

Advancing Neuroscience on the 21st-Century World Stage: The Need for and a Proposed Structure of an Internationally Relevant Neuroethics

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ABSTRACT: Neuroscience has made ardent strides in assessing, accessing, and engaging the structure and function(s) of the brain through the use of ever more advanced and sophisticated innovations in bioengineering. Recent trends reveal the growth of neuroscientific and neurotechnology (neuroS/T) investments worldwide. The internationalization of neuroS/T will likely influence and be affected by extant and newly established asymmetrical relationships among developed, developing, and non-developed nations. The speed, extent, and power conferred by neuroS/T give rise to a number of pressing ethical as well as legal and social questions and issues, which are fostering wider awareness, anticipation, and anxiety. The field of neuroethics addresses these issues and their possible resolutions. How will neuroethics be developed—and enacted—to sustain international relevance, validity, and value? Herein, we offer a model for an applied international neuroethics, starting from an overview and analysis of its socio-political potential on a global level. We examine this model in light of principlism and some additional useful precepts and guidelines. We conclude by offering Rawlsian “reflective equilibrium” as a bridge to Dower’s theoretical construct of “communitarian cosmopolitanism,” and thereby yield a procedural method that satisfies our fundamental premises and corollary principles.

KEY WORDS: neuroethics; neuroscience; neurotechnology; society; principles; cosmopolitanism; communitarianism; globalism

ABBREVIATIONS

PET: positron emission tomography; SPECT: single photon emission computed tomography; fMRI: functional magnetic resonance imaging; fNIRS: functional near infrared spectroscopy; DTI: diffusion tensor imaging; qEEG: quantitative electroencephalography; MEG: magneto-encephalography

I. INTRODUCTION

Neuroscience has made ardent strides in assessing, accessing and engaging the structure and function(s) of the brain through the use of ever more advanced and sophisticated innovations in bio-engineering and technology (i.e., neurotechnologies). In the past 10 years, the pace of neuroscientific advancement has accelerated due, in part, to both expansion within its constituent disciplines and the conjoinment of new disciplines and technologies (e.g., genetics, nanoscience, cyberscience) under a broadening rubric. The conveyance of neuroscientific developments into medical and social contexts is accelerating. Challenges to long-held notions about the basis of consciousness and the nature of the brain–mind–self relationship are, in turn, prompting re-examinations of concepts of personhood and various aspects of the person in society. These developments are inevitably inspiring reflections upon and re-evaluations of socially defined ontologies, values, and moral norms, along with ethical responsibilities involved in constructs of social and/or absolute “good.”

Such technical and epistemological shifts are “grand challenges” as proposed and targeted by “big science” initiatives such as the “Brain Research through Advancing Innovative Neurotechnologies (BRAIN)” project, an agenda to generate federal and private subsidies in support of consilient research that seeks to establish the United States’ efforts in brain science as part of a worldwide enterprise, inclusive of the European Union’s ongoing “Human Brain Project” and the Asian “Decade of the Mind” program. The speed, extent, and powerful capabilities conferred by neuroscience and neurotechnology give rise to a number of unavoidably pressing ethical as well as legal and social questions and issues (see Giordano¹ for current overview), and they are fostering wider public and professional awareness, anticipation, and anxiety (Table 1).

II. NEUROSCIENCE, NEUROTECHNOLOGY, AND NEUROETHICS FOR THE 21ST CENTURY

Consistent with the revenues devoted to and generated by the aforementioned brain research initiatives, economic predictions for 2020 confirm the rise of neuroscience and neurotechnology (neuroS/T) as dominant forces in global markets. Recent trends reveal the growth of neuroscientific and neuroengineering investments worldwide. Current estimates claim that Asian neuroS/T research and development will surpass that of the United States and Europe, achieving a 60% increase in overall market growth within the next 5 to 7 years.² Moreover, the internationalization of neuroS/T will likely influence and be affected by extant and newly established asymmetrical relationships among developed, developing, and non-developed nations.^{3,4}

This situation is already prompting prudential inquiries about guiding and governing the appropriate and justifiable applications of neuroS/T. The field of neuroethics has been developed to address these issues and questions. Although still somewhat nascent, in just over a decade neuroethics has assembled a considerable body of research, ad-

TABLE 1: NeuroS/T developments and the neuroethical issues they generate

<p>Neuroscientific/Neurotechnological (NeuroS/T) Developments</p>	<p>Neuroethical Issues</p>
<p>Use of neuroS/T to assess physiology, cognition, emotion, and behavior:</p> <ul style="list-style-type: none"> • Neuroimaging <ul style="list-style-type: none"> PET SPECT fMRI fNIRS DTI qEEG MEG • Neurogenomics/genetics • Neuroproteomics • Neurobiomarker assessment 	<ul style="list-style-type: none"> • Validity, viability, and value of neuroS/T capability, assessment, claims and meanings • Imposition upon privacy and personal liberty • Use/misuse of neurocentric criteria to define/predict: <ul style="list-style-type: none"> Personhood Capability Culpability Normality/abnormality Potential • Use of neurocentric criteria to establish social norms and standards for socio-economic and political treatment
<p>Use of neuroS/T to affect brain structure and functions (cognition, emotion, and behavior):</p> <ul style="list-style-type: none"> • Tissue and genetic manipulation • Transplants • Stem cells • Genomic/genetic modification • Neuro-psychotropic drugs (to affect memory, vigilance, sleep, pain, mood, aggression, etc.) • Neural-machine interfaces • Neuroprosthetics • Deep-brain stimulation • Direct cortical stimulation • Transcranial stimulation • Neurofeedback 	<ul style="list-style-type: none"> • Actual capabilities and limitations • Appreciation/recognition and responsibility for benefits, burdens, risks, and harms • Defining nature and extent of treatment, enablement, and enhancement • Thought, emotion, personality, and behavioral alteration and control • Weaponization of neuroS/T • Technical and economic leveraging to affect political (bio)power • Distributional variation (i.e., influencing social status of neurocentrically determined “haves” and “have nots”)
<p>Reverse engineering neural systems/brains:</p> <ul style="list-style-type: none"> • Decision-making neurotechnical systems • Sentient machine systems 	<ul style="list-style-type: none"> • Need for novel ethico-legal considerations • Neuro-robotics • Loss of human capability/control • “Techno-dementia” • “Machine citizens”

dress, and application. Two main aspects or “traditions” have taken primacy thus far: (1) the neuroscience of moral cognition, emotions, and behaviors; discerning how moral capacity (and ethical judgment) develops and functions, and (2) inquiry into ethical questions about the use and misuse of neuroscience and neurotechnology in areas such as health care, civic life, and national security.⁵⁻⁷

Given the reality that neuroS/T is, and is becoming, an ever more international endeavor, we may anticipate how each country can separately pursue its own interests, yet we might also seek normative premises for a neuroethics yielding a valid international purview. In this respect, we must ask whether and how the idea of a global community, if at all possible,^{8,9} compels the ideal of universal ethical guidance, and does this ideal provide the groundwork upon which some form of internationally valid neuroethical paradigm could tentatively be built? Globalization has established conditions for restructured individual and collective identities, which are often configured as new forms of cultural hybridization and synthesis. These changing identities provided well-springs for novel ethical theories striving to reach an accommodating and reasonable middle ground for theoretical and factual conciliation between universalism and some kind of contextual socio-cultural specificity. We assert that the valuable practicality of an internationally relevant paradigm of/for neuroethics depends on conciliating tensions between the global and the local that so deeply affect the definition, assessment, and implementation of neuroS/T research and applications.

To implement this global neuroethics project, we argue that two premises will be essential. First, a global community, although conceptually self-referential and unprecedented, is presumed to already exist in some nascent form, and provides a valid basis for a common moral frame.¹ Second, neuroethics, as a discipline and set of applicable practices, should articulate a working normative paradigm designed for this international context.¹ From these premises, we further propose that an internationally relevant neuroethics must follow four corollary principles: (1) it must be sensitive to pluralist views and be liberated from prior hegemonic ideologies; (2) it must fully represent the contemporary reality of the bio-psychosocial human being, as reciprocally engaged in and engaged by human ecology; (3) it must embrace aspects of both individual and collective identity; and (4) it must observe standards of objectivity sufficient for broadly justifying practical ethical positions.

Herein, we offer a model for an applied, international neuroethics meeting the aforementioned criteria. Starting from an overview and analysis of its socio-political potential on a global level, we examine this model in light of the principles of beneficence, non-maleficence, respect for autonomy, and justice (i.e., principlism¹⁰) and some additional useful precepts and guidelines. Our tentative conclusion is that John Rawls’ “reflective equilibrium” can serve as a bridge to Nigel Dower’s theoretical construct of

¹The concept of common morality adopted here corresponds to Kuczewski’s definition as “the conditions for shared pursuit of the good or as the values, deliberations, traditions, and common construction of the narrative of a people.” See Ref. 56.

“communitarian cosmopolitanism,”⁸ yielding a procedural method that satisfies (or at least satisfices) our fundamental premises and corollary principles.

III. NEUROETHICS: “TRADITIONS” AND INTERNATIONAL CHALLENGES AND OPPORTUNITIES

Neuroethics’ first “tradition” explores the putative neural substrates and mechanisms of moral cognition, emotion, and behavior, thereby providing an understanding of the ways that organisms relate to others, environments, and the sociocultural contexts in which they are nested.^{11–17} We maintain that this could be more accurately described as studies into “neuro-ecology” —the neural bases of environmental interaction and action—to afford finer granularity to Roskies’⁵ description of neuroethics’ first tradition as the “neuroscience of ethics.” Within our framework, a human being is fully acknowledged as a bio-psychosocial entity, determining and determined by ecology, responsive and adapting to conditions, and vulnerable to the predicament of injury, disease, and finitude. The human being is a “historicized” actor, interacting with a circumstantial context and responding to a surrounding contingent culture, which affects the “neurocognitive–emotional–environmental” dimensions of this interaction and shapes the expression of the ways that information, knowledge, and tools are developed and used.¹⁸

Neuroethics’ second tradition examines the ways that neuroscientific techniques and technologies are used, queries the modes through which neuroscientific findings are applied, and addresses the ethical and socio-legal issues, questions, and problems generated by neuroscientific research and its applications in medicine, public life, and global relations.^{5,6,11–14} While methodologically derived and linked to basic and clinical bioethics, we posit that neuroethics can focus on unique questions and problems generated by studies of the brain and consciousness relating to any ethical inquiry, including persistent “hard problems” inherent to neuroscience, and the unknowns surrounding any applications of neuroscientific techniques and tools affecting humans and the human predicament.

As reflected by its growing corpus of literature, neuroethical issues range from the philosophical to the juridical. This fortifies the pursuit of an organized, well-articulated neuroethics initiative that explicitly addresses neuroscience, ethics, and legal and social issues (NELSI). Due regard for the social sphere, as our neuro-ecological framework requires, prompts careful consideration of cultural diversity, as well as economic and political forces.⁷ Deep questions cannot be avoided at this level. How, for example, might neuroscientific research, the clinical and social benefits provided by neuroscience, and the burdens, risks, and harms that may be incurred through the misuse or purposive abuse of neuroscience and its technologies, be leveraged in the global biological, psychological, socio-economic, and political milieu of the 21st century?

The broad implications of this ambitious neuroethics must acquire global relevance, particularly with regard to domestic and international policy making.^{16,19,20} We claim that neuroethics deserves the status of a recognized “social force” because (1) it provides a viable analysis of how “moral” constructs are formulated, perceived, and decided upon by individuals and societies, (2) it addresses the ways that neuroscience influences such

knowledge and its meaning and use, and as such, (3) it can be considered to be a “protopolitical discipline.”¹⁶ The idea of an internationally relevant neuroethics is not merely geographical, economic, or political, because it arises from the global dimensions of its subject. As we have emphasized, neuroethics follows neuroscience’s study of embodied brains and the ways that brains generate cognitive activities and behaviors for all interpersonal and social conduct. In addition, it addresses and employs neuroscience’s epistemic and technical tools for controlling those functions on individual, group, and even population levels. The informational basis of neuroethics, i.e., the research produced by neuroscience and the realities of neuro-cognitive and behavioral variables, all reflect the abundant pluralism (contributed by the diversity of individuals across world cultures) and inherent peculiarities of specific individuals and societies.^{21,22}

This multi-level dimensionality is presently underscored by worldwide discussions of neuroscience and neuroethics.^{17,23} Hence, neuroethical issues are both global and local, and neuroethics, as a discipline and in practice, must both reflect and commit to this diversity. The drive to “globalize” neuroscience and neuroethical deliberation is hardly as easy as ecological principles may make it appear. Such a program requires a redefined integrative and culturally sensitive framework for ethical inquiry, which dictates (1) pragmatic assessment of neuroS/T capabilities and constraints and (2) responsibility to prudently use neuroscientific information, outcomes, and tools in the social sphere.¹⁴

At face value, this seems reasonable enough, yet determining which sorts of ethical system(s) and framework(s) such a broad-based neuroethics would provide, along with developing, articulating, and sustaining these ethical guidelines in practice, is also far from simple. The mere fact that socio-cultural pluralism imparts deep diversity in individual, group, and community needs, values, and desires makes any attempt at universal, or at least far-reaching ethical alignment an exceedingly difficult matter. At the fore is the importance of considering whether such tasks—and the resulting outcome(s)—will devolve to either frank ethical relativism or ethical imperialism. Acknowledging this potential pitfall is a vital first step toward deliberations leading to the formulation of a system of neuroethics that could be universally plausible and internationally tenable.

Elsewhere we have opined that, in these terms and within the framing of a (neuro) bio-psychosocial model, neuroethics can be seen as a self-referential and self-contained “meta-ethics” in its capacity to independently address moral capacity, moral practice, and moral principles.^{13,14,17} As we have re-emphasized here thus far, neuroscientific knowledge (combined with biological, cognitive and social sciences) provides iterative information that can and should be applied to the comprehension of human socio-moral capacities. This growing body of information will inevitably foster revisions and/or adjustments to extant theories of sociality and morality, inclusive of the ways that science and technology are engaged and utilized.^{16,17} A fully developed neuroethics will have no choice but to undertake a complete reevaluation of all culturally normative traditions, including moral systems and ethical traditions.

The only real question is whether neuroethics will arbitrarily halt at some boundary that is deemed too sensitive for transgression. Understanding how humans enact and

follow normative belief systems is unavoidably universal, for we are one species. It is already too late to raise any demand that some protected sphere of life go unquestioned and some moral value(s) remain absolute. Cultural traditions are in the habit of demanding specific absolutes for subsets of humanity. The destiny of neuroethics is to disregard “unquestionable” absolutes for some in the name of objective knowledge of our common humanity for all. Neuroethics is already value-laden; the question we pose is this: Which values shall it exemplify?

IV. TOWARD INTERNATIONAL RELEVANCE AND APPLICABILITY

People value their local contexts for good reason. Cultural traditions and social conventions constitute the largest source of neuroethics’ philosophical foundations and normative guidelines.¹⁷ There is ample literature to define, describe, and discuss the relevance of culture to human ecology, inasmuch as biology shapes and is shaped by environment (e.g., Ridley²⁴). As described by Kwame Anthony Appiah,²⁵ cultures are comprised of “continuities *and* changes,” through which the identity of a society is redefined and conferred. Cultural traditions can also account for social amenability and/or resistance to the use of neuroscientific information and technologies to affect and modify the cognitive functions and conduct of the individual, society and prevailing culture.¹⁷ Such socio-cultural specificity at a local level can translate into normative fragmentation that can impede attempts at broader discourse (if not agreement) needed for sustaining an internationally relevant—and applicable—neuroethics. Does normative relativism at a cultural level forever obstruct the pursuit of some universal norms valid at a global level? Previous philosophical efforts of past centuries are not overly encouraging in that direction, but recall that those efforts were not informed by the behavioral and brain sciences. As Fritz Jahr²⁶ presciently noted some nine decades ago, while philosophy provides ongoing questions for science to address, both philosophy and ethics must remain informed—and changed—by the answers that science may provide.

Apropos of Jahr’s invocation, the pursuit of universally applicable neuroethical principles dictates a more comprehensive view of what Levy has referred to as “the new ethics of neuroethics.”²⁷ In light of the pace and breadth of neuroS/T developments, especially compared to the tempo of social progress and ethical revision, an ethico-legal reflection upon new tools and constructs relevant to human activity in the social and political realm is necessary to effectively guide the social manifestations of such tools and discoveries.¹⁶ As Toope has observed,²⁰ increasing and re-orienting social responsibility is a complex and slow process, particularly if and when it is directed by national governments striving to define appropriate supportive policies.ⁱⁱ

ⁱⁱToope argues that an average 7-year timeframe is required to implement the recommendations of a Royal Commission in the United Kingdom, and a 15–20-year timeframe is needed to work recent scientific findings into operative policy.

V. THE VALUE OF MID-LEVEL PRINCIPLES

The idea of a widely agreed-upon paradigm for a cross-cultural theory and practice of biomedical ethics is found in Beauchamp and Childress' proposal of a four-principled ethics: beneficence, non-maleficence, respect for autonomy, and justice. In the absence of philosophical consensus over ethical theory, the apparent flexibility and relative miscibility of the principlist approach offers commitment to a large-scale acceptance and sharing of mid-level constructs applicable across cultural circumstances and contexts.^{10,21}

Beauchamp and Childress' original notion of a broadly construed morality relied upon moral intuition as a universally and trans-historically shared normative baseline for rational judgment.^{10,21} Partially inspired by Rawls' concept of "wide reflective equilibrium,"²⁸ Beauchamp and Childress arranged their four principles as credible foundations grounding wide-ranging ethical convergence. When taken together as a systematized approach, the philosophical neutrality of the four principles is itself a valuable heuristic tool with which to enact and assure that the dialogical exchange between "universal" moral standards is systematized. Then, "particular" variability in socio-cultural norms and moral standards that affect whether and how certain ethical "universals" can be applied.

The intentionally undefined ranking of the four principles is, however, a double-edged sword. Principlism allows for flexibility and broad applicability, yet it also incurs criticism in its lack of definitiveness and a tendency for confusion, if not tensions and conflicts, over how to prioritize the principles in various situations and circumstances. However, it is important to note that these principles are mid-level and are to be used *prima facie* by design and intent. We view this as a potential benefit: such flexibility can be a valuable opportunity for individuals to express preferences for options that are universally agreed upon to be granted—but not enforced—for living with human dignity.²⁹

VI. NEUROETHICS: PRINCIPLISM REFRAMED

Basic principlism ultimately gains plausibility from common moral intuitions, whatever the source. Neuroethics has far more than folk intuitions and folk psychologies from which to work. Eric Racine claims that neuroethics should adopt bioethical methodologies and tools and adapt them to the new challenges posed by neuroscientific progress.⁶ We agree; without doubt, neuroethics can and should be seen as a field of ethics and a sub-field of bioethics. What distinguishes neuroethics is its distinctive neuroscientific field of investigation, that is, studies and manipulation of the brain and its functions, and the whole realm of manifest events of what is colloquially referred to as "the mind." In short, neuroethics can address "what it means to be a thinking being,"³⁰ and what it means to use neuroscience to investigate and affect the nature of being human.^{13,14,18,31–33} Its broad applications can foster a systematic interdisciplinarity and an ability to move beyond limitations of Western philosophy and such philosophies' characteristic ethical concerns.¹⁷

We posit that common ground can be identified using the *naturalistic* approach informing both bioethics and neuroethics, and the underlying conviction that social and moral phenomena are helpfully illuminated by the biological and behavioral sci-

ences.^{6,34} Instead of positing a narrow scientific naturalism endemic to recent Western philosophy, we prefer a looser, more liberal naturalism, of the sort defined as ‘moderate’ naturalism by Jonathan Moreno.³⁵ Naturalism generally rejects foundationalism (in any form) as a cornerstone for ethical inquiry,⁶ preferring empirical approaches instead, and the ‘moderate naturalism’ we advocate helpfully presumes a dynamic reciprocal engagement between object and subject. Where is neuroscience’s proper place within this moderate naturalism? In Moreno’s view, the scientific method as traditionally based upon the experiential source of knowledge should be preferred, but science itself is but one among many alternative valid products of human experience. Therefore, as Racine notes, Moreno’s moderate naturalism pragmatically views ethical norms not as biological laws or derivations from biological laws, but rather as rules codified by and within the cumulative experience of a society.⁶ This epistemological and methodological openness, interdisciplinarity, and flexibility to integrate theoretical and practical perspectives are crucial to the ecological and internationally viable neuroethics herein under investigation.

From such considerations, Shook and Giordano¹⁷ propose four guidelines to address the reality and needs of an internationally relevant neuroethics that are inspired by and generally aligned with Beauchamp and Childress’ model of principlism.¹⁷ Based on the four principles (i.e., beneficence, non-maleficence, respect for autonomy, and justice), the purview of each is addressed and either accepted or modified in light of neuroscientific trends in society to offer innovative ethical constructs that are claimed to represent a novel, principled neuroethics that is ecologically grounded and naturalistically supported. Like Nussbaum and others, we want to preserve individual expression in cultural contexts; like Racine, Moreno, and George Khushf,³⁶ we want to pragmatically respect neuroscience and ethics working together (see also Giordano^{31,32,37}). In this model, beneficence evolves into *empowerment* to advance the capability of people to independently pursue their own well-being with the ultimate purpose to fulfill their lives—but not in ways that impugn the freedom and powers of others. From non-maleficence, a principle of *non-obsolescence* bespeaks a more proactive duty to sustain individual worth and value within a society beyond a simple assertion of non-harm. The concept of respecting autonomy evolves into respecting *self-creativity* as the right of persons to recreate themselves to pursue enrichment in their lives. Finally, *citizenship* extends the principle of justice beyond merely fair allocation of scarce resources to establish abilities to be a “free, equal, law-abiding, and participatory citizen.”¹⁷

VII. A WORLDVIEW FOR MULTIPLY-SITUATED SELVES

Universalism is implied, but not guaranteed, by core principles or ethical frameworks, as they are constructed and/or enacted to afford meaningful articulation in international contexts. Abstract universalism, as we have noted thus far, can be as much a threat as an opportunity for the moral growth and ethical achievement of real people in the world. Must the price of neuroethical universalism be the reduction of individuals to abstractions? Ulrich Beck argues that the “cosmopolitanization” that is actively chang-

ing human experiential space should not nurture misleading convictions that all individuals and institutions are becoming cosmopolitan; cosmopolitan responsibility is not automatically given nor guaranteed.³⁸ We agree, and we seek to define the idea, extent, and realities of what global identity and citizenship mean in a way that develops an interculturally relevant neuroethical paradigm that allows particular situational applications without distorting abstractions. In this light, it is important to consider that identifiable membership in a global community, which is able to establish some grounds for anthropological commonality and appreciate bases for anthropological variation, might effectively lessen the conflict between communitarianismⁱⁱⁱ and cosmopolitanism,^{iv} and offers the possibility for the kind of “fusion of horizons”³⁹ that Dower has referred to as “communitarian cosmopolitanism.”³⁸ Appiah has similarly suggested that the concatenation of both of these stances enables an effective dialectic between the poles of the “individual” and the “community” as bases of moral cognition and sources of morality, thereby fostering simultaneous commitment to both the “local” and the “universal” in the development and articulation of ethical precepts and standards.²⁵

While considering the “universal” pole, the particular version of universalism fostered by an internationally relevant neuroethics must be characterized, pro Judith Butler, by a persistent openness to dissent and contingency.⁴⁰ In this way, neuroethics remains responsive to contemporary scenarios and adaptive to future prospects. Butler acknowledges the somewhat paradoxical conditions of universality in practice, asserting that in actuality, any ethical decisions and practices always take place in a “given syntax, through a certain set of cultural conventions in a recognizable venue.”⁴¹ Contradictions often arise, although (importantly) not in ways or to the extent of being irreconcilable.²⁹ The dialectical exchange and continuum^{5v} from ‘universal’ to ‘local’ or ‘particular,’ and

ⁱⁱⁱCommunitarianism theorizes that the individual is nested in and determined by a relational system of social and cultural inter-dependence. Social order rests on peoples’ interdependence, and society only functions if people recognize and act upon their communal responsibilities. If, on one hand, cooperation is necessary to the state’s functioning, on the other hand, the state’s effectiveness is necessary to individuals’ survival. The community’s social functions are the fundamental source of morality, meaning that the community has ontological priority in regard to human flourishing. The “common good” is indeed privileged, although from this notion many variations of communitarianism arise. For example, East Asian communitarian theories generally stress the role of community and authority, reducing the individual to a cell of this encompassing whole, while other more Western forms focus on individual relevance within a conception of a “socially embedded self.”

^{iv}All cosmopolitan conceptions of morality emphasize the equal stature of all human beings’ moral worth, so that all deserve equal consideration and involvement in the decisions (particularly those concerning law- and policy-making) affecting their fundamental interests and share corresponding reciprocal responsibilities. As Thomas Pogge further specifies, this conception of the individual human being as the ultimate unit of moral concern includes both an interpersonal ethical cosmopolitanism and its international version (ethics as applied to international dynamics and states’ conduct). See Ref. 49.

^vThe interaction between “universal” and “local” suggested here is inspired by the concept of hermeneutical circularity anticipated by Nietzsche in the theme of “Eternal Return.” Hermeneutical circularity is the process of dialogical circulation that continually resists reducing one pole of any relational structure to its oppositional other. The question that originates true dialogue is kept alive by working to enact the conditions, both intellectual and social, necessary to render the circulation sustainable.

the need for cultural translation, implies and compels some form of cross-cultural consensus built upon confrontation and negotiation to re-articulate the universal “in the various languages in which universality makes its varied and contending appearances.”⁴¹

As long as the “universal” is not presumed to imply the ‘rigid,’ ‘unchanging,’ and ‘absolute,’ it can enjoy objective validity and can achieve recognition and respect from the people that it affects with its principled norms. Universality need only point to shared commonality at some point in time, not generic tyranny over all times. Neither the neurosciences nor empirical inquiry guarantee anything like absolutes; so why should ethics, and especially a neuroethics, provide such a guarantee? The universal, in this sense, may become somewhat different in the future, because neither individuals nor groups stay the same over long stretches of time. The normatively universal should appeal to what people want to become as much as what they already are. No community, whatever its size, is really static, regardless of whether a tradition wishes it were so.

Taking a close interest in global commonality and even global community is not the same as focusing solely on global citizenship. Perhaps “citizenship” is too rigid a political and legal construct to fully address and serve here. Advocates of an extant global citizenship^{8,9} as prefatory to an internationally relevant ethics, can typically admit that conceptually strict analogy to ordinary citizenship is both impossible and unproductive. Acknowledgment of both actively divisive sociocultural and political structures, and conversely, of structures that institutionalize humanity as a whole (e.g., international human rights) fall short as well. The existence of a global community as a social reality, with interdependence, shared traditions and norms, and some degree of loyalty to the whole can be emergently identified as long as, at least in principle, (1) all humans display and acknowledge aspects of bio-psychosocial commonality and variability, (2) humans occupy available ecological niches and the position of bio-ecological dominance and dominion,⁴² (3) each person has some duties toward their social in-groups and potentially all other people, and (4) individuals engage in actions that may make a difference at a global level in the name of a global responsibility.⁸ A limited conception of global citizenship could track these crucial factors *en route* to global responsibility, which would be ultimately fulfilled through the participation of economic and political institutions. Philosopher Stan Van Hooft has enumerated basic responsibilities of global citizenship to (ideally) include the following: (1) helping each other, (2) granting cultural respect and political equality across ethnic differences and state borders, (3) affording rights to fair distribution of social goods in a globalized economy, and (4) active engagement in global and globally supportive local/national political institutions.

In accord with the aforementioned considerations, tensions between the local and the global may be surmountable by humanity growing a kind of identity that has been labeled as the possession of “multiple-situated selves.”⁴³ Various communities are simultaneously engaged in differing degrees of social aggregation so that “the global sphere is not a domain in itself, separate from other specific domains. It includes them all, and at the same time manifests itself in each.”²¹ We should indeed hold off a misguided search for a global way of being human. Yet, we persist in our assertion that an integrative syn-

thesis is still viable. Solomon Benatar, for example, articulates a “reasoned, contextual universalism,” taking into account morally relevant local factors conditioning peoples’ interpretation of theoretical universal concepts within the reality of a specific environment.⁴⁴ Thus, the locally contextual application of some universal set of ethical precepts and parameters becomes practicable because of its openness to and respect for the ethos and mores of all agents involved.⁴⁴

The definition and implementation of an internationally relevant neuroethics requires a transdisciplinary orientation embracing a wide range of methods, knowledge, and techniques. This approach mandates a critical assessment of current neuroscientific knowledge and capabilities that is yoked to (1) receptivity and sensitivity to contextual factors, (2) an ability to examine both individual cultural traditions, and (3) an appreciation for the construct and effect of culture writ-large (i.e., *Kultur*). Appiah’s theory of “rooted or partial cosmopolitanism” supports the possibility of fruitful engagement and harmonization of universal and local perspectives. Specifically, in a social reality dominated by multiple and increasing affiliations, an authentic commitment to the ‘local’ must simultaneously generate an obligation to the universal.⁴⁵ Appiah endorses a version of cosmopolitanism that acknowledges allegiance and loyalty to other forms of social affiliation. For example, a nation represents an appropriate object of moral commitment as an “imagined community of culture or ancestry running beyond the scale of the face-to-face and seeking political expression.”²⁵ A nation, according to this understanding, traditionally hosts ethnic, religious, and cultural variety and exemplifies a collective ambition giving rise to its political community regulated by conventionally normative rules.

Recent discussions about cosmopolitanism^{25,46–50} call attention to multiple implications and important critiques. Unmistakably, cosmopolitanism has been impugned as unrealistic, a dangerous illusion based upon false claims of an existing or potential global identity that neglects the situated and communitarian bonds of each individual.^{vi,51} Benjamin Barber has asserted that intellectual conviction (in the Kantian sense of “pure reason”) is the only source of commitment within cosmopolitanism.⁵² Michael McConnell directs attention to the risk of moralism and intolerance implied by cosmopolitanism; in his words, the “moralistic cosmopolitan” is one who feels superior everywhere.⁵³ This directly recalls the looming risk of Western philosophical dominance and the resulting tensions and conflicts that could occur as a consequence (e.g., enacted under a rubric of what Michel Foucault⁵⁴ referred to as biopower and biopolitics).^{vii}

The international pace and trajectories of neuroscientific and technological advancements surely reconfirm, as we have claimed, the need to consider necessities and realities of international neuroethics. Yet authentic attempts toward this goal must recognize

^{vi}For a discussion of potential biopolitical use of neuroscience, and related neuroethical concerns, See Ref. 15.

^{vii}A fundamental difference between cosmopolitanism and communitarianism concerns the origin of human values: for cosmopolitan theories, human beings are bearers of the values, and thus they generate duties as human beings in relation to one another; communitarianism affirms socially constituted values, thus binding in the name of and strictly within meaningful relations. A relation should be considered meaningful if informed, in Dower’s words, by sentiment, affection, shared traditions, convention, reciprocity, and contract. See Ref. 8.

the potential for moral absolutism incurred through imperialist enforcement of Western precepts and standards upon other groups with dissimilar needs and values, as well as the uncritical moral relativism that Nussbaum calls “political cowardice.”²⁹ However, it is noteworthy for us that Barber’s, Himmelfarb’s, and McConnell’s stances on moral cosmopolitanism are all informed by a conceptualization of ethics as concentric circles of moral concern (family, community, neighborhood, nation, humanity) with the individual at the center.

VIII. TOWARD A COMMUNITARIAN, COSMOPOLITAN NEUROETHICS

An ecological approach to human capacities and conduct situates each human being as an individual in community. This approach therefore emphasizes the development and enactment of cognitions, emotions, and behaviors that people must rely upon to live in society, and hence they must (at least implicitly) accept the opportunity—and challenge—to respect, share, and adopt social norms and rules. From this agreeably cosmopolitan perspective, all humans should be included in the concept of society and thus bear various levels of responsibility for their individual, group, and communal actions.⁸ Such responsibility is supported by recognition of a spectrum of potential interpretations of “the good” as based upon needs, values, and desires. However, ethical views and relations exist only within the frame of historicized cultural particularities,⁵⁵ and the moral motivations of individuals largely reflect and respond to the shared values and social sanctions around them.⁸ What does this portend for a realistic framework and practical application of a cosmopolitan neuroethics?

The relevance of the ‘contingent’ in the definition, assertion, and assessment of social identities and moral values^{viii} is traditionally emphasized by communitarian ethical theories. Communitarianism comports well with and supports both the idea of living in community as motivation for moral agency and the importance of social decision making as the sole source for practicable ethical solutions.^{8,56} Upon these premises, an assimilation between cosmopolitan and communitarianism, which Dower qualifies as “communitarian cosmopolitanism,” can be established. Communitarian cosmopolitanism begins from the groundwork of universal ethical claims that are integrated with communitarian accents as necessary to counterbalance and contextualize large-scale moral concepts.

Dower considers the process of communal definition of social values and also focuses attention on widening spheres of social participation, from which deepening cosmopolitan obligations are built.⁸ Such complementarity is illustrated by philosopher F.H. Bradley’s metaphor of morality as being endowed with both “body and soul”: the “body” consists of the social institutions that channel social practices, and the “soul” consists of the individual moral agents keeping the body alive.⁵⁷ John Dewey upheld a similarly organic conception of social institutions as simultaneously guiding and energized by

^{viii}This set of duties posits adherence to a naturalistic basis, need for pragmatic evaluation and incorporation of current facts relevant to neuroscience and the neurobio-psychosocial nature of embodied organisms embedded in ecologies, and necessitates an ongoing self-critical and self-revising approach.

the civic habits of community members.⁵⁸ Pushing these analogies still further, if we seek internationally meaningful moral principles, cosmopolitanism provides the soul of that morality, while communitarianism offers “the insight as to what must also exist for that morality to be embodied.”⁸ A society or subculture need not be the final sphere of moral duty for a society’s members who can grasp how the many consequences of their joint conduct, and hence their ethical responsibilities, transcend the local toward a global context. Local institutions (regardless of traditional function) can be adjusted and coordinated internationally to effect global goals as well as local ends. That opportunity, if and when realized, affords the capacity to develop wide-ranging ethical concepts that remain conceptualized within particular social contexts.

We believe that the core theoretical characteristics that can establish neuroethics as tenable within international contexts have been successfully identified.^{6,27,30} Grounded by a moderate empirical naturalism, the perspective of an alternative meta-ethics for neuroethics has been outlined as informed by the behavioral and brain sciences.^{13,17} We posit that the translation of such a heuristic model into practice requires a theoretical methodology that can successfully act at the level of cross-cultural dialectic: local in origin yet potentially universal to orient the necessary first steps of a reasonable internationally applicable neuroethics.

IX. A RAWLSIAN APPROACH TO STRUCTURE

A Rawlsian approach could support this dialectical neuroethics within an internationally multi-dimensional framework. Rawls’ conception of ‘reflective equilibrium’ offers a method for “considered moral judgments” resulting from procedural reflection on relevant circumstances, contexts, and contingencies of application. The interchange between general principles and specific judgments, involving ongoing modifications to both poles, can result in a “reflective equilibrium,” i.e., settling upon certain ethical priorities in light of known facts. This procedure of reflective interchange should interest neuroethics, for it conjoins its tentative ethical priorities to current information from neuroscience, as well as from historical experience about ways that past science and technologies have been both used and misused.

More specifically, neuroethical theorizing appreciates (1) the role for neuroscience as an objective collection of information, tools, and capabilities; (2) the relatively subjective meanings and employments of neuroscientific information and techniques in various socio-cultural settings; and (3) the potential ways for neuroS/T to exert socio-cultural influence and be affected in turn by cultural forces (inclusive of individual and community needs, desires, economics, and politics).^{15,18,31,32,37} By addressing what Rawls²⁸ described as “background theories” —that is, a “theory of persons” and a “theory of the role of morality in society” —a narrower, local perspective can be extended to a wide (and potentially international) reflective equilibrium for neuroethical conclusions. That equilibrium is just that, a temporary stability that allows for potential re-engagement, modification, or revision of extant principles based upon both particularities of circumstance and iteratively newer knowledge. A tentative set of principles can be employed

and then re-balanced to better meet changing conditions within given communities (of various dimensions) when attempting to address, engage, and resolve neuroethical problems. This approach allows for the development a common set of core neuroethical concepts that can and should be utilized with specificity relative to the stakeholders and shareholders involved, who can then reflect on acquired practical experience and participate in periodic ethical reflections as needed in the future.

We are quite aware how circularity has been charged against the Rawlsian approach. Haslett, for example, has claimed that the Rawlsian method is incapable of providing the criteria necessary to enable choice between apparently incommensurable perspectives; unable to provide any real justification to rational decision-making; and merely offers “layers of protection against any possible refutation.”⁵⁹ Perhaps Rawlsian ideas seem inadequate to those seeking more rigid or idealistic absolutes. However, we admire the flexibility of procedures of reflective equilibrium to construct and sustain a consensus on ethical principles conceptualized only within given contexts, the sort of revisable consensus consistent with the ecological and pragmatic approach to neuroethics outlined here.

Avoiding the lure of non-revisable absolutes can prevent ethical imperialism, but varieties of relativism still beckon. What is deemed “right and good” in one socio-cultural context will not necessarily comport, in each and every aspect, with another. Is ethics itself irretrievably divided? The inspiring answer, inspired by Dewey and Rawls, is to rise to a higher reflective level upon ethics itself. Why would ethics fail to reflect upon itself? Such failure of reflection gives rise to many absolutes, as history proves when each culture deems its own ethics entirely sufficient for all. Therefore, a meta-ethical climb must reach for the local and universal in a single grasp. A limited and revisable yet broadly applicable ethics can be both procedural and principled without tyrannically overriding all local norms. In particular, neuroethics can attain a meta-ethical level due to its natural, ecological grounding and its emphasis upon neurocentric criteria for moral, ethical, and socio-legal consideration and treatment.^{13,14,16,17,42} This yields a “first principle,” recommending dutiful moral regard and care for all creatures enjoying sentience (i.e., the sentient) and feeling pain (i.e., the painient). The prescriptive ordering and application of other, more specific principles falls to those people who will responsibly employ neuroS/T to their particular needs, as individuals who are citizens of both local and global communities, but only insofar as they are not violating other principles at large.¹⁷

The strength of a Rawlsian perspective to this principled, cosmopolitan neuroethics is that, rather than simply attempting to provide principled resolutions *a priori*, it offers a methodology to explore new questions and develop potential resolutions in light of (1) historicized investigation (i.e., casuistry), (2) pragmatic evaluation of facts, circumstances, and variables; (3) address of meanings and effects of neuroscientific techniques and technologies within specified contexts, and (4) modeling of outcomes on a variety of scales and levels. In so doing, it enables a set of core values (i.e., regard for the sentient and painient) as universals, but not in ways that are imperialist in philosophical view

or posture, together with a stance of flexibility, relevance (although not *laissez-faire* relativism), and preparedness for changing epistemological capital, technological capability, and socio-cultural effect, attitudes, and responses.

X. CONCLUSIONS

Our neuroethical exploration has found several crucial allies along the way. William Casebeer⁶⁰ has argued that neuroethics should prioritize three C's: consent (if, how, and why individuals and groups agree to the use of neuroscience and its technologies to affect their lives), consequence (effects and ramifications that use of neuroS/T will have at a variety of scales and timeframes), and character (effects of neuroS/T upon the nature and definition of what individuals and groups hold to be of worth and/or "good"). We agree, adding some grounding meta-ethical C's in concurrence. Neuroethics should include a cosmopolitan worldview, the global as naturally comprised of *both* bio-psychosocial commonalities and differences that are reflected in various philosophies and perspectives. That worldview then enables contextuality to account and allow for the specific ways that these similarities and distinctions are manifest in communitarian settings.

In this way, neuroethics will remain discursive and dialectical. It will display the openness of a moderate cosmopolitan perspective in establishing a basic deontology,^{ix} and it will duly regard the peculiar needs, values, and contingencies of individuals and groups. Therefore, it will consolidate global presence within the realities of communitarian affiliation(s) and focus upon the contingencies of humans-in-community on a variety of levels.^{18,31,32,33,61} This neuroethics is poised to achieve, in Rawls' words, the transition to an internationally viable *modus vivendi*^{x:11} and as such will remain a work in progress.

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^{ix}In so doing, this approach comports well with other ethical systems, such as consequentialism (which emphasizes utility, non-obsolescence) and agent/actor-based approaches (that place considerable value upon individual intellectual and moral virtues and attributes, inclusive of autonomy, creativity, and the role of the individual within a group or polis, e.g., citizenship; see Shook and Giordano¹⁷ for detailed discussion).

^xRawls defines his idea of *modus vivendi* through an example that involves two countries with conflicting interests and traditionally open to pursue their goals at the expense of their competitors but still motivated by virtue of their national interests to negotiate a treaty. The equilibrium of the agreement will lie in the fact that both publically acknowledge that a violation of the treaty concerned will negatively impact their national interest. In this perspective, "social unity is only apparent as its stability is contingent on circumstances remaining such as not to upset the fortunate convergence of interests." See Ref. 28.

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