Public (mis)understanding of Transcranial direct current stimulation as a cognitive enhancer

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## Abstract

One of the most intensively discussed research areas of human enhancement has been cognition, from "smart drugs" to genetic intervention and even brain implants. Some of these are still futuristic, while those already in use have not lived up to the promise of enhancing human traits in healthy individuals to a significant degree. Recently a minimally invasive brain stimulation technique, transcranial direct current stimulation (tDCS), has emerged with the potential to bring cognitive enhancement to a new stage. The technique, which involves applying a weak direct current to the scalp via two saline-soaked sponge electrodes, is relatively safe, effective, portable, and inexpensive.

The perspectives of the general public are generally lacking in the ongoing debate of emerging technologies and cognitive enhancement. In order to get a better grasp of the public stand in relation to tDCS as a cognitive enhancer, we retrieved widely read popular press articles published online from August 2007 to august 2012 in which the subject was tDCS and cognitive enhancement and which had at least 10 comments by its readers. We used thematic analysis to investigate the attitudes of commentators regarding the use of tDCS for enhancement purposes. One of the dominant themes to emerge form the results was the observation that many people misunderstood the technology and its reach. Misunderstanding of tDCS manifested within two principal frames: either as technical misinterpretation of tDCS or a misidentification of the technology. In relation to the former a substantial number of comments implied simplistic but incorrect ideas such as the more current or voltage used the better results for cognitive enhancement. In relation to the latter

frame, a considerable number of comments reflected the view that tDCS was either an extension of other electricity delivering technologies (such as tasers or even electrical sockets or plugs) or been a form of electroconvulsive therapy.

Public (mis)understanding shapes particular attitudes and perceptions on tDCS as a cognitive enhancer. Misunderstanding can lead to activism (for example, groups of people thinking that all electricity is bad) and taking uncritical social and ethical positions about matters that are not well understood. On the other hand, misunderstanding can also lead to facile perspectives on the availability of technologies that do not accord with reality. Both forms of misunderstanding can muddy the debate as well as lead to poorly informed consumer choices, a particularly pressing issue as the number of online resources for home tDCS devices grows.

The main conclusion drawn from this exploratory investigation is that tDCS is misunderstood as an emerging cognitive enhancement technology. In order to promote a well-grounded debate regarding any future governance of tDCS, we will need to explore new ways to clarify sources of misunderstanding, as well as engaging scientists, policy makers, the media, and the public.