

The ethics of brain boosting

January 26 2012, By Jonathan Wood



A healthy adult volunteer takes part in a brain stimulation study. Photo: Roi Cohen Kadosh.

(Medical Xpress) -- The idea of a simple, cheap and widely available device that could boost brain function sounds too good to be true.

Yet promising results in the lab with emerging 'brain stimulation' techniques, though still very preliminary, have prompted Oxford neuroscientists to team up with leading ethicists at the University to consider the issues the new technology could raise. They spoke to Radio 4's [Today program](#) this morning.

Recent research in Oxford and elsewhere has shown that one type of brain stimulation in particular, called transcranial direct current stimulation or TDCS, can be used to improve language and maths abilities, memory, problem solving, attention, even movement.

Critically, this is not just helping to restore function in those with impaired abilities. TDCS can be used to enhance healthy people's mental capacities. Indeed, most of the research so far has been carried out in healthy adults.

TDCS uses electrodes placed on the outside of the head to pass tiny currents across regions of the brain for 20 minutes or so. The currents of 1–2 mA make it easier for neurons in these brain regions to fire. It is thought that this enhances the making and strengthening of connections involved in learning and memory.

The technique is painless, all indications at the moment are that it is safe, and the effects can last over the long term.

Dr. Roi Cohen Kadosh, who has carried out brain stimulation studies at the Department of Experimental Psychology, very definitely has a vision for how TDCS could be used in the future: "I can see a time when people plug a simple device into an iPad so that their brain is stimulated when they are doing their homework, learning French or taking up the piano," he says.

The growing number of positive results in early-stage studies, led the neuroscientists Dr. Cohen Kadosh and Dr. Jacinta O'Shea to talk to Professor Neil Levy, Dr. Nick Shea and Professor Julian Savulescu in the Oxford Centre for Neuroethics about what ethical issues there may be in future widespread use of TDCS to boost abilities in healthy people.

The researchers outline the issues in a short paper in the journal [Current Biology](#) (pdf), and indicate the research that is now necessary to address some of the potential concerns.

"We ask: should we use brain stimulation to enhance cognition, and what are the risks?" explains Roi. "Our aim was to look at whether it gives rise

to new ethical issues, issues that will increasingly need to be thought about in our field but also by policymakers and the public."

"This research cuts to core of humanity: the capacity to learn," says Professor Julian Savulescu. "The capacity to learn varies across people, across ages and with illness. This kind of technology enables people to get more out of the work they put into learning something."

He adds: "This is a first step down the path of maximizing human potential. It is a very exciting development but we need to control the release of the genie. Although this looks like a simple external device, it acts by affecting the brain. That could have very good effects, but unpredictable side effects."

One of the most obvious uses of brain stimulation techniques is in children as an educational or learning aid. The researchers believe that their use in children would be warranted, and that we should begin research to understand how TDCS might be used in children.

Roi notes that: "Parents will often send their child to piano lessons or to football lessons, wanting them to do well." He considers that providing people with ways of fulfilling their potential is not a bad thing.

The researchers consider whether brain stimulation could be thought of as cheating, with the idea that we can get extra cognitive abilities for no effort. Here they offer a resounding 'No'.

The technique seems to boost the learning process in conjunction with standard education or training. There is no free ride here – people still need to work at learning a new skill or language themselves. "It won't be possible to go to sleep at night with the electrodes on, wake up the next day and pass all your exams," says Roi.

They also look at access to this technology, and will it further benefit the well off. But they suggest the TDCS kit is simple and cheap enough to be available to all in schools.

"This technology overcomes some standard objections to enhancement: It is not a set of cheat notes," says Julian. "You require effort and hard work to learn. It is just that you get more out of your effort. And because it is cheap, low tech, easily affordable, it could be widely available. This addresses the objection that it will introduce inequality and unfairness. It could be available and should be available to all, if it is safe and effective."

The researchers' concern is more that the technology is such that people could assemble all the components needed at home reasonably simply. Roi clearly says that this is not warranted yet with our limited current knowledge about the technique's use: "The message should very much be 'Don't try this at home'."

While there have been some ethical discussions in the past of using some drugs to boost concentration or attention, the researchers explain that TDCS is different and needs to be considered separately.

For example, drugs in general are prescribed for use by one person, ingested and taken internally, and with limits on dose. There are no such in-built limits with brain stimulation, and it may not feel as serious as taking a drug because it is an externally applied treatment – though its effects may be as strong.

"Once you have a [brain stimulation](#) device, you can use it as often as you want and there are no limits on who uses it," Roi points out.

But at the current time, most of the TDCS work that has been done is preliminary, small-scale and in the lab. There are no clear guidelines for

its use as yet, as research is still establishing the optimal ways of using TDCS for different areas of cognition.

The researchers are concerned that in this gap, some people could step in to offer TDCS to vulnerable patients or parents desperate to advance their children before the technique is fully understood.

The researchers also identify a number of outstanding questions:

- Are there downsides to boosting capacity in one area of cognitive ability? Do other mental abilities lose out?
- The developing brain in children is different to adults. With most research having been in adults, the use of TDCS in children becomes a pressing question.
- And are the benefits seen in the lab clinically relevant: can TDCS lead to improvements that matter in normal daily life?

Julian says: "At this stage, we need more research to understand better the risks and benefits, in specific populations, in real life. Any regulation should prevent misuse and abuse, but facilitate good research. This kind of technology could be as important as the internet and computing. Those are external cognitive enhancements. This is basic fundamental cognitive enhancement."

The researchers conclude the exciting potential of TDCS requires that this research be done and all these ethical questions considered.

"Enhancing cognitive abilities, or our ability to learn, is not a bad thing to do. There is no problem with that, as far as we see, as long as there are no side effects," says Roi.

"What is the ethical way forward? More research before deployment," says Julian. "It is promising but not proven at this stage."

Provided by Oxford University

Citation: The ethics of brain boosting (2012, January 26) retrieved 19 April 2024 from <https://medicalxpress.com/news/2012-01-ethics-brain-boosting.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.