Sound Decisions: An Undergraduate Bioethics Journal

Volume 4 | Issue 1 Article 5

May 2018

We Can, But Should We? A Response to Ethical Analysis of Brain Augmentation and Nanotechnology

Simone M. Moore
University of Puget Sound

We Can, But Should We? A Response to *Ethical Analysis of Brain Augmentation and Nanotechnology*

Introduction

Science often progresses at rates faster than it can be regulated. Much research has been done in recent years surrounding nanotechnology, mechanisms comprised of various particles between 1 and 100 nm in size that are capable of altering organic and non-organic molecules and atoms. The ethical implications of using such technology have been strongly debated among researchers and ethicists alike, particularly concerning the issue of human brain augmentation. While the definition of what constitutes brain augmentation can vary greatly, for the purposes of this essay, brain augmentation will be defined as the process by which an individual's higher and lower order brain function are enhanced beyond their natural capabilities with invasive forms of intervention. Individuals that have no external alterations in the neural development cycle including neurogenesis, cell migration, cell differentiation, cell maturation, synaptogenesis, cell death and synaptic pruning, and myelogenesis, have "natural" brain function. Using the ethical theory of principlism and addressing the points offered in Caras and De Jesus' paper *Ethical Analysis of Brain Augmentation and Nanotechnology,* this paper will argue that the use of nanotechnology for the purposes of brain augmentation are not morally permissible for they violate the principles of autonomy, non-maleficence, and justice.

Informed Consent

Caras and De Jesus suggest that treating patients with nanoparticles and technologies for clinical purposes presents two major issues. They begin by saying that (1) it is not known how nanoparticles will specifically interact with the human brain and body at this time, and (2) problems of informed consent can arise from a change in identity that may take place after the introduction of nanoparticles into the brain. They go on to argue that overall risks of using nanotechnology would be akin to the side effects one might see when taking prescribed medications, making the use of the technology potentially harmless. They finish by asserting the benefits could outweigh the possible harms, further testing should occur before the technology is introduced into healthy populations, and any human testing should be done for "treatment purposes" (7-8).

The fact that it is unknown how the human body would respond to the introduction of nanoparticles would provide a major violation of the principal of autonomy. Caras and De Jesus' focus on changes in identity post-implementation of the nanotechnology veers away from the basic components of informed consent that one should consider. It would be more correct to suggest that a patient would be unable to provide informed consent if they were using an untested treatment without knowing what the side effects could be for they could have any number of adverse responses to chemical properties of specific nanoparticles without knowing the risks beforehand. Additionally, the nanotechnology could influence brain function in ways that are more detrimental than beneficial and lead to a violation of non-maleficence as well. While the general biological layout of the brain is known, the function of each neuron, their neuritic connections, and synaptic regions have yet to be fully discovered. Even if one had access to such information, the activity of other neural cells, such as glial cells, and the role they play in

neural communication, neuroplasticity, and neural development is still relatively minimal. It is possible that not knowing the processes of certain neural functions can lead to a breach of non-maleficence if nanotechnological, especially if interventions would be used without a patient's proper informed consent. Furthermore, testing nanotechnology on humans for "treatment purposes only," especially under the aforementioned assumptions, would breach other facets of autonomy and non-maleficence because potentially vulnerable populations would be exploited for the purpose of research advancement without any known benefits and disproportionate possibilities for risk. Consequently, that test population would likely be unable to provide proper informed consent for such treatment as well.

Justice and Access

Although nanotechnology has yet to reach this stage, implantation of neural mechanisms that could significantly improve cognitive performance beyond the normal human range could present issues where justice is concerned. Caras and De Jesus explain that providing neurological improvements for some but not others could lead to larger socioeconomic divisions between the upper and lower classes on both a local and global scale. Wealthier individuals would have increased access, presumably, to nano devices that could make them more powerful and intelligent which could lead to them looking down on those who do not have as much access. Caras and De Jesus go on to say that it is more probable that nanotechnology would only be used for medical interventions and, taking a more optimistic view, such technology could be offered to those in less developed countries in the future.

Caras and De Jesus make a good point that only wealthy individuals having access to neural nanotechnological implants that can augment cognition beyond human limits could create a large divide between those who could afford such technology and those who could not. However, they do not go far enough with discussing access to the technology when it is used solely as a clinical tool. Assuming that nanotechnology and its implantation would be costly, it would be unlikely that insurance companies and federal assistance programs, often utilized by low-income individuals in the United States at least, would see such use of technology as a necessity given that there are alternative modes of care that may cost significantly less while still providing enough effective treatment. In this scenario, there would still be a distinct class division and disparity between those who could access the nanotechnology for treatment and those who would not be able to, despite the beneficial medical possibilities that may exist. In addition, should it be possible that all people in more developed countries could have access to nanotechnology for clinical purposes, it is unlikely that individuals in less developed countries would have the same access and resources to use such devices. Consequently, those with the neural nano implants would receive far better, or the best, care while those without would have to settle for less desirable and less effective care. Because the distribution of resources is likely to be unequitable, utilizing nanotechnology for clinical purposes, and especially unnecessary brain augmentation, would go against the principle of justice.

Conclusion

In their essay, Caras and De Jesus offered many points both in and against support of using nanotechnology for brain augmentation using a teleological ethical framework akin to utilitarianism. Using three of the four principles of autonomy, non-maleficence, and justice, this paper set out to analyze and argue with their specific points regarding informed consent and

justice. Caras and De Jesus asserted that the use of nanotechnology for brain augmentation could be so helpful for the user and other individuals on a global scale that the benefits would ultimately outweigh the risks when considering future application options. However, the lack of information about how nanoparticles specifically interact with the human body would make it impossible for an individual to provide proper informed consent at this point in time. Additionally, should nanotechnology actually become a clinical treatment option for neurological deficiencies or be accessible for recreational use, the economic disparities that exist would be further exacerbated. In short, while it may be somewhat beneficial to use nanotechnology, the principles of autonomy, non-maleficence, and justice must be at the fore when considering its use to ensure that they are not violated as they would be at this point in time.