

Neuroethics: What It Is, Does, and Should Do

James Giordano, Ph.D., M.Phil.
 Departments of Neurology and Biochemistry
 and Neuroethics Studies Program,
 Pellegrino Center for Clinical Bioethics
 Georgetown University Medical Center
 Washington, D.C.
james.giordano@georgetown.edu

John R. Shook, Ph.D.
 Philosophy Department
 University of Buffalo
 Buffalo, NY
jrshook@buffalo.edu

Neuroethics is an interdisciplinary field that (1) engages scientific investigations of neuro-cognitive processes involved in moral thought and action, and (2) addresses ethical, legal and social issues generated by brain research, its varied applications, uses and misuse. The late Edmund Pellegrino considered neuroethics to be a “hyphenated ethics” in which the prefix subject (here, ‘neuroscience’) is analyzed with the resources and techniques of ethics. This capacious view certainly allows deliberations about ethical implications of neuroscience and neurotechnology – hereafter, ‘neuroS/T’ – as well as reflections on neuroscientific implications of our self-understanding as persons bearing moral value.¹ Moral philosophy, virtue traditions, professional ethics, patient advocacy, public policy, and legal perspectives are each intrinsic to the scope and practices of neuroethics.

Neuroethics has close academic company. Similar fields are confronting problems arising in and from cutting-edge human

research, and its iterative and inventive uses. Medicine is paired with the ethics of medicine, genetics is paired with the ethics of genetics, and so forth. Research ethics is a well-established field in its own right, capable of addressing many issues fostered by the conduct of brain science. To be sure, there is considerable ethical expertise already well-positioned for dealing with the impact of technology on all areas of society. Placing “ethics of” in front of a scientific discipline might keep things simple; “the ethics of neuroscience” might have sufficed as both fitting under bioethics and ultimately covered by applied ethics. That approach presumes that ethics is a stable and independent field setting principled standards for rightness and goodness, ready for application to particular cases in a deductive manner.

But we believe that neuroethics does not fit well with a mere top-down approach. The brain sciences, from psychology and cognitive science to neurology, are questioning whether the human capacity for ethics is mainly about

principled rules. These fields are also investigating how moral judgment typically functions in real-world situations. How people actually form and act on moral judgments may provide information sufficient to place in doubt those ethical theories still grounded on outdated moral psychology.² Neuroethics – as a discipline and set of practices – should avoid an awkward reliance on ideas about moral thinking that ends up discredited by cognitive neuroscience. Sound approaches to ethics need not suffer that fate, so neuroethics will have sufficient ethical resources. Still, the larger question remains, whether neuroS/T can be pursued ethically.

Ethical Challenges

Perhaps the potential for re-configuring humans' (and other organisms') neurological function through the use of new techniques and technologies is what is most worrisome about brain research.⁴ Both the methods of brain research, and new neuroS/T applications, are marvels of engineering innovation. Investigating the structures and functions of the brain at ever-increasing levels of granularity requires more capable (if not intrusive) methods, and greater intervention and alteration of neurological processes. So, while important non-invasive assessment tools, such as neuroimaging and neurogenetics, will increase in sophistication, dynamic and real-time alterations of brain network activities will be of equal (if not greater) importance for acquiring more precise insights into neurological architectures and their respective roles.

For example, forms of transcranial modulation, such as transcranial electrical and magnetic stimulation (i.e. tES and TMS) can be employed to modify neural activity to discern effects at targeted and interconnected areas, to discover how and why those areas participate in various cognitive operations

and behavioral actions. Even greater specificity of both assessment and control of fine-scale neural networks is being achieved through the use of implantable devices that are capable of recording and stimulating brain structures and functions, the effects of which can be manifest on a variety of levels, from the cellular to the social. Thus, it becomes important to acknowledge the limitations as well as the capacities of these approaches if and when the information they yield is used to infer, describe or define meanings of normality and abnormality that can be used in medicine, as well as legal and political spheres.

This is not unlike monitoring and/or tinkering with a motor's parts to observe how engine performance is affected. If the nervous system is treated like a repairable and adjustable mechanism, then neuroethics can look to topics and methods in engineering ethics that are applicable to "the human machine." Some developments, such as neuroprosthetics and brain-machine interfaces, could clearly be referred to, and gain benefit from, an engineering ethics approach. However, humans, like all organisms, are not machines. Morality won't be reducible to biomechanics. While the use or abuse of technology remains focal to neuroethical address, neuroethical issues will have deeper philosophical implications than most technological problems.

The Need for Watchful Scrutiny

Indeed, we are far more than machines. The point to ethics, one would expect, is to uphold our status as moral agents, worthy of morality's protections against harm and degradation. Technosciences of vast import, such as neuroscience, should arouse thoughtful oversight. That oversight can broaden beyond the amazing applications able to change our lives, to include questions

about how the adoption of those technologies can change conceptions of what human beings are, and what we should be. It is not necessary to view the nervous system as mechanical to understand why alterations to our brains could easily alter who we are as persons. Some neurological adjustments will be welcome, but we must be vigilant about undesirable consequences. NeuroS/T will help alleviate neuropsychiatric disorders, pain, suffering, and sadness, and contribute to optimizing our capabilities. Alterations to brain functioning may also disrupt our mental well-being, and distort our sound self-understanding.⁵

We do not wish to sound too alarmist. It is unnecessary (and probably in error) to suspect that all neuroS/T invites unnatural abominations in order to judge, as we do, that a wary stance of preparedness is warranted. Neuroethics must be part of the watchful scrutiny that checks for unwanted deviations from psychological health and civil conduct.⁶ Neuroethics as an academically *and* ethically responsible field must ponder what it means to be a human being, and a personal self.⁷ Shall the implementations of neuroS/T be encouraged to the point of transforming this “self” into just another adjustable implement, redesigned for whatever specialized work may be wanted? Perhaps not, but only an adequate theory of the self can explain why not. Neuroethics directly overlaps with, and vitally contributes to medical humanities, philosophy of technology, philosophical psychology, philosophical ethics, and biopolitics.

While neuroethics is a specialized domain of ethics and bioethics, it need not, and should not, be entirely subsumed under these or any other disciplines, any more than mind can be reduced to the brain. Rather, neuroethics works best in conjunction and collaboration with many other fields. Neuroethics belongs

wherever neuroS/T is investigated, translated for clinical application, applied in non-medical settings, and adopted into wider use. It is relevant anywhere that the information and tools of neuroscience, from diagnostic methods to medical devices and consumer products, may be beneficially used or dangerously misused within society.⁸ Neuroethics can provide timely guidance about the genuine meaning and import of discoveries and advances in the brain sciences. Accurate interpretations to promote public understanding need to keep pace with exciting headlines from science journalism. Clarifying and cautionary neuroethical advice is also highly valuable in policy, legal, and military contexts.⁹ It should have both an educational and evaluative role everywhere it is needed.¹⁰

The Global Context: Toward a Cosmopolitan Palette

The acceleration of exploratory brain research and novel neuroS/T is occurring in many countries. Major governmentally-funded research initiatives are underway, including the U.S. BRAIN Initiative, the EU Human Brain Project, the China Brain Project, the Japan Brain MIND Project, and the South Korea Brain Initiative. Therefore, neuroethical discussions must be international, both in scope and in spirit. No country’s moral and legal framework will be able to dictate the plan or pace of another country’s research project.¹¹ Neuroethics should not proceed as if domestically familiar standards are straightforwardly applicable anywhere on the globe. Philosophical ethics can be more sensitive and responsive to differing socio-cultural contexts, values, and contingencies. In that spirit, neuroethics can and should be cosmopolitan.¹²

A cosmopolitan palette of neuroethical capabilities must be applicable at community,

national, and cross-cultural scales. Protecting rights of experimental subjects and recipients of clinical treatments must be prioritized, while developing nuanced ethical analyses that consider local values and norms. Parochial moral rigidity will have little relevance or influence, as brain research and neuroS/T products are rapidly developed and utilized on global scales. What major moral issue, or any health issue, stays confined within a country's borders anymore? Moral imperialism will not work, but neither will simplistic moral relativism. A resigned attitude towards cultural isolation cannot be wise where humanity's self-understanding and future flourishing is at stake.

The academic cooperation that characterizes neuroscientific research, and especially ambitious projects conducted by international teams, provides a teamwork model for cosmopolitan neuroethics. On the 21st century global stage, cultural differences can be a resource of ethical strength, because no single wisdom tradition has yet encountered all the possibilities evoked by emerging developments in neuroS/T. The appropriate application of moral concepts and ethical principles will require continual review and revision. What constitutes effective autonomy, for example, will evolve along with the expanding capacities acquired by users of neuroS/T. The supreme principles inherent to ethical wisdom won't be replaced, but their practical fulfillment will demand creativity, cooperation, and courage.¹³

Dialogues have to be open and inviting. Ultimately, ethics is a matter of public discourse. An authentic neuroethics must both keep pace with the science that is its subject, and remain responsive to the publics that are affected by – and which affect – the scope, conduct and outcomes of brain science. In this way, the endeavor of

neuroethics cannot be static: it must entail ongoing education, training, and support of institutions and individuals dedicated to its practices. Efforts toward such support have been encouraging, but must continue and grow. Simply put, there is neither time nor latitude for ethical lassitude, given the pace and breadth of international brain science.¹⁴ The main goal is acquire deeper insights to new developments in neuroS/T, their meanings, probable use, and possible misuse, and to foster preparedness so as to identify, prevent, or at least enable effective response to burdens, risks and harms. Thus, what neuroethics is, and what it does, will, and should remain a work-in-progress.

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²Testing views in moral psychology, and improving them, through a comparison with neurological findings is neither easy nor uncontroversial, but it is not impossible. Consult differing stances taken by contributors to *Moral Brains: The Neuroscience of Morality*, ed. S. Matthew Liao (New York: Oxford University Press, 2016). See also James Giordano, Kira Becker, and John R. Shook, "On the 'neuroscience of ethics': Approaching the neuroethical literature as a rational discourse on putative neural processes of moral cognition and behavior." *Journal of Neurology and Neuromedicine* 1, no. 6 (2016): 32-36.

³See Neil Levy, "Neuroethics: a new way of doing ethics." *AJOB Neuroscience* 2, no. 2 (2011): 3-9; and James Giordano, "Neuroethics: two interacting traditions as a viable meta-ethics?" *AJOB Neuroscience* 3, no. 1 (2011): 23-25.

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⁷Neuroethics as a medicine-related field is perhaps matched only by genetics, reproductive ethics, and psychiatry in these philosophical dimensions.

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¹⁴John R. Shook and James Giordano, "Neuroethical engagement on interdisciplinary and international scales," in *Debates About Neuroethics*, ed. Eric Racine and John Aspler (Dordrecht and New York: Springer, 2017), pp. 225-246. Mihai Avram and James Giordano, "Neuroethics: Some things old, some things new, some things borrowed, and to do." *AJOB Neuroscience* 5, no. 4 (2014): 1-3. James Giordano and Roland Benedikter, "An early - and necessary - flight of the Owl of Minerva: Neuroscience, neurotechnology, human socio-cultural boundaries, and the importance of neuroethics." *Journal of Evolution and Technology* 22, no. 1 (2012): 14-25.