Neuroethics: What It Is, Does, and Should Do

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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. 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
conduit 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act on moral judgments may provide information sufficient to place in doubt those ethical theories still grounded on outdated moral psychology. 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. 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.

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. Neuroethics as an academically and ethically responsible field must ponder what it means to be a human being, and a personal self. 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. 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. It should have both an educational and evaluative role everywhere it is needed.

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. 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.

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.

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. 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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