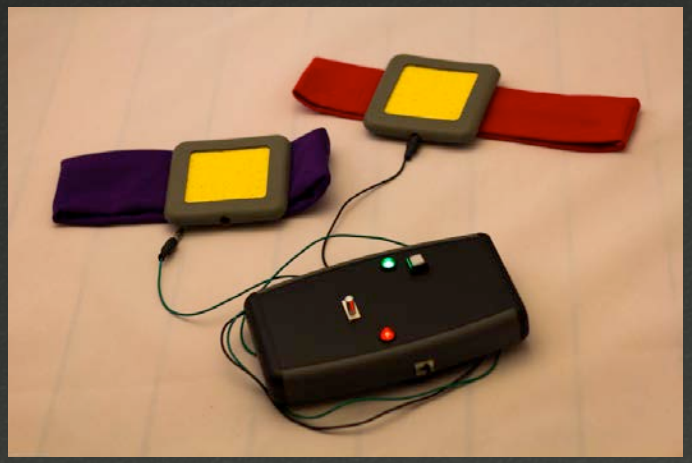
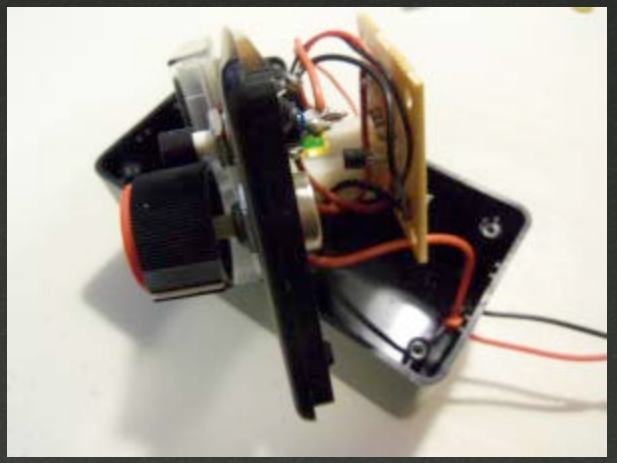
# Neuromodulation and Unsupervised Use





Dr Hannah Maslen
Oxford Uehiro Centre for Practical Ethics | Oxford Martin School | New College

# Direct-to-consumer devices and the DIY community

- Devices marketed for enhancement or wellbeing purposes not regulated as medical devices.
- Only subject to general, non-product-specific safety requirements.
- DIY community make their own devices from individual components.

# EU Medical Devices Directive

‘Medical device’ means any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, including the software **intended by its manufacturer to be used specifically for diagnostic and/or therapeutic purposes** and necessary for its proper application, intended by the manufacturer to be used for human beings for the purpose of:

- diagnosis, prevention, monitoring, treatment or alleviation of disease,
- diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap,
- investigation, replacement or modification of the anatomy or of a physiological process,
- control of conception,

and which does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which may be assisted in its function by such means.

DIRECTIVE 93/42/EEC
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1993L0042:20071011:EN:PDF

# Medical purpose and manufacturers' claims

- Medical devices are defined as articles which are intended to be used for a medical purpose. The **medical purpose is assigned to a product by the manufacturer**. The manufacturer determines through the label, the instruction for use and the promotional material related to a given device its specific medical purpose.

European Commission Guidance Document
http://ec.europa.eu/health/medical-devices/files/meddev/2_1-1___04-1994_en.pdf

# Section 201(h) of the Federal Food Drug & Cosmetic (FD&C) Act

A medical device is "an instrument, apparatus, implement, machine, contrivance, implant, in vitro reagent, or other similar or related article, including a component part, or accessory which is:

- recognized in the official National Formulary, or the United States Pharmacopoeia, or any supplement to them,
- **intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease**, in man or other animals, or
- intended to affect the structure or any function of the body of man or other animals, and which does not achieve its primary intended purposes through chemical action within or on the body of man or other animals and which is not dependent upon being metabolized for the achievement of any of its primary intended purposes."

http://www.fda.gov/medicaldevices/deviceregulationandguidance/overview/classifyyourdevice/ucm051512.htm

# Examples of devices marketed for enhancement: tDCS and TMS

# Foc.us tDCS device


**All New Gamer Headset**

Connect a foc.us v2 with a foc.us gamer headset to increase your working memory and focus.

**the 2015 foc.us gamer headset**

Over 100 improvements over original foc.us gamer, including bigger, better, lower resistance nickel electrodes adjustable for length and rotation, memory titanium band, soft silicon cups and improved sponges.

www.foc.us

## Frequently Asked Questions

### Is foc.us FDA approved?

No. The foc.us gamer headset offers no medical benefits, is not a medical device, and is not regulated by the FDA.

### Is the headset safe?

The foc.us headset has been tested to all required regulatory standards including CE Safety standard EN60601-2-10: 2001 and EN60601-1: 2006.

### Do you ship to X?

foc.us has a warehouse in Redwood City, CA for US and Canadian orders, and a London UK office for UK, Europe and (most) rest of world. We do not ship to Russia and several other countries and unfortunately can no longer ship to APO addresses.

### When will my headset ship?

We ship Monday to Friday via FedEx. If your order arrives before the collection it ships same day, otherwise next working day.

### What does the headset do?

The headset passes a small electric current (<2.05mA) through the prefrontal cortex of the wearer.

### Return and cancellation policy?

You can cancel before shipping for full refund. You can return within 30 days of delivery for a full refund. Product is covered by a 13 month warranty and any faulty units will be replaced.

### Will X platform be supported?

iOS and Android apps are live. OS X and Chrome apps are in development.

### Who should not use foc.us?

The headset is not a toy, is not recommended for under 18s, epilepsy sufferers or people with implants. It should not be used in the treatment of any medical conditions.

### Can I control foc.us without iOS device?

You can start and stop, change mode and change current level. You cannot change the duration and the control is not as granular e.g. manually current can be set to 1.0, 1.5 or 2.0mA, with app anything from 0.8 to 2.0 in 0.1 increments.

# The Brain Stimulator tDCS device

**New Exciting Technology**

tDCS technology is catching on fast! New scientific papers are being published everyday and the results are incredible! You really can improve your brain function quickly through using tDCS.

**Most Affordable tDCS Device**

With only a handful of devices currently on the market, The Brain Stimulator offers more options than competitors for a fraction of what they charge. We believe everyone should be able to afford tDCS!

**Purchase one today**

Priced at $90 for a limited time, The Brain Stimulator is one of the cheapest tDCS devices on the market

http://thebrainstimulator.net/

Notes medical benefits as well as enhancement possibilities

The BrainStimulator
Affordable tDCS Devices

*Transcranial Direct Current Stimulation (tDCS)*

Home | What is tDCS? | About the device | Choosing electrodes | Research | Purchase

## What is tDCS?

**Transcranial direct current stimulation** (abbreviated to tDCS) is a form of neurostimulation which uses constant, low current delivered directly to the brain area of interest via small electrodes. It was originally developed to help patients with brain injuries such as strokes, however tests on healthy adults demonstrated that tDCS can increase cognitive performance on a variety of tasks, depending on the area of the brain being stimulated. It has been utilized to enhance language and mathematical ability, attention span, problem solving, memory, and coordination. In addition, tDCS has been used to successfully treat depression, as well as chronic pain.

## In other words: tDCS allows you to unlock your brain!

**How long do effects from tDCS last?**
The immediate effects, where changes in cortical excitability are directly measurable, usually last from the period of stimulation, plus some after effects ranging from 3 to 90 minutes after the end of treatment. However, a study researching the effects of tDCS on depression found that the beneficial effects of tDCS stimulation were apparent a month after the treatment (link).

**How much power should I use?**
Because this technology is fairly new, it's always recommended to refer to scientific studies. The vast majority of studies conducted with this technology utilize current within the 0.5 – 2.0mA range. In our research, it seems that currents below 0.5mA may not produce noticeable results, while currents above 2mA haven't been researched thoroughly enough to prove safe and efficient. Depending on the application, it is generally believed that higher current sessions produce effects that last longer after the end of stimulation (link).

**Your Shopping Cart**

Your cart is empty

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**Pages**

**What are montages and protocols?**

Montages are the different positions of the cathode and anode electrodes on the body. Protocol is a combination of the montage being used, the current being used, and the duration of the session. The most researched protocol is anodal (positive: red) stimulation of the left dorsolateral prefrontal cortex (F3), and cathode (negative: black) placement above the right eye brow, with 1mA current for 20min. This montage has been shown to improve many cognitive functions such as working memory, impulse control, reasoning, and learning.

**What are some other popular montages and their uses?**

**Treating depression/mood improvement** - Anode: F3 (left dorsolateral prefrontal cortex), Cathode: Fp2 (just above the right eyebrow).

**Memorization and learning** - Anode: Fp1 (just above the left eyebrow), Cathode: Fp2 (just above the right eyebrow).

**Improving dexterity/learning motor skills** - Anode: either C3 or C4 (primary motor cortex), Cathode: just above the eyebrow on the *opposite* side of the head from the anode.

**Chronic Pain** - Anode: C4 (above the right ear, halfway to the top of the head), Cathode: Fp1 (just above the left eyebrow). Another interesting montage involves placing the Anode at either C3 or C4 and the corresponding Cathode at Fp1 or Fp2 on the same side of the head (left or right) for treating pain on the *opposite* side of the body from where the electrodes are placed.

(Disclosure: A lot of this information has been paraphrased from reddit's tDCS community as we have found it to be one of the best, all encompassing sources of tDCS information on the internet. Link's to other helpful sites can be found in the sidebar.)

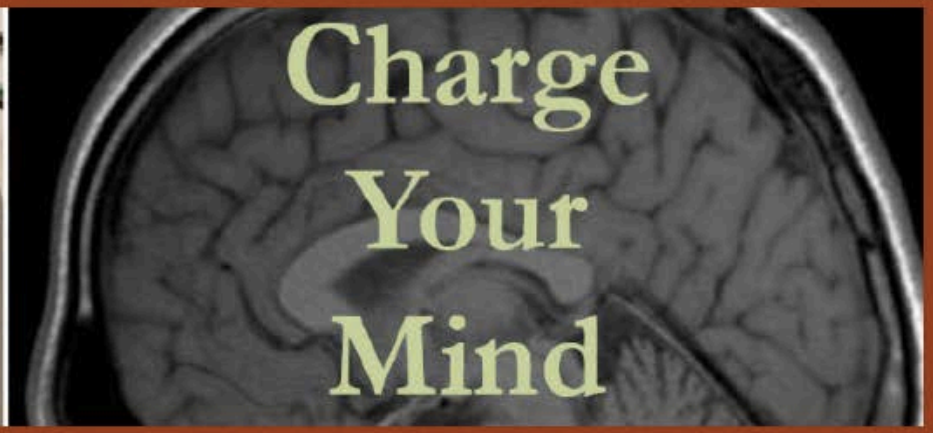
*****Important Note*****

These results are from our finding and may be incomplete and/or completely wrong! Do not view this data as absolute fact. Do your own research and come up with your own conclusions. None of these statements are supported by the FDA. This is not a medical device and we cannot offer any recommendations for use of this device. ALWAYS consult your doctor before performing any tDCS treatment as certain medical conditions and implants may increase the risk of complications.

Although it is generally understood that tDCS *cannot* cause brain damage, it still effects brain function, and can therefore potentially do so in a negative way. Because most tDCS studies only focus on one or two outcome measurements, it is possible that tDCS has subtle adverse effects which are not yet known. By using tDCS, you are doing so at your own risk and liability.

Dr. Brent Williams tDCS blog
Anthony Lee's Youtube page (an avid tDCS experimenter)
Crowdsourced tDCS montages

**Follow Us!**


Buy The Cognitive Kit

## Contact Us

support@cognitivekit.com



The Cognitive kit is now available for $175 and for the month of January, we are providing **free shipping for domestic and international orders**.

## The Prospects of tDCS

Transcranial Direct Current Stimulation (tDCS) is a specific type of neuro-stimulation in which a very small amount of regulated Direct Current is applied to electrodes to the brain. Over the last decade it has been widely studied, with good success, for varied neurological conditions and intentions: from depression, pain relief, and stroke, to working memory, improving insight, and improving overall mood.

It is useful to separate the use of tDCS in the public with clinical intentions or cognitive enhancement purposes. There is no FDA regulation for tDCS devices for medical purposes, but currently tDCS devices are sold, and marketed as, Cognitive Enhancement Devices (CED).

The whole kit.

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**The Cognitive Kit does not intend to diagnose a disease or other condition. It does not intend to cure, mitigate, treat, or prevent a disease. It does not intend to affect structure or function of the body. It is an apparatus that supplies steady regulated current and is supplied through sponge electrodes.**

# Use of the Cognitive Kit

**It is important to understand these safety points before the Cognitive Kit is used.**

1. As with any electrical stimulation, people with pacemakers, or with any electrical apparatus in their body, are most definitely contraindicated (should not do it).
2. Any body part that has metal inside of it (or any type of implant), should not be near the place of electrical stimulation (the person could burn or the part malfunciton).
3. If there is an abrasion or cut, **electrodes should not be placed over the wound**. There is a risk of a much lower impedance path if the skin is broken.
4. Sponge electrodes should be wet but not dripping when applied. The lip in the sponge electrodes catches small drips. Saline is highly recommended, either purchase a saline spray or make saline by mixing 1/4 tsp salt in 8 oz. water. After each use, remove the sponge from the rubber holder, rinse and let dry until next time.
5. When using sponge electrodes with saline solution, always remove the sponge after use and rinse it out with tap water. Dry with the sponge outside of the electrode. Otherwise the metal foil in the electrode will rust very quickly.
5. As an initial suggestion, for cognitive enhancement use, apply Anode (green cable) to Left DLPFC and Cathode (black cable) to Right supraorbital. Don't know what this means? Read more about tDCS.
6. The Cognitive Kit should not be used on children.
7. And, if there is any question about the use of a cognitive enchancement device and your particular condition, ask your doctor before use.

www.braintuner.com/magnetic-wand/index.html

# Sota Magnetic Pulser


Sota Complete Protocol | BT-8 Bio-Tuner | Silver Pulser | Ozonator

## The Alternative Health Product That's Easy to Use

The Magnetic Pulser - MP-5, by Sota Instruments is a pulsed magnetic field generator that is designed to help promote muslce relaxation and over-all wellness. The Sota Magnetic Pulser is thoroughly tested and guaranteed to operate as per the specifications. The Magnetic Pulser (MP- 5) is designed to generate a powerful (~6,000 Gauss) rapidly pulsed (~2.5mS) magnetic field. The high quality capacitor that stores and discharges the energy is rated at 30 Million Discharge Cycles! This means that the average user will get a lifespan of about 10 years or more from the Sota Magnetic Pulser. The Magnetic Pulser is part of a wellness protocol that also includes our Silver Pulser and Water Ozonator. The applicator head is clearly marked for negative North polarity, as this is considered the most beneficial in the literature on mangetic field applications.

# 8 COIL SHAKTI

**Neuromagnetic Signal Generator**

**The Magnetic Spiritual Mind Technology**

Shakti does not diagnose, treat, or prevent medical disorders. No statements about Shakti For Windows have been evaluated by the FDA

Legal: Templates for many signals in the software are licensed for use with this software by Dr. M.A. Persinger and Stan Koren.



## Neural Stimulation Using Moving Magnetic Signals

## The 8 Coil Shakti is for:

**Spiritual and Personality Transformation; Overcoming Fear, Sadness, and Anger.** Details (Does not apply to diagnosed psychiatric disorders)

**Creating Intense and unique altered states of consciousness** Details

**Enhancing Meditation (as well as other mind machines)** Details

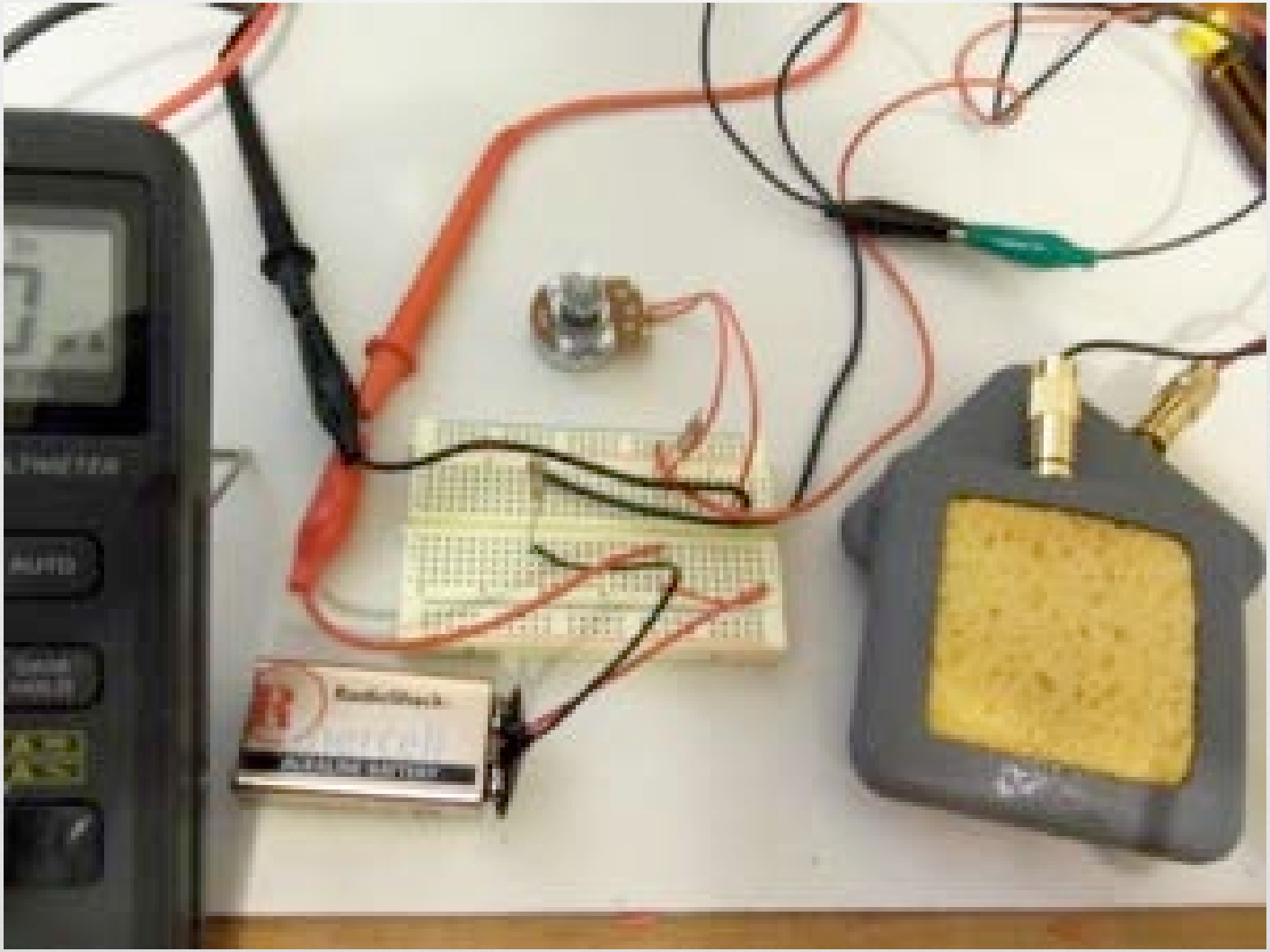
**Mood enhancement** Details

**Shakti uses magnetic fields with signals embedded in them for consciousness exploration, spiritual growth, mood enhancements, altered-state experience, and learning brain structure and function. Shakti connects to your PC computer, which controls it's output.**

**Your brain produces electrical signals as it operates. The 8 Coil Shakti applies magnetic signals to your head that mimic them. Because some brain structures have known 'signatures', they can be 'targeted' by applying their signatures as magnetic signals. Just as the brain has specific responses to specific chemicals, it also has specific responses to specific magnetic signals. It does not use EMF emissions.**

www.shaktitechnology.com/winshakti/rotating/

# DIY tDCS



Please read the FAQ.

1 4 I wonder if there's anything related to NOT playing a brain game for a while (self.tDCS)
submitted 1 day ago by redditsmith
12 comments share

2 2 Possibly relevant TED talk (self.tDCS)
submitted 1 day ago by redditsmith
3 comments share

3 1 Fixation of the electrodes (self.tDCS)
submitted 1 day ago by Panthera-tigris
6 comments share

4 11 Ladies and Gentlemen, The Intellihat (diytdcs.com)
submitted 2 days ago by DIYtDCS
8 comments share

5 2 tDCS and LLLT? (self.tDCS)
submitted 3 days ago by TheModernMonk
2 comments share

6 5 Does anyone currently use and/or prefer Mettler sponge electrodes? (mhmedical.com)
submitted 3 days ago by thatonetdcsguy The Brain Stimulator
9 comments share

7 1 Anyone stopped to use tDCS and why? (self.tDCS)
submitted 3 days ago by Feria94
9 comments share

8 3 A fourth montage list, from Soterix? (self.tDCS)
submitted 3 days ago by redditsmith
2 comments share

9 14 Not much interested in building. Anyone know of a reputable inexpensive place to buy a tDCS device? (self.tDCS)
submitted 4 days ago by Hillbillyjacob
21 comments share

10 2 What new skill to learn? (self.tDCS)
submitted 4 days ago by Hillbillyjacob
12 comments share

11 3 Effects of bilateral pre-frontal tDCS stimulation on motor performance in elderly subjects (mdmx.com)
submitted 4 days ago by mrdmrd
comment share

12 2 So what's the deal with modding up and down on this subreddit? (self.tDCS)
submitted 4 days ago by redditsmith
3 comments share

13 4 Correct current to use? (self.tDCS)
submitted 4 days ago * by clamport
6 comments share

14 8 Wow! Foc.us v2 Update (blog.foc.us)
submitted 5 days ago by DIYtDCS
4 comments share



## tDCS

subscribe 7,258 readers

~7 users here now

Using a few milliamps of current to stimulate your brain - a thinking cap. This subreddit is for anyone interested in discussing the use, construction, and theory of noninvasive electrical brain stimulators.

**Highlights:**

- Video and Instructions
- State of the Art paper
- List of Abstracts - thanks to Pecorino
- New Scientist Podcast (10m)
- Clinical Trials in progress: US EU WHO

**Disclaimers**

1.Using a tDCS device safely requires (at minimum) a basic understanding of Ohm's law and its implications. If you don't understand why you can be killed by a 9V battery, you probably shouldn't be tDCSing yourself.

2.tDCS (and related technologies) are experimental. In most cases, there are options available for treating medical and psychiatric problems which have more demonstrated efficacy and safety than tDCS. If you are concerned about some aspect of your mental or physical health, please consult a medical professional before using tDCS.

**Nothing posted here should be considered valid medical advice, everything is discussed in a strictly scientific context, if you choose to use a tDCS machine, it is your responsibility to ensure that it works correctly and your usage is within reasonable limits.**

**If you are using a device you bought which is malfunctioning, please submit a report to MedWatch. They can do a lot more than we can to investigate the problem.**

# Examples here informative but not representative

- I was heartened to hear earlier at this workshop that there have been some large-scale qualitative analyses of the tDCS DIY community that are soon to be published.
- I want to emphasise that the posts that I'm going to show here are **by no means wholly representative**.
- There are many individuals in the DIY community, even most, who invest a lot of time reading scientific papers and who try as far as possible to replicate what scientists are doing in their labs.
- Where information is lacking, DIYers will sometimes try to extrapolate from scientific findings.
- The posts I'm showing here demonstrate some of the dangers that exist in relation to DIY tDCS, even if they are not representative of the majority.

reddit TDCS comments related

Please read the FAQ.

## What about applying tdcs over the whole head? (self.tDCS)

1

submitted 1 month ago by redidtsmith

Not all at once.

Varying the anode/cathode positions so the eventually the whole head gets covered/treated. The point would be just to "treat" every spot you can.

If tdcs makes everything a little more likely to fire, a little more plastic...

I suppose that would be using the anode on everything. Same idea if suppressing things makes them stronger though.

2 comments share

### all 2 comments

sorted by: best

[-] personwithusername 2 points 1 month ago

This probably wouldn't be a good idea. A well functioning brain is not just a brain that has lots of cells that are firing lots of action potentials (in other words talking to each other a lot), but a brain that has the right cells sending the right action potentials to the right places (in other words have the right relationships with other cells). The extreme example too much brain activity is a seizure, where you have a huge cascade of action potentials flowing though your brain that disable you. Quite a few types of psych meds work by reducing the activity of certain types of synapses.

permalink

[-] mrdmrd 1 point 1 month ago

I suspect each individual is going to be a bit different and that there might be negative experiences in the blend

permalink

reddit tDCS comments related

Please read the FAQ.

1

## Would like to try tdcs. Anyone in San Francisco want to zap me? (self.tDCS)

submitted 21 days ago by jessebub

I'm curious about tdcs and would like to try it. I live in San Francisco. I'm a programmer/entrepreneur/designer type person. Am just curious to try learning stuff with it, the descriptions of flow from tdcs sound amazing. I'd rather try for the first time guided by someone with experience.

1 comment share

### all 1 comments

sorted by: best

[–] haniam 2 points 20 days ago

You should stop by Noisebridge, I know they had someone there who was working on building tDCS devices before.

permalink

Please read the FAQ.

## tingling and occasional pulsing on left side of head days after tdcs (self.tDCS)

3

submitted 15 days ago by selfimprvr

It's been 4 days since my last application of tdcs. All the last 4 days I have been feeling not constantly but intermittently medium(not heavy) throbbing on the left side of my head and a moving tingling sensation on my scalp

4 comments share

### all 4 comments

sorted by: best

[–] scholar_ 1 point 15 days ago

What reading are you getting for contact quality of the electrodes?

permalink

[–] selfimprvr [S] 1 point 15 days ago

How do i check that?

permalink

[–] nmscerra 1 point 13 days ago

The effects of tDCS have a window of 24 - 48 hours, meaning that after that time, the lasting effects of tDCS are not common. The resulting discomfort could be a result of the 'placebo effect' meaning that you are relating your discomfort with the tDCS application.

For further reference, here is a research paper explaining the after effects and window for tDCS: http://www.sciencedirect.com/science/article/pii/S1935861X12000794

permalink

[–] gi67 1 point 12 days ago*

The effects of 2 tDCS sessions separated by 20 minutes have a limited duration of effect, 24-48 hours. 5-10 tDCS treatments over a 1-2 week period produce effects persisting for weeks to months, as demonstrated in chronic pain and depression studies.

The symptoms are likely due to peripheral nerve injury from the procedure.

permalink parent

Please read the FAQ.

## Does anyone else get scared doing this? (self.tDCS)

10

submitted 3 months ago by vit47

I found out about tDCS a few weeks ago, and this weekend I built a few simple current source circuits and tested them under varying loads and I know they are outputting around 1mA. I have my multimeter hooked in series with the load (my head) and I can see that everything is working properly when I turn it on (current is stable at around 1ma).

The problem is that I just get so damn scared when I turn it on. I can't really get myself to do it. I've turned it on for a few brief moments and it messes with my vision and makes my eyes flash, and also kinda stings. I've read that this is fairly typical, but I adjusted my circuit to output closer to 0.5mA and I still get the same effects (using the typical depression montage). I am using a cellulose sponge (cut in half so they are fairly large) for electrodes, and they are soaked in water.

I'm gonna try ramping it down even more today and then slowly ramp it up to 1mA.

23 comments share

### all 23 comments

sorted by: best

[–] **TDCStest** 2 points 3 months ago

Also new to tDCS. I have had similar stinging issues and read it was likely due to using too much salt in my saline solution. I made a new batch and now don't even feel it for one montage and feel it much less for the other that I use. The montage of anode to left temple, cathode to right forehead above eyebrow still gives a little sting and some pulsing of the temple but nothing bad.

permalink

[–] **vit47** [S] 1 point 3 months ago

I've heard that mentioned but the whole salt thing kinda confuses me, because the salt is needed to lower the resistance enough to where these devices can actually supply 1-2mA of current. With a lot of the devices I've seen, they only use a 9V battery which means that if someone used less salt, I'd suspect it can't actually supply 1mA of current and that might be why it's stinging less. When I soak my sponges in water (with no salt) and put them to my head, I measure around 15k ohms of resistance. So best case scenario for the 9V tdcs devices, that is only 0.6mA of current going through someone's head.

permalink parent

reddit tDCS comments related

Please read the FAQ.

## Simple tDCS Experience (self.tDCS)

2

submitted 10 months ago by MrThetaZeta

So I hacked together a real quick tDCS device with little more than 1.8 miliamp current regulating diode, a 9 volt battery, a single metal annode and two metal cathodes.

Most basic circuit possible, I guess.

Whoa though, does it ever burn. Any thoughts as to why? Is this simply me being a puss or something? Is it supposed to be this way? Is it my choice of using metal electrodes?

Is there a particular cream, or lubricant for the skin that may assist or help this situation?

Perhaps it's the current regulating diode?

34 comments share

### all 34 comments

sorted by: best

[–] keithdcstim Cognitive Kit 3 points 10 months ago

Am I missing something, what are metal electrodes? Are you putting metal directly on to the skin? That will cause discomfort and burning. Buy (or make) some sponge electrodes, I think it is the best way (only way for me) to implement TDCS.

permalink

Please read the FAQ.

# -9 Volt Battery- Anode vs Cathode/Positive & Terminal vs Negative Terminal-Final Answer Sought (self.tDCS)

2

submitted 10 months ago by adonisofnumenor

Hello everyone, this is my first post and I apologize preemptively if I violated any sort of etiquette. I have a 9 volt tdcs unit with red cables going to the positive terminal, and black cables leading to the negative. I am trying to increase my working memory via anodal stimulation to my DLPFC and cathodal stimulation to my left supraorbital region.

I am having an extremely difficult time figuring out which electrode is the anode/cathode. I see all of these diagrams -example(1)- online and they almost always show positive as the anode, yet in a discharging galvanic cell such as a 9 volt battery the anode is "negative"(2).

(1) http://brmlab.cz/_media/project/brain_hacking/tdcs.jpg?cache=

(2) http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Anode.html

The cables of my device are marked as red/positive and black/negative I am using a system with a 9 volt battery. What is the your final answer to my problem?

Thanks for your previous post and help!

10 comments share

## all 10 comments

sorted by: best

[–] keithdcstim Cognitive Kit 1 point 10 months ago

Hi,

Keep the red/positive/anode and black/negative/cathode symbolism. It is right for electronics and try not to be confused with your post 2. This is a good method to keep, think of it as direct current flowing (forget the electrons, charge flow, more confusing) DC flows from the Anode (+) to the Cathode (-).

Regarding your circuit, the Anode is the line that comes from the regulator (LM317) to the head, the cathode is the one that goes from the head to your battery.

For your montage, if you are using the commonly used montage, it is Anode L DLPFC and Cathode R supraorbital (this is the picture for the brmlab, you are looking opposite).

good luck

permalink

[–] derphurr 2 points 10 months ago

No, this is not correct really.

Just avoid using anode/cathode and avoid problems.

A battery anode isn't the same thing as diode anode and the meanings are all bizarre. Anions and biological charges are different from electrons flowing out of a battery.

Just keep track of which electrode needs current flowing into it or out of it. And a battery you care about which

reddit tDCS comments related

Please read the FAQ.

## Help me summon the courage to mount this beast! (self.tDCS)

submitted 5 months ago by I_Am_Coder

I received a mysterious device that does input (and output?) via audio cables: http://i.imgur.com/pSGEEPv.jpg. I haven't connected anything before that plugs directly into the wall, so I have some resistance to overcome...

37 comments share

### all 37 comments

sorted by: best

[-] **mrdmrd** 5 points 5 months ago

If it plugs in the wall best to avoid connecting it to your head. A short could be problematic. This looks a bit jury rigged.

permalink

[-] **I_Am_Coder** [S] 1 point 5 months ago

Thanks. I will see if I can get some dry readings from it first.

permalink parent

[-] **John-A** 1 point 5 months ago*

I'd plug that in outdoors just to be on the safe side.

permalink parent

[-] **s1gmoid** 5 points 5 months ago

What the hell IS this? It looks absolutely ludicruous. And what's with that montage?

I'd say the only person qualified to put this thing on on would be its *creator* (pronounced, in this case, *kree-ay-tohr*).

permalink

[-] **I_Am_Coder** [S] 0 points 5 months ago

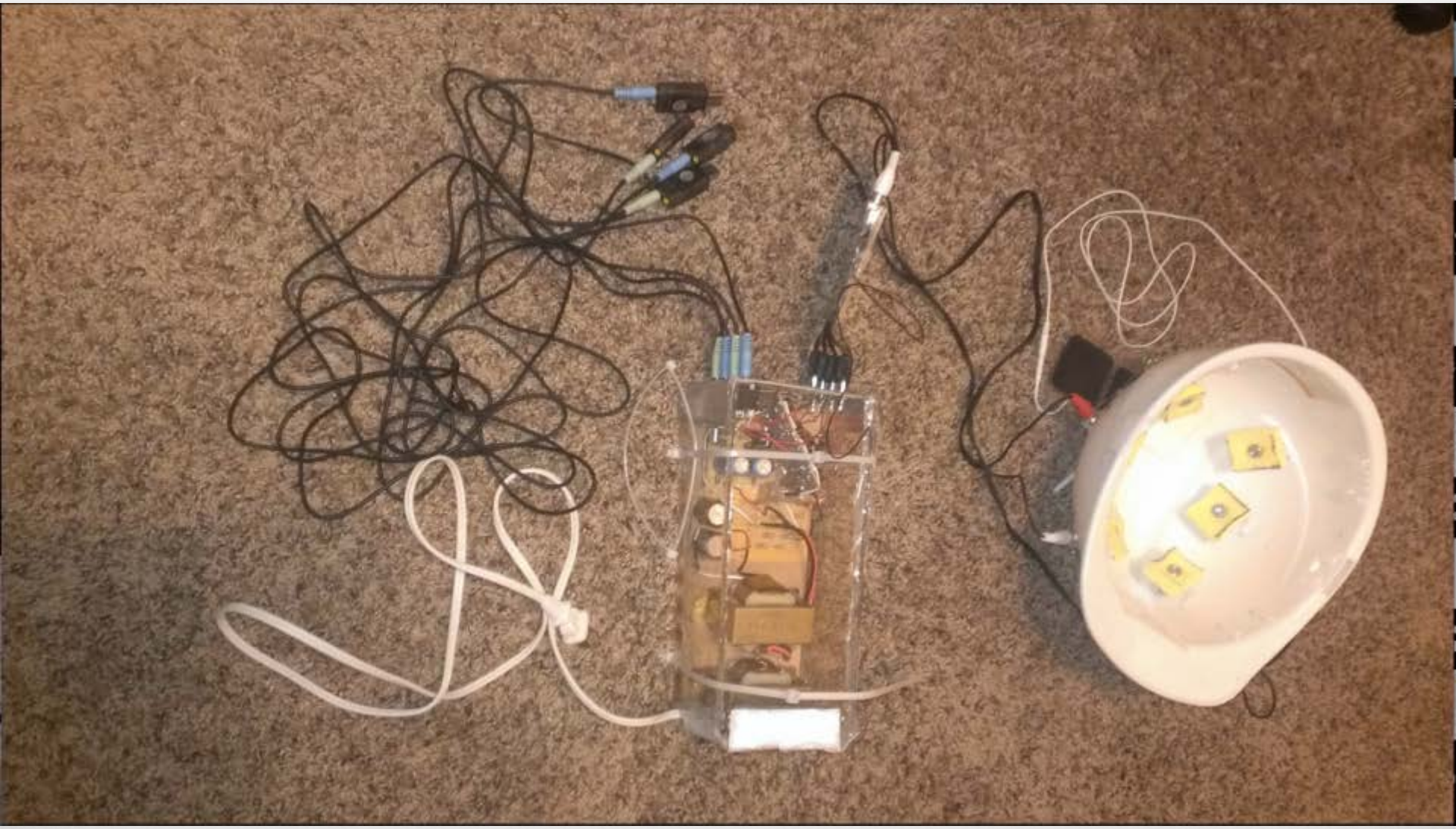
No sure either... this is what it looks like on the underside: http://i.imgur.com/0xFLp6q.jpg.

permalink parent

[-] **RiddleGiggle** 3 points 5 months ago

Also, do I see right these sponges are **BURNT** at the edges? **Stay the hell away from that thing! >.<**

permalink parent



# Ethical and Regulatory Challenges

# DIY *t*DCS

- Do researchers have a responsibility to lay persons who appropriate their research for parallel purposes?
- Should such appropriation of research be explicitly considered by ethics committees when researchers obtain ethical approval for their studies? What would such consideration look like?
- Should researchers (and funding bodies) make research freely available where doing so would better inform and protect those engaging in DIY practices?
- What would the implications of orienting and disseminating research to this 'second audience' be?

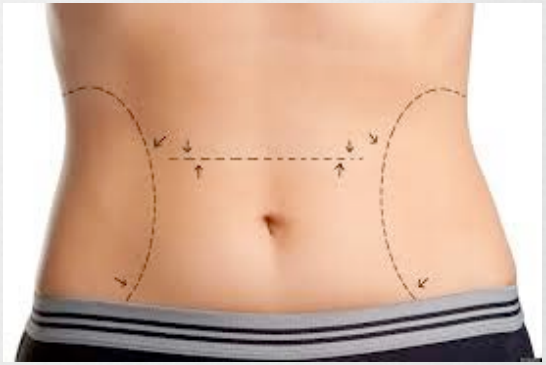
# Device regulation and "Lifestyle benefits"?

- Regulatory agencies might find their responsibilities expanding into considerations of "lifestyle" benefits and the definition of acceptable risk in exchange for such benefits

Farah, M. J., Illes, J., Cook-Deegan, R., Gardner, H., Kandel, E., King, P., ... & Wolpe, P. R. 2004. Neurocognitive enhancement: what can we do and what should we do? Nature Reviews Neuroscience 5(5): 421-425.

# Enhancement benefits similar to cosmetic surgery?

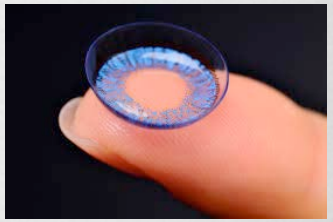
- In the case of liposuction devices, the panel of experts advising the FDA decided that ‘it could only characterize the benefits from these devices in terms of patient satisfaction’.



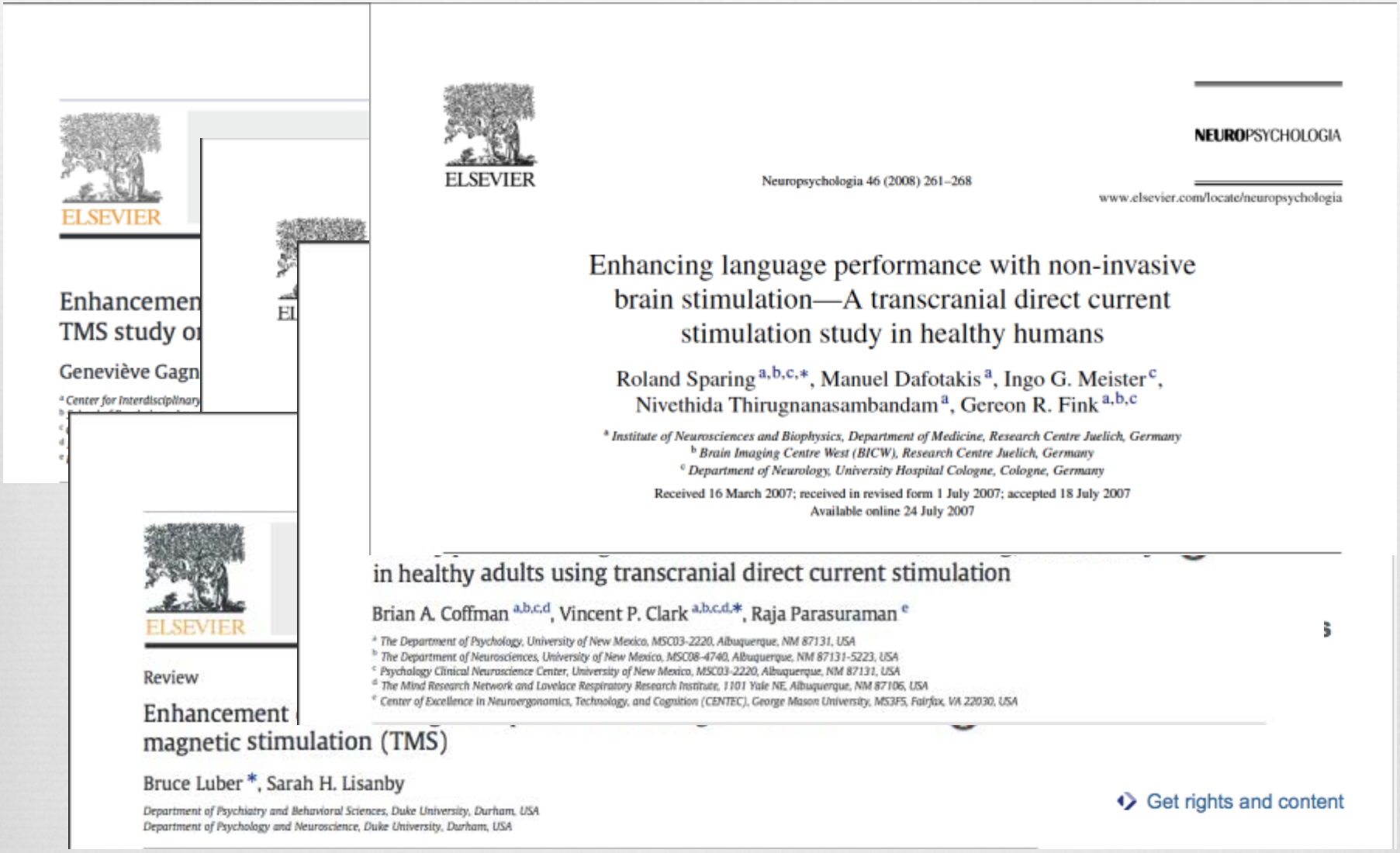
Mehlman, M. J. 1999. How will we regulate genetic enhancement. *Wake Forest L. Rev.* 34: 671.

# MHRA consulting on inclusion of non-medical cosmetic devices

Weighing up the risks and benefits of a product which does not have a medical purpose is different than for medical devices. Therefore […] manufacturers of implantable or invasive products without a medical purpose [must] ensure that these products present either no or the minimum acceptable risk which is consistent with a high level of protection for the safety and health of persons. The instructions for use must also include information on the absence of clinical benefit for these products and the risk of using them.



MHRA, *The Revision Of European Legislation On Medical Devices* (November 2012)
http://webarchive.nationalarchives.gov.uk/20141205150130/http://www.mhra.gov.uk/home/groups/comms-ic/documents/publication/con205362.pdf



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Enhancing language performance with non-invasive brain stimulation—A transcranial direct current stimulation study in healthy humans

Roland Sparing [a,b,c,*], Manuel Dafotakis [a], Ingo G. Meister [c], Nivethida Thirugnanasambandam [a], Gereon R. Fink [a,b,c]

[a] Institute of Neurosciences and Biophysics, Department of Medicine, Research Centre Juelich, Germany
[b] Brain Imaging Centre West (BICW), Research Centre Juelich, Germany
[c] Department of Neurology, University Hospital Cologne, Cologne, Germany

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in healthy adults using transcranial direct current stimulation

Brian A. Coffman [a,b,c,d], Vincent P. Clark [a,b,c,d,*], Raja Parasuraman [e]

[a] The Department of Psychology, University of New Mexico, MSC03-2220, Albuquerque, NM 87131, USA
[b] The Department of Neurosciences, University of New Mexico, MSC08-4740, Albuquerque, NM 87131-5223, USA
[c] Psychology Clinical Neuroscience Center, University of New Mexico, MSC03-2220, Albuquerque, NM 87131, USA
[d] The Mind Research Network and Lovelace Respiratory Research Institute, 1101 Yale NE, Albuquerque, NM 87106, USA
[e] Center of Excellence in Neuroergonomics, Technology, and Cognition (CENTEC), George Mason University, MS3F5, Fairfax, VA 22030, USA

Review

magnetic stimulation (TMS)

Bruce Luber *, Sarah H. Lisanby

Department of Psychiatry and Behavioral Sciences, Duke University, Durham, USA
Department of Psychology and Neuroscience, Duke University, Durham, USA

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But improvements in cognitive performance are measurable

# Still more subjectivity to enhancement?

- Subjects reported feeling significantly more alert, attentive and energetic on [modafinil] than placebo.

Turner, D. C., Robbins, T. W., Clark, L., Aron, A. R., Dowson, J., & Sahakian, B. J. 2003. Cognitive enhancing effects of modafinil in healthy volunteers. *Psychopharmacology* 165(3): 260-269.

# The varying value of enhancement effects

Interviews with healthy scientists taking modafinil for cognitive enhancement purposes revealed that the subjective effects ranged from moderate to 'mild *but very valuable* to me'


Sahakian B, Morein-Zamir S. 2007. Professor's little helper. *Nature* 450: 1157–1159.

# Important distinctions

- Objective benefits
  - Measurable improvements in cognitive performance
- Subjective benefits
  - Experiential and difficult to measure
- Value of benefit
  - Varies depending on goals and preferences

# Benefits as effects on wellbeing

Since:

1. what is fundamental for a basic level of wellbeing (e.g. absence of pain) will be more or less universal to all individuals, but what is required for higher levels of wellbeing will diverge in line with the diversity of individuals' life goals, and

2. a basic level of wellbeing is necessary before higher levels of wellbeing can be reached:

The effects labeled as treatments will be more universally valued than the effects labeled as enhancements.

This makes enhancement benefits (objective and subjective) harder to weigh against risks, counting in favour of more consumer freedom when devices are marketed for such purposes.