

Information before regulation to make amateur brain stimulation safer

November 7 2016, by Rachel Nowak

In the comfort of their own home, an unknown number of people are electrically stimulating their brains.

People are doing it because they believe it can boost mental agility, help with disorders such as depression, or just for the pleasure of exploring a scientific frontier outside the constraints of professional science.

And apparently some computer gamers are doing it because they think it can improve their performance.

But [home brain stimulation is opposed](#) by most neuroscientists on safety grounds. That has helped create a knowledge vacuum that leaves [brain stimulation](#) enthusiasts piecing together information on which devices to purchase, and how to use them, from whatever online sources they can find, most often from other home users.

It's the Wild West of neuroscience. And that needs to change.

Methods of stimulation

Whether home users [get the brain boost they seek](#) is unclear. One technique, TMS or [transcranial magnetic stimulation](#), is approved by the US Food and Drug Administration for clinical treatment of [migrane headaches](#) and [severe depression](#). Large trials are also planned for autism, schizophrenia and stroke.

But the jury is out on the go-to technique for home use which is tDCS, or transcranial direct-current stimulation. Lab tests suggest that tDCS changes language and maths abilities, attention, video gaming ability (part of its popular appeal) and other cognitive skills, but more evidence is needed to be sure.

And here's the rub. If [electrical stimulation](#) does boost brain function, it can also harm it. That's why brain researchers are careful to limit risk by being conservative about how long and how often they stimulate someone's brain. Home users won't be so cautious, especially without access to information.

The research community's response to home use is to draw attention in carefully-couched terms to its dangers, still largely unknown but generally considered likely to be slight, such as in this [open letter in the Annals of Neurology](#).

Or researchers' reaction is to ask for more regulation.

Regulations

Consumer brain stimulation devices, which can be legally purchased online, are already regulated by the general consumer rules set out by the [Australian Competition and Consumer Commission](#) and in the US by the [Consumer Product Safety Commission](#).

But overzealous regulation has the potential to do harm as well as prevent it. It could, for example, slow the development of these devices to treat mental health disorders, an area in which there is a pressing need for effective therapies and where brain stimulation shows much promise.

The consumer market for brain stimulation devices provides an opportunity to optimise design. John Reppas, director of public policy at

the Neurotechnology Industry Association, told the US Food and Drug Administration meeting [Noninvasive Neurostimulation Devices and Cognitive Function](#) last year:

"It [may also] allows an eventual next-generation medical grade product to be developed and financed a lot more quickly [...]."

Then there's the case for personal autonomy. Allowing adults to learn more about their own bodies and brains, even to alter their function, is not necessarily bad. We allow adults to change body and [brain function](#) with caffeine, alcohol, exercise, and learning. Is the use of electrical brain stimulation devices different?

Talk to the users

We suggest a more pragmatic approach to harm reduction. Don't stop with just a warning to home users, or calls for greater regulation.

Why not also work with home users to understand what drives them, to test the devices they use, and fill the information void with scientist-sanctioned safety guidelines and easily-accessible translations of new findings. These would include the limitations and side-effects.

Nick Davis, a neuroscientist at Manchester Metropolitan University, [goes further](#) to suggest harnessing this "pool of creative and engaged self-experimenters [to] shape and inform the future uses of tDCS".

Health agencies could also step in with a similar approach to that taken to stem cell tourism, in which people with life-limiting illnesses travel overseas for what are often unproven therapies.

Stem cell tourism and lounge room brain stimulation share similarities. In both cases, users have moved a new technology out of the lab before

the evidence is in.

Both technologies promise game-changing treatments for intractable health problems, firing a scientific optimism that has gushed into public consciousness, driving demand for an under-developed technology.

When first faced with stem cell tourism, scientists tended to protest its foolishness. But after listening more carefully to the tourists to understand what was driving them (in a nutshell, no other options), some changed tack.

They brought together stem cell scientists, people who wanted the technology in its unbaked state, and those who wanted it developed and approved first. They talked through issues of [safety, evidence, autonomy and hope](#).

Their efforts culminated in advice from various bodies, including the National Health and Medical Research Council [providing information](#), to assist people contemplating stem cell tourism. Why not a similar approach to the lounge room use of brain stimulation devices?

Brain stimulation is cheap, accessible and potentially of interest to anyone who ever wished they could think faster, or at least better than their colleagues, their ageing self, their class mates or their competitors.

Nobody knows how many people currently home use, or who they are. Recreational gamers are clearly not the whole story. We know of people who home use in attempts to treat age-related cognitive decline and severe, uncontrolled mental disorders.

What we do know is that if the brain stimulation makes good on its early promise those numbers will surely grow, never mind how many cautious warnings and calls for greater regulation are issued.

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