

This response was submitted to the consultation held by the Nuffield Council on Bioethics on *Novel neurotechnologies: intervening in the brain* between 1 March 2012 and 23 April 2012. The views expressed are solely those of the respondent(s) and not those of the Council.

## **Consultation Response**

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### **Novel Neuro-technologies: Intervening in the Human Brain**

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#### **Background:**

The human brain, a “jelly-like mass of tissue” (Philips, 2006) weighing about 1.4kg, is perhaps the most multifaceted human organ in the body. Consisting of multi- billion nerve cells and neural connectivities, the brain is responsible for all human memory, thought, feeling, action, and experience (Philips, 2006). It is the central processing core of all sensory experience. It is arguably the primary human organ that regulates the human organic system. Cognitive strengths, personality states, and mental health disorders are measured by its performance. The brain is an organ with potentials that almost precisely define the human spectrum of abilities. Professor Dick Swaab, a renowned world-class neuroscientist, offers a rather compelling assessment of the human brain – “We are our Brains”:

Everything we think, believe, and do is determined and carried out by our brains. The unprecedented evolutionary success of humankind – as well as the many limitations of individual people – is determined by the fabulous organ, our brain, which determines our possibilities, our limitations, and our character, as was already recognized by Hippocrates and Descartes; *we are our brains*. The rest of our body only serves to feed our brain, to move it around, and to make new brains through procreation. Brain research therefore not only deals with disorders, but is increasingly becoming a search for the answer to the question why are we the way we are, an *ultimate* (my emphasis) search for the self.

In the wake of neuroscientific advancements in novel [non-pharmacological] neuro-technologies like neurostimulation, brain computer interfaces, and neural stem-cell therapy, it is pertinent to explore and investigate the ethical and practical implications of these new brain technologies for both clinical and non-medical applications. While I generally welcome these neuro-technological advances as great strides in the fields of neuroscience and neuro-therapy, I strongly recommend and employ caution in their use and application. Like the centuries-old dichotomy of man vs. machine, some novel neuro-technological developments are pushing the frontiers of the human brain to the point of re-defining the concept of the human person in a manner unrelated to nothing in the history of human experience. As such, it is appropriate to evaluate these

developments against an objective ethical background with the view of informing researchers, safeguarding human value systems, and developing relevant policy recommendations.

On this background, I will respond to several crucial questions, both general and specific, as posed by the Working Party of the Nuffield Council on Bioethics for “Novel neurotechnologies: intervening in the brain.”

**2. If you have not used a technology that intervenes in the brain before, would you do so if you were ill? Why / why not?**

Yes. I would consider using a brain-intervening technology if I were ill. From a general perspective, the goal of treatment or therapy is to alleviate illness or relieve/reduce pain. There are several kinds of brain-related illnesses – some are due to brain injuries; some are caused by memory loss; others are mental health-related. Examples of all of these include Alzheimer’s, Parkinson’s, Huntington’s, Stroke, Aneurysms, Dementia, Major Depressions, Migraine, Addictions, etc. From a practical point of view, when used *properly*, novel brain technologies like stimulation and stem cell therapy promise huge success for reverting and treating some of these illnesses.

**3. Would you use a technology that intervenes in the brain for non-medical purposes, such as gaming or improving your cognitive skills? Why / why not?**

Yes, I would use a brain-intervening technology for non-medical purposes. While medical uses of novel neurotechnologies seem to be more relevant to treating brain-related diseases/injuries, it would seem that non-medical applications of brain technologies are non-justifiable since they have no direct medical benefit. It is important to underscore that advances in science bring welcome changes to human living conditions. Throughout the history of science, scientific inventions have transformed human experience in aviation, telecommunication, electric energy, transportation, agriculture etc. Despite shortcomings and unfortunate accidents, all of these have greatly improved human existence. The difficulty with novel neuro-technologies is that they directly affect the fundamental human organ in a manner unlike before, and most of their reach as well as long-term potential risks remain relatively unknown. Consider a scenario where brain-intervening technologies could alert law enforcement officials about an imminent homicide or terrorist activity. Even with gaming and improving cognitive skills, brain-intervening technologies could prove very useful. Why should I have to type if I could operate my laptop by thinking? All of these scenarios no doubt, raise ethical questions of neuro-security and confidentiality of neural information.

**4. What are the most important ethical challenges raised by novel neurotechnologies that intervene in the brain?**

- If I am my brain, based on Swaab’s synopsis above, am I still fully human if I employ the use of brain-intervening technologies perhaps to improve and enhance my cognitive skills? Sportsmen are penalized for taking stamina-building drugs because they operate on a different level and end up outsmarting their opponents.
- What rights does anyone have to invade the privacy of my cognitive faculties?
- In warfare, is it fair and just to employ neuro-controlled arsenals against an opponent with human armies?

**5. In what ways, if at all, should the development and use of these technologies be promoted, restricted and/or regulated? Please explain your reasons.**

- Neuro-technological use should be promoted by providing research funding and resources to conduct relevant studies either with medical settings or for non-medical purposes. This promotes and incentivizes scientific discovery that is beneficial for the human reality.
- Proper regulations should be put in place to regulate and restrict the abuse of brain technologies. While it will be counter-productive to over-regulate the research industry, it is essential to ensure that neuro-scientific advancements and discovery is at the service of the human being and not vice versa.
- Scientific and ethical review committees should be put in place to ensure proper review of research that aims to develop these technologies. While these review processes do not guarantee 100% accuracy, they help undergird the neuroscientific research enterprise with proper checks and balances from peers and experts.

**12. If you have not used neurostimulation before, under what circumstances would you do so?**

While I have not used neurostimulation before, I would be inclined to do so in certain circumstances. One of such would be in helping individuals to forget painful and damaging memories. While this sounds selective, certain kinds of traumatic events are better if out of the human memory system. Physical abuse, genocide and massacre, rape, war-related images etc are examples of these traumatic events. Psycho-therapy for these kinds of traumatic events (post-trauma) seeks to reduce painful memories, and to enable the individual dissociate from these memories. If neurostimulation could practically make the brain undo those memories, it would tentatively improve the human mental system. However, to what extent can we control the human experience or memory of suffering and how it gives birth to new vistas and possibilities for building societies around peace and tranquillity?

**16. Under what circumstances would you use neural stem cell therapy?**

I will use neural stem cell therapy under almost every circumstance of neural tissue damage or brain injury. Though the science of stem cell research and neuro stem cell therapy is relatively young, I am confident it holds positive therapeutic remedies for treating neural tissue damage through regeneration of neural cells and reformation of neural pathways.

**19. How do you feel about neural stem cell therapy being used for non-medical purposes one day, for example for human enhancement?**

This would be more of a “cosmetic” use of neural stem cell therapy. Human enhancement by neural stem cell therapy raises critical ethical questions surrounding justice, respect for human

dignity, equality, and solidarity in society. Is it fair for a neuro-enhanced individual to do well in a Math test that his non-enhanced fellow classmates? Is it ethical and legal for neuro-enhanced individuals to outsmart systems that regulate other members of the society?

**Conclusion:**

In sum, while we are faced with an ever-increasing advancement in science in general and in neuroscience, it is necessary to constantly evaluate and re-examine every step of that advancement. We live in a present global community where research abuses have rocked governmental systems and entities. The more ethical cognizant and conscientious the neuro-research community and society at large are, the better the hope that humanity can preserve those fundamental values that defines what it means to be human, even in the wake of mind-transforming brain-intervention techniques.

**References:**

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