT NEWS

Do-it-yourself neurostimulation

Posts in Consumer tDCS



December 12, 2021

TENS vs tDCS

Overview of the difference between tDCS, TENS and other similar but different technologies [Read More](#) →

ANNUAL BIOHACK CONFERENCE

EMBER 17 - 19

ANDO, FLO

September 1, 2021

7th Annual BioHacking Conference

7th Annual Biohacking Conference - Sept 17-19 in Orlando, FL [Read More](#) →



March 29, 2021

Can brain stimulation trigger ecstasy?

There has been a lot of work testing if tDCS (transcranial Direct Current Stimulation) can change how people think or feel.

JOURNAL OF RESPONSIBLE INNOVATION, 2018
VOL. 5, NO. 1, 103-108
<https://doi.org/10.1080/23299460.2017.1338103>

DISCUSSION PAPER: RESPONSE

DIY tDCS: a need for an empirical look

Anita Jwa

Stanford Law School, Stanford, CA, USA



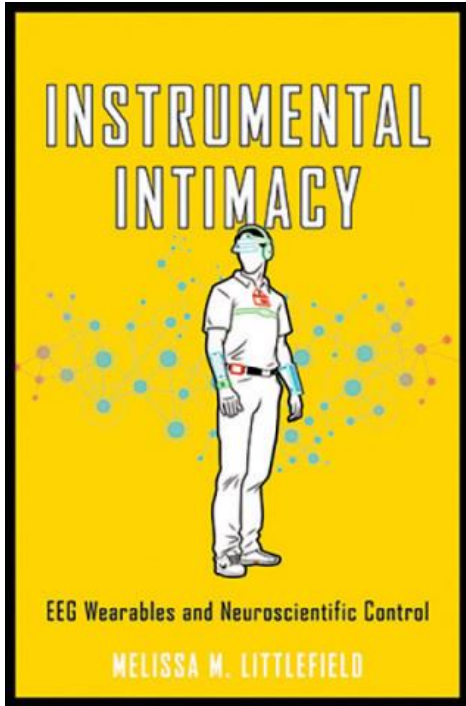
Journal of Cognitive Enhancement (2018) 2:114-134
<https://doi.org/10.1007/s41465-017-0062-z>

ORIGINAL ARTICLE



Who Uses Direct-to-Consumer Brain Stimulation Products, and Why? A Study of Home Users of tDCS Devices

Anna Wexler¹



Instrumental Intimacy

- **Instrumental Intimacy:** Die Darstellung sowie die Ansteuerbarkeit der Gehirnaktivität verspricht einen privilegierten Zugang zum Selbst
- “Brain Overclaim Syndrome” (Morse, 2006)
- Neuroessentialism -> Wir sind unser Gehirn
- Neuromyths und Neuroenchantment



Table 4

Regression analysis predicting belief in neuromyths, including demographic variables in Step 1 and the different cognitive biases in Step 2.

	B	SE	β	p-Value
Step 1	40.36	4.74	0.01	
Gender	1.46	1.47	0.05	.32
Age	0.01	0.06	0.01	.85
Education	-0.95	0.65	-0.08	.14
Media exposure	0.04	8.96	0.14	.01
Step 2	18.92			
Gender	2.51	1.34	0.09	.06
Age	0.09	0.06	0.07	.13
Education	-0.08	0.59	-0.01	.89
Media exposure	0.06	0.03	0.10	.04
Need for cognitive closure	0.78	0.79	0.05	.32
Epistemological understand	3.22	0.97	0.17	.001
Faith in intuition	4.63	0.93	0.24	.000
Mindset	-4.16	0.95	-0.21	.000
Scientific literacy	-2.23	0.58	-0.18	.000

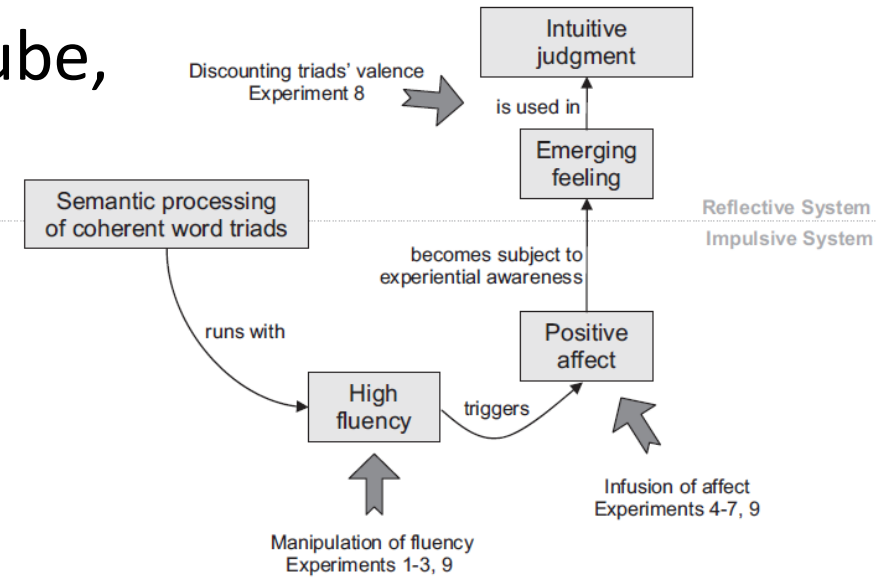
Table 5

Regression analysis predicting belief in cognitive enhancement, including demographic variables in Step 1 and the different cognitive biases in Step 2.

	B	SE	β	p-Value
Step 1	64.12	4.60	< 0.001	
Gender	-2.58	1.43	-0.09	.07
Age	-0.02	0.06	-0.01	.79
Education	-0.70	0.63	-0.06	.79
Media exposure	0.13	0.03	0.23	.000
Step 2	44.59	8.05	0.000	
Gender	-1.66	1.38	-0.06	.23
Age	0.04	0.06	0.03	.51
Education	-0.19	0.61	-0.02	.75
Media exposure	0.09	0.03	0.16	.001
Need for cognitive closure	-1.46	0.82	-0.09	.08
Epistemological understand	2.16	1.00	0.113	.03
Faith in intuition	3.67	0.97	0.19	.000
Mindset	4.29	0.98	0.22	.000
Scientific literacy	-0.50	0.60	-0.04	.41

Neuromythen

- Epistemischer Glaube,
- Wissen aber auch
- Intuition



Personality and Individual Differences 147 (2019) 28–32



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid



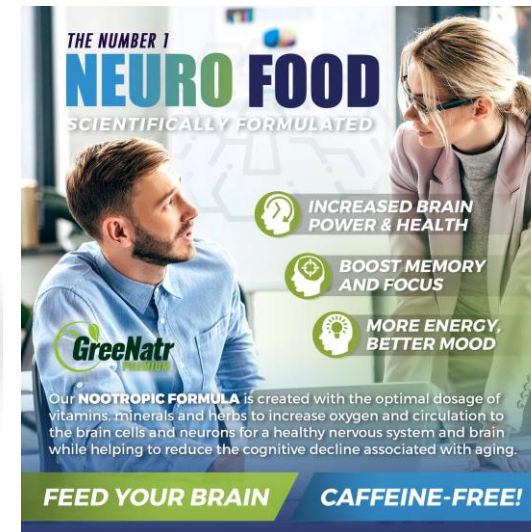
Socio-cognitive biases are associated to belief in neuromyths and cognitive enhancement: A pre-registered study



Michiel van Elk*

Department of Psychology, University of Amsterdam, Amsterdam, the Netherlands
Amsterdam Brain and Cognition Center, University of Amsterdam, Amsterdam, the Netherlands

Neuroenchantment



Neuroshoes



NEUROSPORT
PHYSICAL THERAPY

<https://de.wikipedia.org/wiki/Neuroathletiktraining>

Neuroenchantment

frontiers in
HUMAN NEUROSCIENCE

ORIGINAL RESEARCH ARTICLE
published: 27 May 2014
doi: 10.3389/fnhum.2014.0036

Empirical neuroenchantment: from reading minds to thinking critically

Sabrina S. Ali¹, Michael Lifshitz² and Amir Raz^{3,4*}

¹ Department of Psychiatry, McGill University, Montreal, QC, Canada

² Integrated Program in Neuroscience, McGill University, Montreal, QC, Canada

³ Departments of Psychology, and Neurology and Neurosurgery, McGill University, Montreal, QC, Canada

⁴ The Lady Davis Institute at the SMDB Jewish General Hospital, Montreal, QC, Canada

ment. Approximately 65% of neuroscience-educated individuals reported believing the paradigm. Furthermore, comparative anal-



Table 1 | Subjective ratings of participant beliefs concerning the neuro mind-reading paradigm (on a 7-point Likert scale ranging from 0 “not at all” to 6 “extremely”).

	Mean scores (SD)		
	All participants (n = 58)	Neuro (n = 26)	Other (n = 32)
Future Possibilities—Before the computer correctly reveals their choices “How possible is it to use Spintronics® to unravel your thoughts with even more complex information (i.e., a visual image or an abstract concept)?”	2.38 (1.53)	2.00 (1.36)	2.77 (1.36)
Future Possibilities—After the computer reveals their choices—Same question as above	3.88 (1.77)	3.46 (1.94)	4.16 (1.57)
Believability—“How ‘believable’ are these results to you?”	4.44 (1.93)	3.96 (2.09)	4.96 (1.53)
Skeptical—“How skeptical are you of the results?”	2.66 (2.13)	3.42 (2.04)	1.94 (1.93)
Suspicious—“How suspicious are you about this experiment?”	2.73 (1.91)	3.00 (1.60)	2.44 (2.11)

Participants answered all questions after the mock scan in the order listed here. *p < 0.05; **p < 0.01; ***p < 0.001.

Glaubhaftigkeit von (Placebo) Neurofeedback



ELSEVIER

Contents lists available at [ScienceDirect](#)

Clinical Neurophysiology

journal homepage: www.elsevier.com/locate/clinph



- 75% Experimentalgruppe
- 100% Kontrollgruppe

Shutting down sensorimotor interference unblocks the networks for stimulus processing: An SMR neurofeedback training study

Silvia Erika Kober^{a,c,*}, Matthias Witte^a, Matthias Stangl^a, Aleksander Våljamäe^a, Christa Neuper^{a,b,c}, Guilherme Wood^{a,c}



Contents lists available at [ScienceDirect](#)

NeuroImage

journal homepage: www.elsevier.com/locate/neuroimage

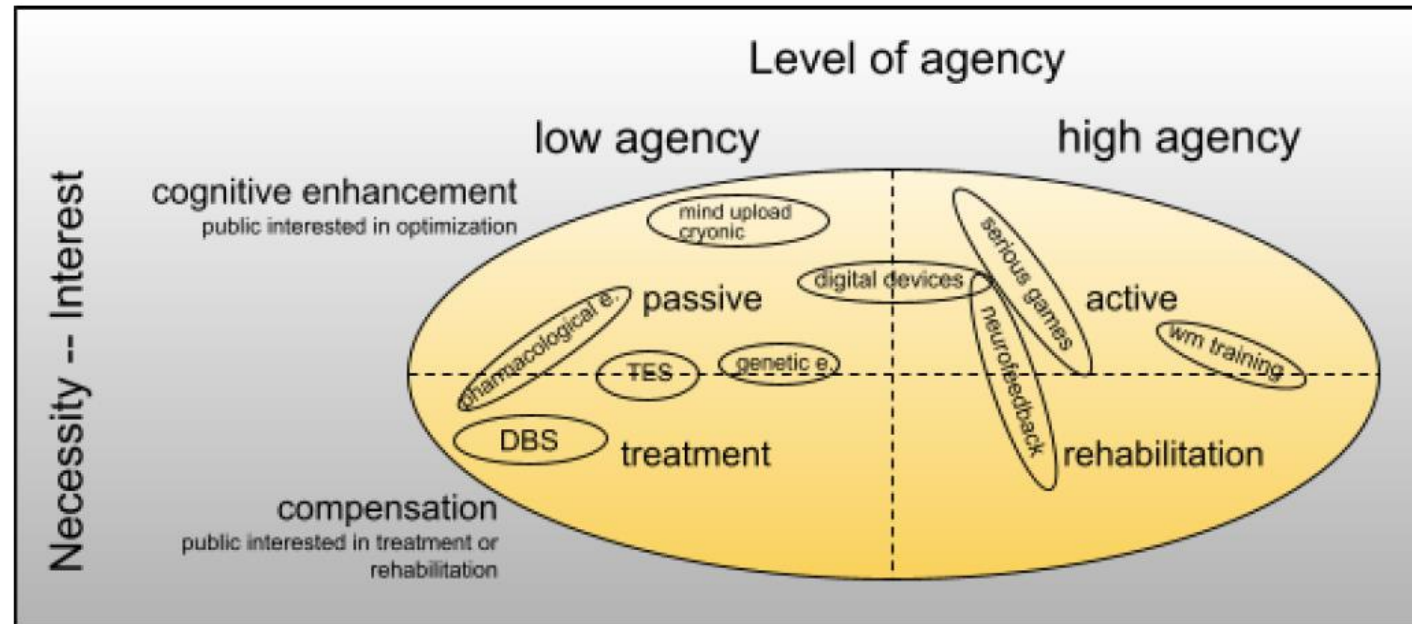


- 45% Experimentalgruppe
- 62% Kontrollgruppe

Placebo hampers ability to self-regulate brain activity: A double-blind sham-controlled neurofeedback study

Silvia Erika Kober^{a,b,*}, Matthias Witte^{a,d}, Sandra Grinschgl^{a,e}, Christa Neuper^{a,b,c}, Guilherme Wood^{a,b}

Kontexte und Motive für Neuroenhancement



- Grinschgl, Ninaus, Wood Neubauer (in Vorbereitung)

Neuroenhancement

- Ist kulturell sehr positiv geprägt
- Eine allgemeine Akzeptanz der Technik kann zur Unterschätzung von Risiken führen

Neurorights

- - the right to mental privacy;
- - protection against personality-changing manipulations;
- - protected free will and decision-making;
- - fair access to mental augmentation; and
- - protection against biases in the algorithms that are central to neurotechnology

[Home](#) > [Protecting the Mind](#) > Chapter

A Technocratic Oath

[María Florencia Álamos](#), [Leonie Kausel](#), [Clara Baselga-Garriga](#), [Paulina Ramos](#), [Francisco Aboitiz](#), [Xabier Uribe-Etxebarria](#) & [Rafael Yuste](#) 

Hippocratic Oath?


[Home](#) > [Protecting the Mind](#) > Chapter

Neuro Rights: A Human Rights Solution to Ethical Issues of Neurotechnologies

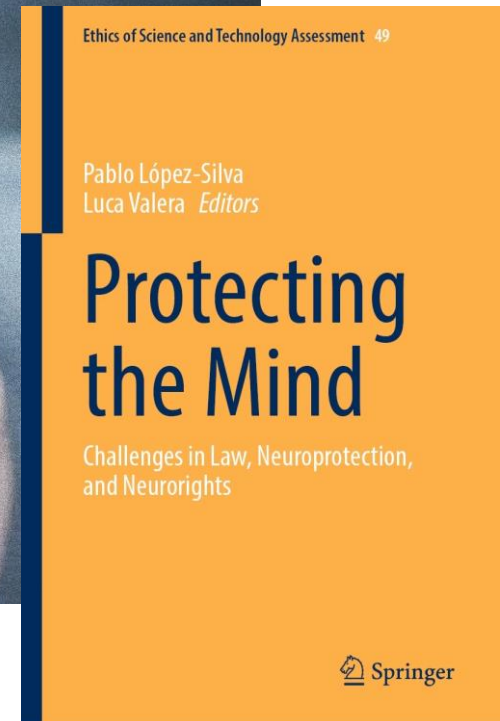
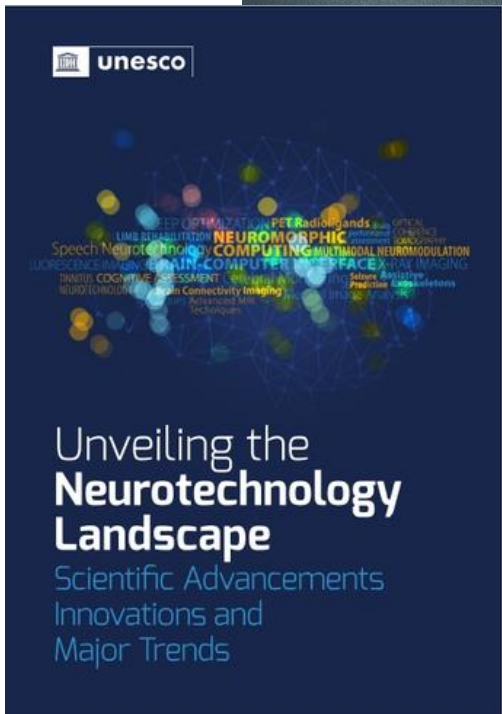
Neuroethics (2022) 15:7
<https://doi.org/10.1007/s12152-022-09481-3>

ORIGINAL PAPER

Novel Neurorights: From Nonsense to Substance

Jan Christoph Bublitz 

Neurorights





Team & Tasks

- Legal, ethical and societal implications related to neuroenhancement technology development (e.g. neuralink);
- Assess (the urgency of the) need for the adoption of new legal and regulatory framework at EU level as proposed, for example, by the Neurorights Foundation;
- To help filling the gap in AI legislation work (e.g. EU AI act) related to the health or neural data;
- Draft/envision policy options for next steps in the direction of neural rights.

Resources

- 33k € from our doctoral academy
 - 4 x 10 hours PhD salary for 6 months (the duration of the study)
- 15k € from the European Parliament
 - Contract pending (see e-mail)

Vielen Dank für Ihre
Aufmerksamkeit!