

Cognitive Enhancement

ETHICAL AND POLICY IMPLICATIONS
IN INTERNATIONAL PERSPECTIVES

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OXFORD
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Published in the United States of America by Oxford University Press
198 Madison Avenue, New York, NY 10016, United States of America.

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Library of Congress Cataloging-in-Publication Data

Names: Jotterand, Fabrice, 1967- editor. | Dubljević, Veljko.

Title: Cognitive enhancement : ethical and policy implications in international perspectives / edited by Fabrice Jotterand and Veljko Dubljević.

Description: Oxford ; New York : Oxford University Press, 2016. | Includes bibliographical references and index.

Identifiers: LCCN 2015037613 | ISBN 9780199396818 (hardcover : alk. paper) |

ISBN 9780199396825 (online content) | ISBN 9780199396832 (ebook)

Subjects: LCSH: Nootropic agents. | Neurosciences—Moral and ethical aspects. | Neurosciences—Political aspects.

Classification: LCC RM334 .C65 2016 | DDC 612.8—dc23

LC record available at <http://lcn.loc.gov/2015037613>

9 8 7 6 5 4 3 2 1

Printed by Sheridan, USA

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Defining Contexts of Neurocognitive (Performance) Enhancements

Neuroethical Considerations and Implications for Policy

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Non teneas aurum totum quod splendet ut aurum.
“Do not take as gold all that shines.”
—Latin proverb

In its disciplinary stance and practice, neuroethics takes the brain and cognitive sciences most seriously, accepting their sufficiently confirmed theories as (provisionally) accurate in an overriding manner. As admittedly partial and preliminary as the best-confirmed theories may be, pragmatic neuroethical address does not ignore or set aside such theories if/when inconvenient for or incompatible with practical applications, principled values, private intuitions, or popular common sense. Nor are these theories muted when neuroethical engagement of real-world issues, questions, and problems are needed. How the brain actually works, as best as can be described at present, is—and must remain—fundamental to any neuroethical deliberations.

Certainly, such considerations are important to a neuroethical view of neurocognitive enhancement. In this chapter, we first advance some general considerations about neuroethical inquiries into cognitive enhancement. We next examine conceptions of “enhancement” to reveal how the crucial role of context is already embedded in standards framing enhancement in general. From this vantage, we investigate some sociocultural contexts to conceptions of the “cognitive” so that authentic neuroethical discourse may be better prepared for inevitable issues arising over the use of specific cognitive performance enhancers. We follow this with a discussion of the broader context of biopolitics and policy for neurocognitive enhancement, and we conclude by applying this contextualization in both a critique of overeager

enhancement advocacy and a call for interdisciplinary neuroethics to inform and enrich public policy debate. Contextualities also include the need to consider the broad international use of neuroscience and neurotechnology, as well as the particular values of various cultures that affect—and are affected by—the ways that neuroscientific and neurotechnologic interventions are viewed and employed.

Our position, most briefly, is that context is crucial. We assert that the more that any context relevant to neuroscientific information used for normative purposes is taken seriously, the better neuroethics is able to helpfully formulate and guide ethical quandaries as they arise. Deliberations about what constitutes an enhancement and the validity and value of enhancing interventions must expand and evolve as a consequence of ongoing developments in neuroscience and neurotechnology. Inquiries must take into account assumptions framing this issue, applications of scientific information, forecasts of predictable expectations, roles for laws and ethics, and the perspectives of many disciplines on broader social and political implications. A robust neuroethics, as we hope to show in this chapter, can meet these high standards while aiding the public understanding of the issues and helping to develop sound public policy. In this way, we join the ranks of other neuroethicists who have voiced similar perspectives and concerns.¹⁻⁵

Situating Neuroethics

If the ethics of some alteration to neurological functioning is called into question, neuroethics isn't automatically invoked. Applied ethics has long been focused on concerns about the effects of psychoactive, addictive, and mood-altering drugs on sound cognition and good conduct. In such deliberations, scientific knowledge about underlying neurological causes to those effects may not be available, but any available moral standpoint can be applied to generate judgments on those effects. This sort of ethical reasoning won't be adequate for neuroethics.

The “neuro” prefix of neuroethics shouldn't reflect that the brain is targeted for modification; nor does the suffix “ethics” merely relate that some principled values are applied. Brain sciences should inform a conception of the manifestations and multiple implications of neural modification; brain sciences should also inform conceptions of human values as having psychological bases and social histories. Neither neurons nor norms exist and operate in isolation apart from wider contexts, and many relationships interconnect them as well. Thoughtful entryways to neuroethics open up as such contexts receive closer consideration. Both values and facts have contexts, permitting them to be what they are. Value standards may seem as fixed as anything factual, but they have

a cultural provenance and a social significance that point to their residency in human brains. Modifications for improvement can seem as objective as anything measurable, yet they have an individualized location and a physiological basis, pointing to their exemplification in the activities of individual subjects.

Certainly, this is the case for those neurological modifications that enhance some domain and/or aspect of performance. Knowledge about brain function and capabilities are wholly relevant and important if we are to comprehend how value commitments are acquired and used and how personal performance can be better exemplified. This is especially the case for the complex neurological processes included under the umbrella label of “cognitive” processes. Keeping cognitive processes strictly apart from value commitments—and both of these far away from personal performance—can be (somewhat naively) done for the purposes of simple applied ethics. But we believe that a more realistic perspective beckons if we avoid presuming that every person, no matter her enculturation and/or the group socialization she embodies, will classify a cognitive alteration in the same way. What is classified as one sort of cognitive alteration may be differently classified in another culture or possibly considered different by subgroups within the same culture. In short, context matters. Prior to judging whether any alteration represents a “good” enhancement, its status as a specific cognitive alteration and as a value-neutral alteration must be considered and not taken for granted.

Productive neuroethical deliberations are obligated to engage this higher level of reflection when regarding alterations and putative enhancements. Neuroethics has, from its origins, encompassed two primary concerns: first, ethically evaluating brain research and any applications of resulting knowledge about brain functioning, and, second, studying how the brain functions for manifesting social and moral life.⁶ Both these foci possess descriptive and normative components: the normativity of each affects the descriptivity of the other, and the descriptivity of each affects the normativity of the other. The first focus, for its part, must not appeal to technical impossibilities or social and moral norms that turn out to be fictional, impractical, or deleterious. The second mode must appeal to prior ethical familiarity with what counts as sociality and morality in order to find out how brain processes support those capacities. Disagreement over what counts as moral behavior, for example, will cause divergent descriptions of brain functioning that no neural scans could adjudicate.

Ethics can be idealistic, but neuroethics should not be unrealistic, and it must be liberated from ethical theorizing done in ignorance of the human brain. In short, neuroethics must comprehend the genuine basis to our conceptions of self, society, and morality and rely on changes or replacements to those conceptions where scientifically warranted.⁷ This is entirely consistent with a neuroethical approach to and address of human enhancement and

advancement. As we have previously claimed, “any neuroethical consideration of treatment-enhancement (perhaps more intuitively called ‘flourishing’) must first and foremost relate to the epistemic and anthropologic domains of (a neuro)philosophy, to gain deeper appreciation for the nature of the human condition and what it ‘means’ to be human. . . . enhancement—in some form or another—is a basic human striving.”^{8:343}

Enhancement Standards

How can “enhancement” be defined? Bioethicist Thomas Murray identifies two primary meanings: “to advance, augment, elevate, heighten, increase” and “to increase the worth or value of.”^{9:491} Numerous scholars have similarly noted this term’s “metric” and “normative” dimensions. For both dimensions, context is axiomatic. If context is not ignored or taken for granted, as we urge, then enhancement must not be simplistically defined as anything beyond normality or described solely in reference to normality. Enhancement for an organism such as a human being does imply opportunities to improve capacities or abilities—features that can be simultaneously measurable and valuable and possibly moral as well. Structure and function cooperate and even interfuse, even as they have distinct implications for evaluating the ethicality of enhancement. Hasty and indiscriminate appeals to moral dimensions can quickly confuse discussions of enhancement in general and of “cognitive enhancement” in particular.

Modifications, even if they appear to be improvements, are not automatically enhancements because human contexts matter. It is important to first ascertain whether a particular modification is responsible for altered performance of a specified task. If so, then that modification is a *performance modifier*, and if that change is regarded as positive, then we can refer to it as a *performance improver*. Furthermore, if we call a particular activity an “intellectual” task, then we are actually talking about an intellectual enhancement for performing that task. This physiological modification may be called an “intellectual enhancement” in an easy, colloquial manner of speaking, although a scientific understanding of the brain or intellectual capacities is not yet involved. However, we argue that it isn’t enough to simply track cognitive functions and the resulting performance on particular tasks. An alteration to a physiological process associated with cognition can be measured and compared against some organic standard. Has enhancement occurred? At this point, it is still too soon to say whether enhancement is achieved; actual cognitive function (for the processing and integration of various types of sensations, memories, emotions, subconscious valuations, and so on) must be estimated and compared against some standard. Once this has been done, it still may be premature to

say whether or not the evoked changes represent an enhancement; reliable cognitive performance (for one's overall management of life activities and achievements) must be judged in light of some ethical standard(s) as well. We repeat our warning: taking initial bearings against some selected standards, whether scientific or social, does not automatically make a modification into an enhancement. Classifying something as an "enhancement" may make sense, depending on chosen context, with respect to bringing some function up to a given standard, going further than some standard, getting far beyond a standard, or even transcending the existing standard(s) entirely. And a classifiable enhancement may be deemed inappropriate and unapprovable in light of moral values. Additional contextual factors demand consideration.

Physiological standards, normality standards, and ethical standards all compete for prominence where definitions of "enhancement" are concerned. Furthermore, it doesn't help that the complexities of the nervous system can permit odd scenarios in which an increase in physiological function(s) might diminish cognitive ability, and diminishing a specific type of cognitive function might be conducive to optimizing a person's actions or general well-being.¹⁰ Rigidly demanding that only one standard or one direction by that standard should dictate enhancement is a stubborn path to take, and one that any rational approach to neuroethics should avoid. In light of this, we are pursuing a more contextual and pragmatic stance for the operational use of the concept and term "enhancement" in practice. This will enable neuroethics to realistically contribute to both professional and public deliberations on those issues aroused by applications of the neural and cognitive sciences. Neuroethical analyses cannot afford to neglect one or another standard, but must instead note when, where, and how certain deliberations offer concerns that are relative and relevant to physiological normality, as well as ethical criteria.

Letting the concept or term "enhancement" stand for any nontherapeutic benefits conferred by an intervention is a common way to avoid taking any (if not all) standards seriously. Does enhancement begin when a medical treatment exceeds the usual dosage or typical extent of repair? Perhaps enhancement refers to those instances where intervention yields physiological functioning beyond some mean upper limit or even the normal human range. Or, enhancement might entail evoking superior performance that lends distinct advantages to a person's life. Arguing over these narrow options overlooks the mistaken view that "enhancement can begin where therapy ends." But this is a mistake that is easy to make. Therapeutic medicine simplifies its standards because it takes all of humanity to be its proper field of work; a good treatment for a health deficiency generically helps any patient suffering from that problem. So long as the reference class remains "humanity," then there would only be "disease treatments" (aiming toward normality) and "enhancement treatments" (aiming

beyond normality). However, patients aren't so generic in the real world. Broad culture and local society are contexts that always exert their due influence.

A culture's medicine, if sufficiently advanced, can become accustomed to mainly treating its more "typical" members if the majority of patients are from that culture. If that culture enjoys a better overall level of health than humanity as a whole, such narrow regard for what is "typical" can be tacitly omitted, and medical normality can be construed to reflect the characteristics of a particular group or community. Thus, criteria used to define health, disease, illness, normality, and abnormality and the treatments rendered—if not bases for medical success—would be held to a higher standard, especially by better-paying customers of that culture. Conventional medicine can often be oblivious to this tendency, given that certain cultural ideologies teach and reinforce that that one's culture is among the best. If an ideology claims that one's culture is what all of humanity should be, then the medicine developed and employed by that culture will be used to develop and respond to metrics that it uses to define (its) normality. Of course, what counts as normality and abnormality within one culture might not obtain for all of humanity. But, if that culture's influence is sufficiently powerful, then clinicians, patients, publics, and governing bodies might not necessarily notice, care, or feel empowered to act even if they did.

Looking more closely, any social group within that culture could come to regard itself as the proper reference class, especially if that group enjoys some status and/or privilege. When that social group requests medical treatment, it is set in terms of what counts as "group normal" rather than just "culturally normal" or "normal for humanity." For example, when middle-aged privileged men take their reference class as "adult men like us," they surely aren't thinking about "all human males on the planet between the ages of 18 and 80." Nor are they taking their reference class to be people very much like themselves, such as "successful men between 45 and 65." Instead, what counts as "normality" is the reference class in which these men perceive themselves or desire to be, perhaps something like "healthy guys in their 30s." So, in effect, they want what counts as "subgroup optimal." If a culture's medicine proves willing, then treatment for achieving subgroup optimality could be labeled as medical therapy rather than enhancement. Precedents are hard to ignore.

What sorts of enhancement people want for themselves depends much less on the precise physiological nature of the alteration and much more on (1) the reference class to which a person ascribes and (2) the choice of either "normality" or "optimality" made by that person as the treatment goal. Hence, what may seem like enhancement with respect to all humanity could be medical treatment within a certain culture, and what could seem like an enhancement within a culture as a whole could be merely a treatment within a privileged subgroup. Indeed, interventions can (1) treat universal health problems for generic humans, (2) treat cultural health problems for generic members of that culture,

(3) deliver supra-normal health with respect to what counts as “normal” within a particular culture, and (4) deliver optimal health to a subgroup according to its chosen reference class. There’s even more that neurological interventions could accomplish, such as transcending optimality for the most optimistic subgroup. Augmentation by neuroprosthetics and brain–computer interfacing—although certainly realistic and possible—can easily stretch the imagination.

Summing up this section, neuroethics must take close notice of (1) the kinds of standards applied for determining enhancement, (2) the chosen reference class serving as the background against which enhancement would be measured and stand out, and (3) the selection of “normality” or “optimality” as the envisioned goal to enhancement. Contemporary medicine’s admirable focus on generic remedies for universal application to all humanity is not the best (or perhaps even a viable) framework for identifying and classifying enhancements. Cultural inheritance, group socialization, personal values, and physiological factors are each and all necessarily involved when realistically defining and addressing what enhancement is and could be. Nothing inauthentic or alien to neuroscience or ethics is introduced by these considerations, and nothing that makes us fully human should be left out of the account. Science and ethics exemplify the search for human authenticity in its senses of human “self-discovery” and “self-creation,” and, as Neil Levy has noted, in its derivation from and reliance on the brain sciences, neuroethics inherits this proper respect for both human authenticity and for the concrete contexts of human lives.¹¹

Enhancing Cognition in Context

The temptation to regard cognition as an entirely neurophysiological matter, amenable to objective study, definition, and measurement, isn’t just a symptom of overreaching reductionism or scientism. Frustration with too much context can set in for anyone reconciled to cognition’s reliance on brain functioning. If cognition is, in some sense, objectively present as subjects undergo experimental study, then it could be objectively modified. Researchers would be able to determine when and how cognition is improved as compared to some pre-set standard of cognitive ability. Serious attention to cognitive enhancement came to the fore as a consequence of experimental facilitation of cognitive ability, with due caution leveraged against exaggerated claims of capability, meaning, and utility.¹²⁻¹⁷ Hard lessons learned from pharmaceutical studies apply to any sort of performance effects produced by alteration of brain structure and function.¹⁸

Neuroethical attention must be paid to wider contexts of neurological manipulation, beyond the fairly objective and narrow ways that cognitive

performances can be adjusted in desired directions. Determining if a neurological intervention can actually produce a desired enhancement is one thing. Ascertaining that some sort of adjustment is truly cognitive (in the expected manner) is quite another, and these distinctions deserve respect. Imitating medicine's quest for therapies that have universal utility for anyone suffering from a certain health issue is no longer a wise undertaking for the application of 21st-century medical advancements. As well, we maintain that the promotion of enhancements as if they could be universally beneficial for generic cognitive improvements to anyone's intellectual performance is equally unwise.

There may not be such a thing as a "generic enhancement to cognitive performance." Two people from two different cultures, or even two people from two subgroups within the same culture, may not necessarily agree on what is cognitively adjusted by some alteration of neurological function. Thus, neuroethical inquiry cannot avoid an interpretative circle: some group of people ascribes a "function" to a cognitive process in service of a task that is considered to be "normal"—but this is a social imposition of normality on a neurophysiological process. In this way, performance, not neurophysiology in isolation, decides functionality and what counts as "normal."

Let us consider an analogy. Suppose a practical way to increase muscle mass (without deleterious side effects) is offered as a general "athletic enhancer" that could be used by anyone. Athleticism depends on one's musculature, surely, so, given this rationalization, more muscle should enable more athleticism. But muscle mass alone does not equate with athletic ability (or in some cases even potential ability). For example, one can take anabolic-androgenic steroids (AAS) to augment muscle mass. As matter of fact, these very likely will lend something of an "edge" to (important) dispositions and characteristics necessary for improved athletic performance (i.e., muscle size and strength).¹⁹ However, the underlying premise is that the agent is increasing specific qualities of muscle (e.g., diameter of muscle fibers, contractile force, etc.) that have been shown to be operative in a number of athletic events.

Herein, though, are important caveats. Although an AAS may yield mass and strength gains, these are only preparatory for "training effects" because an athlete must still train for a particular sport. AAS can facilitate that training, but if training is conducted improperly, less success at a sport is a likely result. Furthermore, different pharmacological agents can elicit distinct effects. Some will enable gains in muscle mass but not necessarily facilitate definition; others will be more lipolytic and produce lean, muscular density but will not greatly increase mass, and so forth.¹⁹ Also, AAS do little for aerobic endurance per se, just as an endurance-facilitating agent (such as erythropoietin [EPO]) does little for mass or strength.¹⁹ The adage is: the right agent for the right effect. Additionally, there is ample evidence (and practical wisdom) to demonstrate that if one wants to become proficient in a particular sport, then it is necessary

to train in that sport. There are generic athletic training exercises, but each sport must evaluate their utility. For example, cross-training can lend overall benefits to components of athleticism, but it doesn't necessarily permit direct performance gains peculiar to each sport. Only after specific kinds of athletic performances and the individual athletes performing them are identified and targeted would an intervention be intelligently developed and employed to exert positive effect(s) within selected contexts. Here, the adage is: train as you play, play as you train.

Let's build on this analogy with a specific example of cognitive performance enhancement. Whereas certain neuropharmacological agents and neurotechnological interventions might increase the speed of neural processing and facilitate network activation—and perhaps (as in the case for transcranial magnetic stimulation [TMS], transcranial direct current stimulation [tDCS], and deep brain stimulation [DBS]) even do so site-specifically—there do not appear to be agents that evoke the kinds of cognitive effect(s) popularized, for example, by the 2011 film *Limitless*. Reports of the effects of amphetamines (e.g., methylphenidate, pemoline), ampakines (e.g., farampator, phenotropil), eugeroics (e.g., modafinil, adrafinil), and racetams (e.g., piracetam, oxiracetam) all reveal how any drug must be “put to work” while a subject engages in task-specific activities while simultaneously confirming how not all types of cognitive tasks are affected by their use.²⁰ This prompts inquiry into which specific neural processes are involved in particular types of cognitive events and tasks and how those process may be best enhanced. Promising neurological interventions might not yield better results than nonsupplemented cognitive boosts that anyone could do.²¹ Also, some neurological interventions may work best in conjunction with strenuous cognitive training regimens.

To reiterate, individual context—and specificity—matter. Neuroethical analyses and explorations into cognitive enhancement must keep abreast of relevant findings from many fields, such as personal genomics, developmental psychology, social neuroscience, cultural neuroscience, cross-cultural psychology, and cultural anthropology. As any of these fields can indicate, there will always be debate as to what constitutes the “cognitively normal” human brain, and rightly so. What exactly counts as constituting a cognitive deficit, disorder, distortion, or bias will not converge across cultures or even within societies. It is naïve to suppose that a compensatory adjustment, much less an enhancing adjustment, could be generically assigned any validity across all of humanity.

Even best-case scenarios remain stubbornly diffuse. Calling a performance test a “cognitive performance test” and observing that individuals who are subjected to intervention *X* perform better doesn't mean that some purely cognitive functioning has been isolated and targeted as the improved factor. Fortunately, careful research is hardly so naïve, as recent exemplars have noted.²² The lesson is that no one pondering cognitive enhancement should

assume that higher cognition can occur in some “pure” forms, no matter how specific the task. To begin with, multiple affective and motor processes are interfused with the functional components that are operative in executive control. In turn, executive control is interfused with every sophisticated practice acquired during childhood and adolescence. This is especially the case with all manifestations of higher cognition involved in social and moral behaviors, so isolating something like the neural processes for “autonomy” or “morality” for some enhancement is unrealistic.²³

Enculturalization takes advantage of advanced executive control for instilling specialized task performances, such as learning mathematics and logic. It is no paradox that the more abstractly cognitive the task, the more it has a cultural rather than a purely biological basis; hence, such tasks are very much subject to the vagaries of social history and practice. Things seemingly as simple as conceptualizing number and quantitative amounts have been shown to display cultural variation.²⁴ Nor is memory performance culture-neutral.^{25,26} Cultures contribute to cognition as much as cognition contributes to culture.²⁷⁻²⁹ Even context is contextual as far as cognition is concerned because the developing sensitivity toward and responsiveness to enviroing interpersonal context displays cultural variability.³⁰

These contextual factors aren’t raised here in order to endorse a thorough relativism or dismissive eliminativism about potential enhancers. Cognitive enhancement can be quite real, when and where it is created. The reason why confirmable cognitive enhancements can be achieved is because improved cognitive (i.e., intellectual and/or emotional) performances by selected and trained participants can be measured under controlled conditions. Generally speaking, under sufficiently similar conditions, similarly altered people having enough in common will perform in similarly different ways, all other things being equal. What more could be expected from science?

Enhancement in Public Contexts

What a social group regards as enhancement cannot be automatically extended to any individual, anywhere, and what can be enhanced at an individual level may not necessarily be extrapolated to an entire culture or to all of humanity. This appears to be especially the case for cognitive enhancers. Still, it is likely that the quest for generic cognitive enhancers will continue. There is ongoing hope for neurological interventions that will be able to enhance anyone, anywhere, no matter what they are doing in their lives. Desires to “improve the human condition” conjure proposals for a proverbial “rising tide” of neuroscientific and neurotechnological modifications that will “raise all brains” and in so doing “elevate all minds.”

Dwelling on piece-meal contextuality rather than uniform advancement can sound like a surrender to defeatism and a victory for elitism. To be sure, elitism is a valid worry. Why should those with so much get even more—and such potent gifts, too? Those who want humanity as a whole to benefit, however, tend to make sweeping generalizations about the good of humanity and what it means to be human. But being human means many things, including the exercise of some intelligent supervision over what “the good life” shall specifically mean and what achieving the good life shall entail. Each human being is a nonstatic being-in-evolution, employing abilities to optimize survivability and flourishing both by altering environments and one’s own “being.”^{31,32} In this pursuit, individuals and communities query potential conditions for achieving good lives within the environs they find themselves. Queries can also eventually arise about the long-term consequences of such pursuits. It is just as natural for humans to question where their journeys are going as it is to embark on them. Looking ahead, unavoidable questions include: how much can humans be enhanced without deforming or destroying aspects of the social or natural world on which life relies? And, will human character and moral progress be sustained if hopes for enhancement become realized?

Enhancement is inevitable because humans, as a species, are exploratory and experimental. But this does not imply that obligations inherent to and derived from this experimental (and self-determining) impulse should be neglected. We have stated elsewhere and reiterate here that science and technology are human endeavors conducted in the sphere of human existence.³³ Thus, there is a duty to evaluate the contexts and consequences of any such experiments. This duty applies no less to those who undergo enhancements than to those eager to apply them. In this light, setting and meeting high standards of informed consent develops far greater importance and necessity. Extending the boundaries of what is possible through the articulation of scientific knowledge and tools creates conditions of uncertainty, which are also conditions permitting closer inquiry.

The avant garde nature of brain sciences is evidently generating a host of unknowns: new questions about the brain; unpredictable consequences to novel neuroscientific techniques and technologies; and uncertainties about side effects of such interventions on the nervous system, the organism in which that nervous system is embodied, and the ecology (i.e., environment, society, culture) in which these embodied organisms are embedded and function.³⁴ However, we argue that this need not compromise current and/or future research enterprises. To the contrary; given these unknowns, we believe that continued research (inclusive of examination and re-evaluation of uses in real-world practice) is the only way to allow more thorough, detailed insight and a growing understanding of potential benefits, burdens, risks, and harms that such interventions may incur.

Responsible conduct of this research (whether in trials or through longitudinal examination of effects in use) dictates attention to what William Casebeer^{35: 226} has referred to as “the 3 Cs”: *character, consequence, and consent*. An additional “3 Cs” are called for here as well: the realistic assessment of the *capacities*—and limitations—of any neuroscientific and neurotechnological intervention to be used, *continuities* between research and clinical care of those receiving interventions,³⁶ and due appreciation of *context*. Contextual re-evaluation is precisely what happens when the interdependencies among the other Cs are taken seriously. Concern for context emerges from realizing how the other 5 Cs are not just independent boxes to be checked off; each C must be regarded as mutually relevant and relative.

Positional Perspectives

Taking the 6 Cs into consideration enables an assessment of the various positional perspectives of enhancement, as well as the values and needs that shape the use of neuroscience and neurotechnology. For example, some have supported a duty to intervene once we are in the position of realizing how an intervention is becoming technologically feasible. Being in a responsible position carries burdens. Yet, justifying interventions on others simply because they have become available fails to account for additional realities spawned from actualizing possibilities. Comprehension of long-term consequences is limited, and encouraging (what may be long-lasting) modifications without ensuring equally durable individual welfare is reckless.³⁷

Shall the position of the responsible individual prevail instead? Letting individuals choose for themselves is no less reckless. Even when individual benefits can be guaranteed, it must be asked: which people should receive them? The answer, “All who can benefit,” is no answer at all because it won’t really be the case that people will have the same or even similar access at the same time. Differential access is inevitable in a world of finite time and resources. That differential access is *prima facie* unjust because those who already possess certain traits, attributes, and/or resources will likely acquire even more. Hence, realistic concerns for distributive justice arise from the position of society at large. The distribution of improved health and lifestyle status, and even improved moral status, will always be a social concern.^{38,39}

Worries over distribution cannot, nor should not, be easily dispelled. Those with the least assets are those most unlikely, statistically speaking, to get access to state-of-the-art scientific and technological interventions. It is unrealistic to assume that some massive shift in the social architectonics of medical resource allocation will occur (a shift without historical precedent) so as to allow neuroscience and neurotechnology to close the gap between

those who “have” and those who “have not.”⁴⁰ Given this reality, does everyone really want a society where the people getting the most enhancement(s) are precisely those enjoying great wealth? The prospect of cognitive enhancement surely highlights this worry: intelligence does what character directs, and the kinds of characters getting so wealthy in our times may not be the people to be trusted with even more intelligence and the powers concomitant with intelligence. Proponents of unlimited access to enhancement are unwitting enablers of unbalanced distribution. Contests between idealistic distributive methods can be debated in ethics, but they get realistically adjudicated in politics.

Entering the realm of politics is unavoidable. The politics surrounding access to enhancement will be intense. Of equal importance are the ways that the capabilities of brain science tempt its use within agendas of political power to control fundamentally biological aspects of individuals’ and communities’ existence (invoking what Foucault referred to as biopolitics).^{41–43} Bioethical and neuroethical analyses cannot avoid addressing the relationships among science, ethics, and politics: science as a public good, ethics as a search for the good and the right, and politics as the participation of citizens in decisions about the guidance of public order.

As public debate over the impact(s) of enhancing interventions accelerates, the search for principled guidelines has ensued, and the discipline and key groups of scholars in neuroethics are presently involved in this effort.^{44–46} Guidelines may be expected to display continuities with older medical tenets for experimental research, advocating due caution with experimental clinical applications and emphasizing priority access for those in worse health. Should wisely conservative guidelines from the medical ethics tradition be further extended for guiding the biopolitics concerning modes of enhancement beyond “normal” health? We doubt that this simplistic extension will prove satisfactory. Irrespective of whether enhancement is regarded as a dangerous minefield or a bountiful cornucopia, the vital contexts of enhancement radically transform its biopolitical status.

For example, recall from a previous section our attention to the choice among physiology, normality, and ethical standards for identifying what counts as enhancement. Experimental medical research focusing on physiological alterations (typically) emphasizes interventions for the most unhealthy. Policy tends to approve funding for basic research if and when it could soon help those with the most severe and/or epidemiologically extensive health conditions. These prioritizations wouldn’t work in the realm of enhancement for two reasons. First, a traditional approach to funding and engaging research would tend to leave most enhancements on the theoretical drawing board. Second, although there may be desires for expensive advanced research into fundamental neurological mechanisms that can be targeted for cognitive

performance enhancement, unless these approaches can be ascribed to incur some “therapeutic” benefit against an identified disease, disorder, or (medical) condition, financial and administrative support for broad-scale research and translation of outcomes and products would tend to be lacking.

A related issue is contemporary medical endorsement of interventions that restore or sustain normality. Explicitly and implicitly, this position conforms to sociocultural requirements that all people should seek and exhibit “normal” functioning, rather than (what is regarded to be) abnormal or anti-social conduct that deviates from socially established standards. What posture should be assumed when (1) certain people seek optimal functioning in pursuit of what they personally deem as the apex of the good life, and/or (2) society sets requirements that individuals in special roles (such as physicians, pilots, peace officers, or military personnel) must attain optimal functioning?^{47,48} Medicine’s laudable work in service of living a good life isn’t automatically extendable to living a great life or to achieving great performance in a socially sanctioned service. Justifications for specialized enhancements for enabling idiosyncratic lifestyles or for extraordinary public service will not arrive from medical principles.

A second set of examples arise from our earlier discussion of the cultural variability inherent to the precise identification of cognitive improvements. Medicine’s due caution with clinical application, watching carefully for deleterious health and lifestyle side effects, typically relies on cultural consensus about what constitutes “normal” performance in daily life.⁴⁹ Those seeking significant enhancements, by contrast, won’t be interested in conforming to cultural norms about ordinary performance, and medicine may not be able to restrain them. When the recipient of an enhancement is achieving extraordinary performance levels and feeling empowered to transgress cultural expectations in the name of greatness (despite the risks), what social institution or cultural tradition can and will restrain such pursuits?

Evidently, society turns to law for these proscriptions. Here, it becomes necessary to ask how restrictions of and prohibitions against certain types and extents of enhancement will be determined. Targeting neurological modifications for legal action (i.e., imitating the criminalization of psychedelic drugs and un- or inaptly prescribed AAS or bans against performance-enhancing substances for professional athletes) has the merit of objective verification. But this only spurs those seeking improved types of cognitive performance to find alternative physiological methods not yet banned or detectable, and the chase is begun anew.

Legal bans could instead prohibit specific kinds of “cognitive enhancement” as excessively abnormal, no matter the neurological method involved. Here, the objectivity inherent to medical classifications of diseases and disabilities fades away entirely. Could there realistically be a legal ban against,

say, excessive speeds of logical inference? This would necessitate some form of baseline assessment against which to measure change in cognitive task performance. Absent this methodological rigor, enhanced performers could simply retort that any improvement they've undergone merely represents an ability to keep many things in mind simultaneously, which can be conflated with near-instantaneous inference speed. Given the legal standard to assume innocence, it would need to be demonstrated beyond reasonable doubt that any such cognitive performance is the result of some (banned form of) intervention. Although this might be possible, it then opens up a proverbial can of worms in its reliance on neuroimaging and other types of neurological assessments to define and/or predict "normality" and "abnormality" in ways that would be admissible under the law.^{50,51}

Blanket bans on every form of cognitive processing relevant to superior intelligence, at least the forms confirmable by neuroimaging, could temporarily work within a culture sharing common (albeit conventional) views on labeling what being "smart" entails. But we question the effectiveness of this approach. After all, how well have operational definitions of "intelligence" worked thus far? Conventional views, and hence any laws relying on them, are limited, biased, and fragile. They do not translate across cultures or even subcultures with any exactitude, and they thereby limit applicability. Moreover, they will not translate well into the future as neuroscientific findings reveal how conventional categories for intellectual subprocesses only perpetuate folk psychology or embody traditional prejudices, thereby proving to be little more than myth. Future neurotechnologically enhanced intellects could regard legal bans against "dangerous" cognitive improvements to be humorously irrelevant or socially biased (if not marginalizing and subjugating). We must ask: what is the final goal or end on this horizon of possibility? We believe that neither neuroethics, neuropolicy, nor neurolaw can—or will—provide any quick and easy answers. But then, we promised that a contextual neuroethics won't be about applying top-down guidelines from any traditional ethos or ethical system.

Policy Priorities and the Role of Neuroethics

Frustration over excessive contextualization is a perennial complaint. Simplifying matters can seem attractive when modest advances require prompt address and short-term priorities are within reach. Simplification would be possible if "enhancement" just satisfied pragmatically defined scientific and ethical criteria. That way, any continued debate would be centered on those improvements that were already deemed to be fairly good for people in general, so far as could be scientifically and ethically determined. But matters shouldn't be too simplified, of course. Warnings are certainly in order that

current enhancement interventions rarely prove to be wholly effective or without deleterious effects. Unsurprisingly, there is wide agreement among the scientific, ethics, and policy communities that enhancing interventions shouldn't be counterproductive or harmful to overall health. Couldn't the practical route, bypassing those contextual complexities raised in previous sections, maintain scientific focus on whatever looks to be safe and effective for individuals?

We claim that practical risk–benefit analyses are insufficient. Detailed ethical scrutiny is required before any such practical improvements can be classified as good enhancers. It is wise to demand that putatively enhancing interventions do not diminish self-control or autonomy, degrade personal growth or self-worth, or diminish life-management and social skills.^{52,53} These demands of ethics can be reasonably placed on envisioned enhancements, even if they aren't so stringently applied to proven medical therapies. Improvements toward health are usually consistent with personal empowerment, and the consequences of restoring expected functioning are largely understood. By contrast, the longer term effects of experimental enhancements, especially cognitive enhancements, on the psychological self and internal self-conceptions and motivations are among the least predictable and least understood aspects of this issue. Ethics is rightly concerned about the vital capacities for autonomy, dignity, and morality. All the same, as we have noted, setting high standards for enhancing interventions need not cast dark suspicions on the persistent search for enhancements. A number of scholars have advocated practical and ethical standards while endorsing the pursuit of enhancement.^{38,53–58} In short, the goal is to develop helpful interventions that are able to meet these high standards.

If such normative thresholds are maintained, public and regulatory approval could be a helpfully expedited matter. But approval may not be automatic. Labeling an intervention as an “enhancement” once it makes some individual lives demonstrably better can't be the final hurdle before regulatory approval. An additional major factor that cannot be omitted is the wider public context. We believe that this is where the broadest and deepest deliberations over the wisdom of enhancement should occur. We are forced to ponder what shall be done when sound public priorities cannot automatically approve genuinely ethical enhancements. Policy principles should be well-informed, ethical, and just. When some reliable enhancements are deemed safe and effective, and seem capable of promoting the good life, then why wouldn't they be approved through policy and law? Here, it is important to appreciate that sincere advocacy of genuine individual enhancers could still be underinformed, potentially unethical, and possibly unjust. In those cases, public judgment should lean against approval.

From this position, due regard for the broader contexts of enhancement cannot be avoided. Ascertaining when some improved capacity is actually an enhancement must undergo closer examination. The determination that something is an enhancement involves knowing what a “good life” generally looks

like. Perhaps, as musician Louis Armstrong said of jazz, it's intuitive: one just knows it when one sees it. All the same, not everything "jazzy" is jazz,⁵⁹ and even intuitions have origins and contexts. Let's say that an author is writing about the use of neurological enhancement to achieve the "good life." What would a claim about enhancement for the "good life" specifically mean? Four primary meanings might be intended:

1. When individual P receives an enhancement for the good life, that "good life" is P's own conception of the good life. This is an appeal to what can be labeled as *personally subjective enhancement*.
2. When individual P receives an enhancement for the good life, that "good life" is what P's society generally regards as the good life. This appeals to what can be labeled as *locally relativist enhancement*.
3. When individual P receives an enhancement for the good life, that "good life" is what the author and that author's readers typically regard as the good life. This makes an appeal to what could be called *socially conventional enhancement*.
4. When individual P receives an enhancement for the good life, that "good life" is what the objectively correct ethical theory sets as the good life. This is an appeal to what can be called *objectively ethical enhancement*.

Someone writing about the "good life" might intend a subjective conception of the good life, but an author offering broadly applicable ethical or policy principles would avoid subjectivism, as well as local relativism. Unless an author explicitly takes one ethical standpoint to be most valid, the default position thus falls to the "socially conventional" level. Norms about the good life can indeed seem so conventional within one's own society that they needn't even be mentioned, much less explicitly defended or philosophically grounded.

Defining enhancers as improvements toward "the good life" may essentially amount to this:

Some capacity is enhanced if it is improved relative to its prior level of functioning such that it increases the individual's chances of leading what Our Society rightly regards as a good life.

We already see how an enhancement could be underinformed, potentially unethical, and possibly unjust. Putting these two matters together, we get:

An enhancement according to Our Social Standards may be something that well-informed, ethical, and just policy couldn't approve.

This viewpoint encapsulates our point that a modification deemed to be an improvement according to local expectations could prove to be unacceptable by higher level principles of crucial importance to any public.

Understanding this viewpoint requires appreciating how two issues must remain distinct. First, it must be determined whether and in what ways a modification is a genuine enhancer. Second, it must be questioned whether a genuine enhancer will be something that sound policy can approve. The criteria by which an enhancement is deemed conducive for the “good life” cannot be the same criteria that are applied for deciding whether it should be approved. It must be possible, in the open space of public deliberation, that wise policy can proscribe or prevent something that the public presently understands to be reliably conducive to the “good life.”

Herein we avoid assumptions that knowing what is conducive to the good life for each person constitutes knowing what is ethical and wise. We also avoid the position that knowledge about what is conducive to the “good life” for everyone constitutes knowing what is ethical and wise. Rather, we posit an alternative stance. We argue that (1) well-informed policy would use more information than just the scientific facts about a performance enhancer promoting the “good life,” (2) ethical policy would use other ethical criteria beside simple promotion of the “good life” (individually or collectively), and (3) just policy may prefer a stable and well-ordered society that isn’t advancing the individual or collective “good life” quite as quickly as could be technologically possible (or imagined by technophiles).

Gazing down the tougher route we propose, eager advocates of enhancement might ask why objective scientific facts couldn’t lead the way, especially when cognitive enhancement seems so modest, practical, and generically useful? At face value, this supports two possible roles for science:

1. *Weak role*: Ethical questions can be better pondered with relevant scientific information kept in mind during deliberations.
2. *Strong role*: Knowing just the right scientific facts can often be sufficient for deciding many tough ethical questions.

If an enhancement advocate prefers the stronger option, that strong role for science can alleviate frustrations over excessive contextualization, and it meshes well with the simplified meta-ethical positions mentioned already and listed again for convenience:

1. Only a normative standard set by an ethical theory about the good life will serve to determine “enhancement.”
2. When individual receives an enhancement for the “good life,” that “good life” is what the advocates and their audience generally regard as the good life.

3. Only when something typically is promoting the “good life” can policy be truly informed and ethical.
4. Knowing just the right scientific facts can often be sufficient for deciding many tough ethical questions.

Converging these positions yields:

A sound policy decision will always approve what, in light of ascertainable scientific facts, can be expected to be an enhancement to an individual that is conducive to what “our society” regards as the “good life.”

Whether this viewpoint, so contrary to ours, is the actual view of any bio-ethicist or neuroethicist or just a caricature for academic target practice, we cannot really say because few scholars have explicated their meta-ethical presumptions. We do say, however, that this stance does not seem adequate to meet the urgent complexities and contextualities inherent to authentic human life as we all must actually live it. However scientifically objective it may appear, in fact, there is little that is genuinely neuroethical embedded in it.

Our call for an embellished neuroethics needs to be put into some context. Sarewitz and Karas⁶⁰ outline several different approaches that can be adopted in order to make choices and decisions about cognitive enhancement technologies. Among those approaches, ours aligns with the “optimistic” approach via engagement of a managed technological optimism that best represents our position as relevant to ethical decision-making processes and public policies in this field. We endorse continued research into cognitive performance enhancements. We also call for the need to optimize definitions of any and all concepts and terms and to equally define the contexts in which any cognitive task optimization can or would occur. Only from that point can one be optimistic that progressive, nonstatic concepts of the human and human function will be realistically entertained and enhanced, both practically and ethically. This position takes a pluralistic, democratic approach toward options of emergent (rather than merely proscriptive) governance, and this final section points to ways that neuroethics can play a supportive role.

A contextualized neuroethical outlook allows for better informed approaches utilizing all relevant interdisciplinary input in considering what therapies and enhancements could be. It permits neuroethical deliberation to rise above local conventionality and a single social ethos, to instead survey the rich cultural diversity of human self-understandings and dynamic cognitive capacities.^{7,34,35,61,62} Neither ethics nor politics is debilitated from acknowledging that diversity. And, it encourages neuroethics to caution against destabilizing and unjust procedures in policy debates that rashly extend medical models beyond the sphere of their proper functioning.

Plurality doesn't leave us abandoned with relativity or subjectivity; the normative default cannot be laissez-faire individuality. Sound policy decisions for pluralistic societies won't rashly approve whatever appears to be scientifically ascertained enhancements without extensive public deliberations about human welfare and social justice. Neuroethics should play a truly informative role in that public arena.

In its naturalistic basis, this contextually enhanced neuroethics establishes grounds to view the human as engaging biology (through intellectual and physical tools) to optimize survival and flourishing in changing ecologies. And in its appreciation for the human as a bio-psychosocial organism, it engenders an interdisciplinary approach (conjoining anthropology, sociology, economics, and political science) to depict and address ethical issues within the contexts in which human activities are conducted. Thus, in the spirit of cognitive enhancement itself, neuroethics as a discipline—and in its methods, approaches, and practices—should embody and enable greater human self-understanding and improve our public deliberations over the many dimensions of life that we all treasure.

Acknowledgments

This work was supported in part by the William H. and Ruth Crane Schaefer Endowment (JG) and through funding from the Pellegrino Center for Clinical Bioethics, Georgetown University Medical Center (JG). An earlier, abbreviated version of this material, "Cognitive Enhancement Kept Within Contexts," was previously published in *Frontiers in Systems Neuroscience* 8 (5 December 2014): article 228. We are grateful to Lucia Galvagni at the Bruno Kessler Foundation in Trento, Italy, for her helpful contribution to this chapter.

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