



Advancing neuroethics in Africa

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Significance:

Neuroscientific technologies to assess, monitor and influence brain activity offer tremendous potential in the prevention and treatment of neurological and mental illnesses. However, these innovations, and their pursuit, also raise serious ethical questions. Neuroethics is a field that explores the ethical, legal, societal, philosophical, and cultural implications of neuroscience and related neurotechnologies. Many of these considerations have distinct cultural and contextual dimensions. Along with the advancement of neuroscience research in Africa, it is therefore critical to advance neuroethics as an integral component of neuroscience research on the continent.

Across the world, there is great excitement about the myriad discoveries and new technologies that increase our understanding of the brain and its functions. Large international brain initiatives promise to accelerate the development of neuroscience and neurotechnology.¹ Whilst offering tremendous potential in the prevention, management and treatment of neurological and mental illnesses, these innovations raise a host of ethical challenges. Neuroethics considers the ethical implications of neuroscience and neurotechnologies, as well as how neuroscience may shed light on moral decision-making. It aims to recognise and anticipate the ways in which neuroscientific advances affect our self-understanding, our communities, and our interactions with the world.² Neuroethics includes both normative and empirical approaches; normative neuroethics focuses on the conceptual and ethical debates that arise with advances in neuroscience and neurotechnologies, while empirical neuroethics explores perceptions and interpretations of data from emerging neuroscientific studies and neurotechnological interventions in different contexts.

A central discussion within neuroethics concerns regulation of emerging neurotechnologies. For example, in 2019, following engagements with interdisciplinary leaders, the Organisation for Economic Co-operation and Development (OECD) released recommendations on responsible innovation in neurotechnology.³ In 2021, the International Bioethics Committee of UNESCO (IBC) published a report on the ethical issues of neurotechnology.⁴ In 2023, UNESCO expanded on the report and published a document on the risks and challenges of neurotechnologies⁵ for human rights. In 2024, UNESCO convened a group of 24 experts from different geographical regions to develop the first global framework on the ethics of neurotechnology. These documents contain contributions from a range of neuroethics scholars from around the globe. Despite neuroethics being embedded in global debates to support efforts to establish worldwide standards concerning neuroscience and neurotechnology, the participation and perspectives of African researchers on neuroethics has thus far been limited.⁶⁻⁹ We recognise, however, the recent UNESCO efforts to change that, through the involvement of African scientists in the development of a globally relevant recommendation on the ethics of neurotechnology.

Here we emphasise the need for, and unique contributions of, neuroethics research concerning and emerging from Africa. Distinct values, concerns and priorities within different African socio-cultural contexts are likely to generate distinct neuroethical considerations. These considerations may stand to impact: (1) philosophical questions generated by research in neuroscience – such as what it means to be human or how different neurotechnologies may impact personal identity, (2) African contextual and cultural perceptions on the acceptability and applicability of specific neuroscientific interventions, (3) empirical research on practical issues such as informed consent, stigma, and return of incidental / individual results, as well as context-specific research concerning how social attitudes are affected by neurotechnological interventions (including artificial intelligence informed neurotechnologies), (4) ethical considerations related to the use of neurotechnologies among African children who may be exposed to highly prevalent environmental factors that impact brain development as well as mental health, and (5) policies based on ethical neuroscientific developments and brain data governance.

We elaborate on these five areas to demonstrate the unique concerns, as well as the unique contributions, that arise with the advancement of neuroethics and neurotechnology in Africa.

African-oriented philosophical and psychological frameworks can offer unique contributions to prominent philosophical debates within neuroethics, including those regarding personal identity, agency, personhood, autonomy, moral status, cognitive and moral enhancement, moral responsibility, mental privacy, and cognitive liberty. For instance, relational conceptions of moral status might reach very different conclusions on key neuroethical disputes (e.g. the status of brain surrogates) from individual capacity-based conceptions.¹⁰ The communitarian emphasis of prominent African ethics frameworks also generates distinct ethical perspectives and insights with regard to prominent debates in neuroethics, such as those concerning moral bioenhancement.¹¹ Similarly, while experimental philosophy has rich application to questions in neuroethics, it has scarcely been applied in African contexts. We should expect prominent judgements and intuitions to differ in different cultural and geographical contexts, given the influence of prevailing belief systems. Such divergences are of theoretical interest, but they may also have practical significance. This is because key research questions in neuroethics are often culturally and socially informed and therefore require exploration by research teams with cultural awareness.¹² Experimental philosophy can potentially inform culturally and contextually sensitive policies and approaches that emerge in response to advances in neuroscience and neurotechnology. Research conducted elsewhere might be more or less relevant to the beliefs, judgements, intuitions, and concerns that arise in local contexts. In turn, international research might misinform the ethical and policy debates that such findings are ultimately intended to support.

Neuroethicists within Africa are in a unique position to focus their attention on how African values and priorities can inform the development of contextually appropriate interventions. One example is the emphasis on health equity and social justice that would suggest investigators should focus on affordable, accessible, and more



long-term effective neurotechnological interventions – for example, encouraging more research on cost-efficient treatments of common mental disorders, rather than on difficult-to-access and high-cost invasive interventions such as deep brain stimulation.¹³ In addition, unique factors and considerations arise in different African contexts and communities which require context-specific insight and sensitivity. For instance, the intracultural diverse experiences of members of different groups, such as people who identify as part of the LGBTQI+ community, also need to be considered.¹⁴ This is particularly important given the continued unjust treatment and lack of adequate consideration of the views and experiences of people from the LGBTQI+ community in many countries on the continent. Local researchers who are aware of these sensitivities are more likely to be in a position to anticipate any concerns specific to their contexts. It is thus local researchers who should design and lead neuroscience and neuroethics research studies that aim to benefit African people and communities. In cases of global collaborative projects, it is also imperative that African scientists play a central role in the intellectual leadership of the project.¹⁵

Empirical research on practical issues – such as informed consent and return of incidental / individual results – is also important for neuroethics in Africa. The ethical dimensions of these concerns will be influenced by contextual considerations. Questions about ethical participation in neuroscience research, and what may be required to ensure that processes of recruitment and consent are valid, are critical to the ethical advancement of neuroscience within Africa.¹⁶ The return of results and secondary findings is another important consideration for ethical research practices, which is impacted by contextual considerations. For example, in the event that neuroscience data point to a likely genetic origin of a neuropsychiatric condition, key considerations are needed to ensure that the genetic reference data are representative for African populations. Additionally, considerations ought to be made on how to communicate such findings to individuals and families in ways that are culturally sensitive and appropriate. This needs to be done in consideration of both the limitations of resources in the context (e.g. the lack of genetic counsellors in Africa to convey results likely means that results will be returned by other health workers) and with sensitivity to local mental health causal belief systems and associated stigma and discrimination that is sometimes experienced by individuals with a neuropsychiatric condition.^{17,18}

It is also important to consider the ethical implications of involving children in neuroscience and neurotechnological empirical research in Africa (paediatric neuroethics)¹⁹, particularly as it is critical to study the risks and protective factors regarding child brain development in Africa, given that many African children are particularly vulnerable to disruptions in healthy brain development due to increased exposure to risk factors such as poverty, trauma, alcohol, and HIV²⁰. Developing assessments which are culturally informed and contextually sensitive is therefore an important ethical consideration.²¹ These factors also tie in with the growing area of environmental neuroethics, which considers specific environmental risks for neurological and psychiatric disorders.²² Relatedly, African neuroscientists have emphasised the importance of considering environmental features such as the diverse flora, fauna and ecosystems in Africa, for neuroscience research in addition to climate change and other environmental risks prevalent in some African countries.²³

Finally, in addition to developing global standards and policies on ethical brain science and brain data governance, specific policies are required concerning research in Africa. This is crucial for protecting the data of research participants and for ensuring that all contributors (including African research participants, communities, and researchers) benefit from advancements emanating from their data in the near and long-term future. What types of benefit-sharing principles should be in place? And how should these principles be developed? These questions are crucial given the historical exploitation of various groups of people on the continent.²⁴ The increasing commercialisation of neurotechnological innovations and related neuro-data, and their use for non-medical purposes, also adds urgency to the need to establish good brain data governance frameworks for Africa.

In conclusion, it is critical to advance the neuroethics agenda for neuroscience and neurotechnological innovations in and for Africa. Conducting neuroscience research that is regionally relevant but that has global impact may ultimately improve our understanding of brain and mental health as well as contribute to the development of neuro-interventions that substantially reduce the disease burden in Africa and elsewhere. This would in turn contribute to the realisation of the United Nations Sustainable Development Goals (SDGs)²⁵ to “promote good health and well-being” (SDG3), “reduce inequalities” (SDG10), and “promote peace, justice and strong institutions” (SDG16). Early inclusion of African people and scientists in African institutions in neuroethics discourses may contribute to a more robust and nuanced debate on neuroethical questions globally.

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Competing interests

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