



## It Is Time to Expand the Scope and Reach of Neuroethics

Patrick J. McDonald

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There is, indeed, an increasing need for a collaboration between neuroethics and neuroscience in order to better identify and analyze the ethical issues raised by brain research. Equally important, however, is their collaboration in providing the necessary conceptual toolkits for avoiding misconceptions and misleading interpretations of neuroscientific language and categories. In short, we agree in that conceptual clarity is key for a richer analysis of the practical (and often urgent) issues raised by neuroscience (e.g., clinical options for severely injured patients) or for enhancing our understanding of moral reasoning. However, we think that the value of such analysis is not exhausted by its potential to improve normative discussions or to refine our empirical understanding. Insofar as conceptual analysis mitigates problematic misinterpretations, it fosters a clearer and more reliable vision on how to respond not just to practical but also to the many philosophical issues raised by neuroscientific knowledge and neurotechnologies. For this reason, we believe that conceptual work as described in the preceding should be part of neuroethics for better facing present and future challenges.

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#### ORCID

Arleen Salles  <http://orcid.org/0000-0002-1397-7932>

Michele Farisco  <http://orcid.org/0000-0002-3298-7829>

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# It Is Time to Expand the Scope and Reach of Neuroethics

**Patrick J. McDonald**, BC Children's Hospital, Neuroethics Canada, and University of British Columbia

Kellmeyer and colleagues, on behalf of the International Neuroethics Society (INS) Emerging Issues Taskforce (2019) discuss the current and future environment for neuroethics on this, the 15th anniversary of the International Neuroethics Society. While highlighting the tremendous progress made in neuroethics in the short period since the founding of the INS, they underscore the need for a global, transdisciplinary community of researchers to address future challenges. While I am in agreement with the authors' focus on the importance of further discourse and research on rapid neurotechnological advances and commercialization of both implantable and wearable devices, harvesting of brain data, and global mental health concerns, a dramatic expansion of

neuroethics beyond its current focus on neurotechnology to include neuroethical issues of day-to-day significance to the average neuroscience clinician, researcher, and patient is required. Further expansion of the scope of neuroethics to include more issues of significance to patients and practitioners in low- and middle-income countries is also warranted.

#### WHAT IS NEUROETHICS?

Wolpe underscored the difficulty in defining what neuroethics "is" in his editorial "Enhancing Neuroethics" (2011) and called for an expansive definition that included a wider range of discussions in a field still in

Address correspondence to Patrick J. McDonald, 4480 Oak Street, K3-216, Vancouver, BC, Canada V6H 3V4. E-mail: [Patrick.McDonald@cw.bc.ca](mailto:Patrick.McDonald@cw.bc.ca)

its adolescence. Kellmeyer and colleagues seem to also call for an expansive definition, stating, “Neuroethics seeks to understand and navigate the ethical tensions and conflicts that arise in the research and application of neuroscientific knowledge and techniques” (104). I contend that neuroethics should go further and encompass ethical issues relating to more neurologic illnesses and conditions than it has thus far, especially ones that are currently underrepresented in the neuroethics literature.

### EXPANDING NEUROETHICS

Much neuroethics research and commentary to date has appropriately focused on the significant ethical issues relating to the development and adoption of novel neurotechnologies such as deep brain stimulation (DBS), responsive neurostimulation (RNS), and more recently neuro-wearables and machine–brain interfaces. A quick review of target articles published in *AJOB Neuroscience* since its first issue was published in May 2010 reveals a focus on implantable neurotechnologies, with 14 articles on implantable devices such as deep brain stimulators (DBS), and 13 articles on cognitive or moral enhancement. Twelve target articles have focused on disorders of consciousness, six on free will and moral behavior, and an entire issue devoted to a dubious proposal for a head transplant.

While proactive discussion of neuroethical issues in all of these topics is critical (with perhaps the exception of head transplants), these topics represent a small fraction of the burden of neurologic illness worldwide. As an example, at my own institution, an academic tertiary care center in a high-income country, high-tech implantable devices to treat neurologic illness such as DBS and vagal nerve stimulators (VNS) account for less than 4% of all neurosurgical interventions. The most commonly implanted neurosurgical device (representing 25% of all interventions at our hospital) is the relatively low-tech cerebrospinal fluid (CSF) shunt, used to treat hydrocephalus. Neuroethics has had little to say about either the device or the disease it is designed to treat.

In a Gates Foundation study of global disease burden, neurologic illness was found to be the largest cause of disability-adjusted life years (DALY), and the second largest cause of death globally (GBD 2016 Neurology Collaborators 2019). Of the 15 neurologic disease categories studied, the five largest contributors to DALYs worldwide were stroke, migraine headache, dementia, meningitis, and epilepsy, not all of which are well represented in the neuroethics literature. Going forward, neuroethics research and scholarship should expand further into other common neurologic diseases such as brain tumors, mild and moderate traumatic brain injury, hydrocephalus, cerebrovascular disease, and pediatric neurologic illness.

The authors highlight the finding of Lomber and Illes (2009) that the majority of neuroethics research and scholarship is conducted in the highest income countries, the results of which are unlikely to be generalizable or of relevance to

the vast majority of persons in low- and middle-income countries. Indeed, given the growing income inequality in high-income countries, a focus on expensive neurotechnological interventions may also lack relevance to many in those countries. As an example, socioeconomic factors have been shown to significantly impact on access to DBS in the United States (Chan et al. 2014; Benesh, Gupta and Sung 2017).

Neuroethics’s focus on expensive neurotechnologies has also potentially excluded not just those of lower socioeconomic status in the developed world, but much larger populations in lower- and middle-income countries. Meningitis was the fourth largest cause of neurologic DALYs in the Gates study just cited, due almost entirely to its prevalence in low-income countries, yet the neuroethical implications of CNS infections have not been well studied. Neuroethics should seek to expand its reach into issues of importance in hitherto underrepresented diseases and populations, especially those more common in lower-income countries.

### NEUROETHICS FOR THE NEXT 15 YEARS

The neuroethics community has accomplished much in the 15 years since the INS was founded. The Emerging Issues Taskforce of the INS has presented a framework for moving forward in neuroethics research and scholarship. In addition to the issues they have suggested as a focus for neuroethicists in the coming years, we should seek to further expand the reach of neuroethics to include other common causes of neurologic illness and burden. ■

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