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Neuroethics at 15: Keep the Kant but add more Bacon

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During its first 15 years, neuroethics research has focused mostly on theoretical analysis of the ethical implications of emerging neuroscience knowledge and technologies. Kellmeyer and colleagues (2019) identify three developments shaping the field of neuroethics and explore some of the normative questions that these raise. In their concluding paragraph, they call on "neuroethics as a field [to] *continue to expand* its conceptual toolbox by incorporating analytic instruments *and empirical approaches* from other fields, such as science and technology studies, human-machine interaction studies, design thinking and others." (our emphasis). We agree that there is a critical need for empirical research to both strengthen and complement theoretical neuroethics research. In this commentary, we argue

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that this should be accomplished with 1) theoretical analyses that are more grounded in the state of the science; 2) increased use of empirical research methods; and 3) an interdisciplinary "team neuroethics" approach that better integrates theory and practice.

"Keep the Kant"—The need to continue theoretical neuroethics research and promote analyses more grounded in the state of the science.

The German philosopher Immanuel Kant (1724–1804) is an example of a thinker whose theoretical contributions have greatly influenced practical ethics. "Keep the Kant," therefore, refers to the importance of continuing robust theoretical neuroethics research.[1] In fact, we believe there is a need to increase funding for theoretical neuroethics research in order to advance both neuroethics and neuroscience. We define theoretical neuroethics research as the examination of ethical issues related to neuroscientific developments using moral theories (e.g., deontology, consequentialism, virtue theory) or other normative-theoretic frameworks (e.g., theories of quality of life, conceptions of distributive justice) and arguments, without employing systematic data collection. Theoretical work helps to clarify concepts under study, focuses debate on aspects of practices and technologies that present ethical quandaries, and provides potential ways of managing these problems. Well-informed and ethically-justified solutions to neuroethics problems require sound theoretical analysis. Without this work, a field like neuroethics could not move forward.

In fact, the first 15 years of neuroethics have involved four major activities that were mostly based on theoretical neuroethics research: 1) defining the scope of the field and opening outlets for its discussion (Roskies 2002; Wolpe, 2010); 2) attempting to clarify ethically relevant concepts (e.g., free will) in the context of emerging neuroscience knowledge and neurotechnologies (Haggard, 2010); 3) applying emerging neuroscience knowledge in an attempt to better understand moral dilemmas and moral reasoning (Gazzaniga, 2005); and 4) analyzing the implications of and proposing policies to manage neuroscience tools for non-medical purposes (e.g., drugs for cognitive enhancement (Greely et al., 2008), brain imaging and psychiatric/behavioral genetics in the legal system (MacArthur Foundation, 2019)), and for medical purposes (e.g., memory manipulation for post-traumatic stress disorder (Lázaro-Muñoz and Díaz-Mataix, 2016)).

At times, however, theoretical neuroethics research, particularly anticipatory neuroethics, has not been sufficiently sensitive to the capacities and limitations of current and emerging neurotechnologies, limiting the relevance of these discussions (Zuk and Lázaro-Muñoz, 2019; Zuk et al., forthcoming). "Big neuroscience" projects (e.g., BRAIN Initiative, Human Brain Project) are fueling the emergence of novel knowledge, neurotechnologies, and the translation of these into clinical care and other spheres of society. There is a pressing need to anticipate and examine their ethical implications to maximize the clinical and social benefits and minimize potential harms. Yet, when discussions of the ethical implications of novel neuroscience knowledge or neurotechnologies overestimate or misstate the capacity of neuroscientific knowledge or technologies, the field misses an opportunity to contribute to

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[1] Kant is but one example. There are of course, many others (e.g., J.S. Mill's consequentialism).

the resolution of pressing neuroethics problems that currently affect or will soon likely affect stakeholders. Thus, to continue moving neuroethics forward and expand its relevance, we must promote theoretical analyses that are more grounded in the state of the science or reasonably foreseeable advances.

"But add more Bacon"—The need to complement theoretical neuroethics research with empirical neuroethics research

Most of the early work in neuroethics has involved thoughtful theoretical research but comparatively little data collection to shape analysis and ensure the practical applicability of conclusions. Sir Francis Bacon (1561–1626) was one of the most prominent early champions of modern empiricism: the systematic observation of facts to generate knowledge (Bacon, 1620). We believe neuroethics needs more research that employs empirical methods to generate data from stakeholders in order to formulate well-informed and ethically-justified policies. Of course, in order to conduct sound empirical neuroethics research, we need sound theoretical analysis. For example, if we want to empirically examine the impact of a neurotechnology on autonomy, we first need to clearly define what we mean by "autonomy." Data collection from stakeholders (e.g., patient-participants, caregivers, researchers, health care providers, neuroethicists, policy makers) using social science methods (e.g., interviews, surveys, participant-observation, deliberative engagement, Delphi methods) is critical for neuroethics because it allows researchers to: 1) **identify unexpected neuroethics issues** that are difficult to recognize without attention to facts and distinctions that may only be appreciable "from the inside"; 2) **corroborate ethical concerns** raised in theoretical analysis, especially from the perspective of stakeholders whom they are claimed to impact; 3) understand **how neuroethics issues manifest** for and are experienced by stakeholders, including getting a sense of the frequency and magnitude of the neuroethics issue; 4) identify ways to potentially **minimize the likelihood of the neuroethics issue arising** (e.g., undesirable changes in personality or behavior); 5) **start identifying potential solutions** to a neuroethics problem from the perspective of those experiencing it, who may have important insights into potential methods of resolving it; 6) **formulate testable hypotheses** that can be examined with larger samples (e.g., what factors help predict patient or caregiver regret after a neurotechnological intervention?); 7) help ensure that **normative concerns are grounded in the realities** of the science and technology; and 8) **inform analysis of ethical questions** in which stakeholder experience may be a constitutive element of the concepts at issue (e.g., quality of life, alienation, personality, identity, moral distress).

Empirical methods can be used not only to gain a much deeper understanding of neuroethics issues and informing theoretical analysis, but also to generate policy solutions that will help maximize the clinical and social benefits of advances in neuroscience. Ideally, the process of generating these policy solutions should involve representation of key stakeholders to maximize both trust and trust*worthiness* (Majumder et al. 2019). Acknowledging the importance of neuroethics generally, and empirical neuroethics, the BRAIN Initiative created a Neuroethics Program and in 2017 began funding neuroethics research (mostly involving data collection from stakeholders) to help identify and better understand neuroethics challenges that arise in neuroscience research and translation, and to inform policy about how to optimally manage these challenges.

The need for an interdisciplinary Team Neuroethics approach

Neuroscience integrates numerous fields of science to advance our understanding of the brain. Neuroethics must reflect the interdisciplinary nature of this field in order to formulate more informative research, analysis, and policies. Furthermore, neuroethics is itself a highly interdisciplinary field. Thus, we also call for a “team neuroethics” approach that involves greater engagement between natural and social scientists (e.g., anthropologists, psychologists), philosophers, ethicists, and other stakeholders. Researchers in neuroethics must have a working understanding of the science and technologies under study, but neurotechnologies and emerging knowledge in neuroscience can be highly complex. Thus, working together with neuroscientists developing these technologies is particularly important to better understand potential applications, misuses, and the capacities and limitations of the technology or knowledge. This collaborative approach is extremely useful in developing informed neuroethics research, analysis, and policy alternatives that are feasible and responsive to the reality of how this research is performed and translated (Lázaro-Muñoz et al., 2018a, 2018b). This is not to say that all theoretical or empirical neuroethics research must involve collaboration with neuroscientists in order to be valuable. Distance from neuroscientists may minimize potential bias and possible conflicts of interest based on relationships established between neuroethicists and neuroscientists. However, it is critical that analysis is well-informed and recognizes the capacities and limitations of emerging knowledge and neurotechnologies, as well as their social and cultural impacts. This is more easily achieved through a team neuroethics approach.

Conclusion

Neuroethics at 15 is vibrant, in great part, thanks to those who had the vision and perseverance to identify its need and push for its recognition. Today, neuroscientists, funders, academic institutions, policy makers, journalists, patients, caregivers, and other key stakeholders are quickly beginning to recognize neuroethics as an essential component of neuroscientific endeavors. Let us continue to be self-critical and identify ways to improve our ability to achieve the various goals of the field, whether it is to better understand ethically-relevant concepts such as autonomy and identity, generate policies to manage neuroethics challenges in research and clinical settings, or the vast middle ground in between. To continue moving neuroethics forward at 15, let’s “Keep the Kant but add more Bacon” by ensuring theoretical analyses are based on the current state of the science or reasonably foreseeable advances, using rigorous empirical methods to generate data, and employing an interdisciplinary team neuroethics approach.

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