cognitive enhancement

Ethical and Policy Implications in International Perspectives

Edited by
Fabrice Jotterand and
Veljko Dubljević

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Cognitive Enhancement

1

Introduction

FABRICE JOTTERAND AND VELJKO DUBLJEVIĆ

> Many of the cognitive enhancement drugs serve to increase focus and concentration. But "letting your mind wander" is very often an important part of the creative process.
> —Jamais Cascio

The development of novel technologies that could potentially enhance human cognitive capacities (either through psychopharmacological means, neurotechnologies, or a combination of the two modalities) has generated, in the past decade, many heated debates concerning a set of issues mostly focusing on conceptual, philosophical, and ethical matters. However, as these technologies are reaching the marketplace, few proposals have been put forward to regulate their nonclinical use. Although there is a growing body of work in neuroethics addressing issues associated with cognitive neuroenhancement for healthy adults, discussions on concrete policy proposals and detailed analyses of regulatory frameworks for cognitive enhancement technologies are scarce. Furthermore, debates tend to rely solely on data from the United States or English-speaking countries, whereas international perspectives are mostly neglected. Recognizing the necessity to address these gaps in the literature and to provide the most up to date analysis, we invited scholars from various disciplines, with different expertise and national identities, to reflect on issues pertaining to cognitive enhancement around the following three questions: (1) What are the conceptual implications stemming from different points of view about the nature and goals of cognitive enhancement? (2) How different are the ethical, social, and legal perspectives in various countries from Africa, Asia, Australia, Europe, North America, and South America? And (3) what are the legal and regulatory frameworks, if any, set by these countries that reflect their sociopolitical and ethical values?

This volume is built around these three framing questions and offers a unique collection of essays from a multidisciplinary and international perspective. Unlike other volumes on enhancement that focus almost exclusively on

discussions concerning abstract conceptual positions, this volume emphasizes a pragmatic approach for examining and potentially solving social problems. Specifically, we structured the volume into three main sections that include conceptual implications, contextual analysis, and legal and regulatory options. The first part, entitled "Conceptual Implications," gathers essays that address important questions related to the nature of the philosophical claims used in the enhancement debate, issues pertaining to the meaning of moral agency, particular assumptions about human abilities and social expectations, and the need for a better consideration of the specific contexts in which the enhancement debate takes place. The second part, "International Perspectives," examines the role of cultural values and national political systems in shaping public attitudes and the justification of national policies. Essays include analyses from the various national contexts of South Africa, Taiwan, Israel, Australia, Germany, the Netherlands, Canada, and Chile. The third and final part of the volume, "Law and Policy Options," builds on the examinations of the national contexts provided in Part 2 but addresses questions pertaining to the regulation of cognitive enhancement technologies. Contributors investigate a broad set of issues that comprise the regulatory framework for the use of enhancement drugs (e.g., Modafinil), market considerations, constitutional and legal concerns about the freedom to use enhancement in the United States, and the use of cognitive enhancers in the judicial system to improve the cognition of judges.

Conceptual Implications

The implementation of cognitive enhancement technologies in the social context is not without its set of conceptual problems. These neurotechnologies not only raise issues about their appropriate application, but also call into question formerly accepted conceptualizations of human agency and social expectations. The chapters in Part 1 provide a rich analysis that aims at describing key elements of this questioning intended to further foster a robust debate over cognitive enhancement within academic circles but also in the public sphere. In the first chapter of Part 1 ("Toward a More Banal Neuroethics"), Neil Levy examines the notion of ambivalence developed in the critical work of Erik Parens with regard to attitudes toward the enhancement project. Levy contends that some clarification is needed concerning pessimist and optimist attitudes over the possibility of enhancement. Contra Parens, who argues that ambivalence is the right response in reflections regarding enhancement, Levy considers ambivalence as a deterrent for well-reasoned deliberations in neuroethics. His analysis is based on the most recent experimental work on cognitive dissonance regarding the susceptibility of people to confabulation

in moral reasoning. In Levy's words, "given the extensive evidence, from a very large number and variety of experiments, for confabulation of reasons, it is extremely likely that people sometimes confabulate moral reasons" (Levy, p. 4). In the light of these considerations, he suggests removing those elements (excitement, emotional responses, etc.) in neuroethics debates that could trigger ambivalence and, subsequently, confabulations. So doing, he argues, opens more ample space in which well-grounded arguments for and against enhancement can be advanced.

In the second chapter ("Why Less Praise for Enhanced Performance?"), Filippo Santoni di Sio, Nadira Faulmueller, Julian Savulescu, and Nicole Vincent analyze whether appeals to responsibility-shifting, authenticity, or cheating arguments support the widely held moral intuition that less praise is due to enhanced agents. They first present original empirical data that show a connection between the *less praise intuition* and the public's negative attitude toward pharmacological performance enhancement. After referring to examples from performance enhancement in sport and professional contexts to demonstrate that the usual arguments for it are lacking, they develop a novel justification for the less praise intuition. On their account, praise is diminished by the presence of enhancers because enhancement may change the nature of activities in which actors are involved. As they point out "this . . . nature-of-activities justification . . . allows us to capture the true concerns that lurk beneath the other three justifications [responsibility-shifting, authenticity, cheating] while avoiding their drawbacks" (Santoni di Sio et al., p 9).

Next, Fabrice Jotterand in his chapter ("Moral Enhancement, Neuroessentialism, and Moral Content") critically examines the conceptualization of morality by some proponents of moral bioenhancement, which he argues requires particular epistemological commitments and neuroessentialist assumptions. Although he recognizes that currently there is no evidence that supports "the science of moral bioenhancement," he notes that it is important to distinguish between hype, hope, and reality in the enhancement debate because some techniques might provide options to address moral pathologies in psychiatric disorders (e.g., psychopathy). In his analysis, he shows why neuroessentialist assumptions are problematic for the development of a sophisticated framework of morality at the intersection of neuroscience and moral philosophy. Jotterand underscores two potential dangers: first, such account does not take into consideration the complexities of human morality; second, it misconceptualizes morality by placing an overemphasis on neurobiology and exhibiting a lack of consideration of how conceptions of the good and the just contribute to one's moral identity.

In the fourth contribution ("Cognitive/Neuroenhancement Through an Ability Studies Lens"), Gregor Wolbring and Lucy Diep analyze ability expectations and ableism as the basis of social preferences. They assert that the

discourse on cognitive enhancement can be seen as a manifestation of societal focus on certain abilities, and they propose scrutinizing the debate through an ability studies lens. In this context, Wolbring and Diep sketch how legal, ethical, biological, cultural, and social constructions are exhibiting ability expectations and how such ability expectations and the actions they trigger lead to an ability-based and -justified understanding of self, body, and the relationship with conspecifics, other species, and the environment.

In the final chapter of this section ("Defining Contexts of Cognitive (Performance) Enhancements: Neuroethical Considerations and Implications for Policy"), John R. Shook, and James Giordano contend that the standards framing the enhancement debates are context-dependent; therefore, neuroethical discourse ought to consider the key sociocultural elements that shape examinations of the use of cognitive performance enhancers. They suggest a contextualization of the debate over cognitive enhancement within the broader context of biopolitics, in national and international milieus, and call for an interdisciplinary approach to neuroethical reflections that will inform and enrich public debates. They believe that a contextual approach would provide a richer neuroethical discourse because it specifically incorporates particular values intrinsic to social contexts, and they define the nature of neuroscientific and neurotechnologic interventions.

International Perspectives

In the last chapter of Part 1, Shook, and Giordano stress the importance of taking into account the specific contexts in which neuroethical discourse occurs. To this end, Part 2 of the volume specifically looks at the international dimension of the discourse on cognitive enhancement and provides discussions on normative issues and cultural values along with analyses of available empirical data on public attitudes on cognitive enhancement and prevalence specific to certain countries or linguistic and cultural regions. The range of issues addressed in this section offers useful resources for comparative research and policy analysis to both the academic community and policymakers. Furthermore, the data presented from various national contexts will enrich the public debate on cognitive enhancement, which up until now tended to rely solely on data published in English. In the first contribution to this section ("Cognitive Enhancement in South Africa"), Dan Stein provides a perspective from South Africa and points out that the majority of the literature has focused on Western, educated, industrialized, rich, and democratic (WEIRD) regions. Paradoxically, 90% of the work is being done on only 10% of the global population. For this reason, he considers the issue of cognitive enhancement in low-middle income countries such as South Africa, emphasizing issues such

as the lack of relevant data on psychotropics and even older mind-altering substances (e.g., alcohol) in these parts of the globe. Stein compellingly argues that it is important for neuroethics to be an international field that emphasizes the cross-cultural applicability of its findings, which ultimately contribute to global mental health.

Kevin Chien-Chang Wu ("Cognitive Enhancement: A Confucian Perspective from Taiwan") offers a perspective from Taiwan, particularly from a Confucian standpoint. In order to discuss cognitive enhancement from a Confucian perspective, Wu argues that another interpretation of enhancement is necessary because, in Confucian thought, the distinction between enhancement and therapy is not a major concern. Crucial to a Confucian understanding of enhancement is the concept of self-cultivation (*xio shen*), which is an important way to enhance virtues. Although Wu recognizes that there is a potential tension between cognitive enhancement technologies and Confucian values, he points out that a close look at the Confucian views on human nature, self-cultivation, and harmony provides an ethical framework for cognitive enhancement. Wu concludes that "when neurotechnology could be used for self-cultivation in ways harmonious with humanity and nature, Confucians will see no reasons why cognitive enhancement should be prohibited" (Wu, p. 4). This chapter also provides an interesting analysis of a survey in Taiwan regarding public perceptions and acceptability of cognitive enhancement.

In the next contribution ("Enhancing Cognition in the 'Brain Nation'"), Hillel Braude analyzes the ethical landscape of research in cognitive enhancement technologies in the Israeli context and the specific political and ideological views that define Israel as a "Brain Nation." Cognitive enhancement technologies (especially brain–machine interfaces and neurostimulation devices) are considered a vital means of national renewal in Israel in terms of research and economic development (as a matter of fact, a number of companies in Israel already offer innovative cognitive enhancements). Braude also analyzes the different strategies for cognitive improvement followed by psychological and neuroscientific researchers and the level of neuroethics reflection among researchers, clinicians, and the public at large. Overall, he concludes that there is a lack of support for robust examinations of the ethical implications of emerging neuroenhancement technologies in Israel.

Charmaine Jensen, Brad Partridge, Cynthia Forlini, Wayne Hall, and Jayne Lucke ("Cognitive Enhancement Down-Under: An Australian Perspective") examine the Australian context in the debate on and practice of cognitive enhancement. They analyze how Australia's cultural values differ from those of countries such as the United States, where cognitive enhancement has been reported to be more prevalent and appears to be more acceptable. They also examine the available empirical data about public attitudes toward cognitive enhancement (which appear to be negative) and the prevalence of

pharmaceutical cognitive enhancement (which seems to be low) in Australia. They conclude with a discussion of Australia's relevant regulatory and legal frameworks and the impact of Australian anti-hierarchical egalitarianism on public attitudes toward the use of cognitive enhancement.

In his contribution ("Cognitive Enhancement in Germany"), Sebastian Sattler focuses on the German context. He provides an overview of social, ethical, and legal perspectives, as well as of prevalence rates concerning cognitive enhancement drug use in Germany. He notes that the legal status of cognitive enhancement drugs ("over-the-counter drugs," "drugs that are only available in pharmacies," "prescription drugs," and "illegal drugs") correlates with different views, definitions, and even terms used by the general public and different groups, such as scientists. In addition, he analyzes data on perceptions of positive and negative drug effects and provides an in-depth review of moral perspectives and their consequences for consuming behavior. He concludes by summarizing, comparing, and discussing prevalence rates of cognitive enhancement use among students and the working population, and he identifies pressing questions for future research.

In the next chapter ("Cognitive Enhancement in the Netherlands: Practices, Public Opinion, and Ethics"), Maartje Schermer offers another perspective from the European continent. She analyzes the Dutch debate on cognitive enhancement that has engaged researchers and raised some interest among the general public. She reports that the debate has mostly focused on the rising prescription use of methylphenidate (Ritalin), which has stirred some criticisms about the increasing pressure to use performance agents in Dutch society. Schermer also remarks that there has been little reliable research into actual practices of cognitive enhancement among students in the Netherlands or into public opinion regarding this subject. Nevertheless, the existing evidence of such practices seems to indicate that the rates of methylphenidate use or of other cognitive enhancers are very low among students in the Netherlands because the majority of the population appears to oppose the idea of cognitive enhancement. Perhaps surprisingly, given the rather liberal regulation of soft drugs in the Netherlands, the Dutch appear to have a conservative attitude toward enhancement and the use of drugs for enhancement purposes. Because concerns about safety seem paramount and natural means are considered somehow "better" than artificial ones, the majority view seems to be that medical drugs should not be used in the absence of disease.

Eric Racine, in his chapter ("Cognitive Enhancement in Canada: An Overview of Conceptual and Contextual Aspects, Policy Discussions, and Academic Research"), examines the cognitive enhancement debate within the Canadian context. He states that Canada ranks among the heavier prescription drug–using nations, but that the data and public discourse on the misuse or repurposing of prescription drugs for cognitive performance enhancement remains

fragmented. On the one hand, public interest indicates that Canadians are concerned by this issue. On the other hand, few attempts have been made to better understand the current Canadian situation and to respond to the challenges it raises. Racine outlines the development of discussions on drug prescription misuse in the Canadian context—within which cognitive enhancement is contextualized—and reviews some of the nation's major responses, such as academic research and public policy discussions. He concludes by focusing on stakeholder perspective research in Canada that might shed light on salient problems of international relevance.

In the final contribution of Part 2 ("Cognitive Enhancement and the Leveling of the Playing Field: The Case of Latin America"), Daniel Loewe provides a thorough descriptive and normative analysis of cognitive enhancement in Latin America. According to available data, modafinil seems to be the cognitive enhancer of choice, at least among medical students in Latin America. However, current legal frameworks are very punitive and, according to Loewe, counter to the idea of justice. After analyzing several policy options, he stipulates that a more liberal policy would be a requirement of egalitarian justice in the context of developing countries. In his view "Latin American countries, . . . should not punish students using CE [cognitive enhancement], and should seriously consider more liberal policies toward CE that promote egalitarian justice" (Loewe, p. 26).

Law and Policy Options

The third part of the volume emphasizes the pragmatic nature of legal and social norms as resources to implement in addressing social problems and benefiting the emerging global society. Whereas Part 1 examined conceptual issues and Part 2 looked at contextual matters within various national milieus, in this part, concrete and realistic cases of cognitive enhancement technologies, along with policy proposals and detailed models for implementation, are discussed. The contributions from legal experts in the United States and the European Union offer a wider range of perspective and demonstrate the wide latitude apparent in how countries regulate substances. More specifically, the diversity of legal and political systems means that policy proposals for cognitive enhancement may be inapplicable in some jurisdictions due to particular cultural values or complex regulatory regimes.

In the first chapter of this section ("Regulating Cognitive Enhancement Technologies: Policy Options and Problems"), Robert Blank examines the legal and policy facets of the cognitive enhancement debates and describes the policy options that are available to policy-makers in regulating the research, marketing, and individual use of cognitive enhancement technologies. Specifically,

Blank points out that whereas cognitive enhancement raises distinctive issues, its regulation is very similar to other areas of biomedical research. Blank outlines three policy dimensions to consider with regard to cognitive enhancement. The first dimension concerns questions related to the research and development of these cognitive neurotechnologies, their funding, and public involvement in early discussions about their development and implementations. The second policy dimension centers on their use by individuals and the role of government in their regulation. The third dimension relates to what Blank calls "the aggregate consequences of widespread usage," that is, the impact on society of the widespread use of cognitive enhancers. Blank concludes with a discussion on four competing ethical frameworks (laissez-faire, managed technological optimism, managed technological pessimism, and human essentialism) that might guide public policy on cognitive enhancement drugs or devices. Ultimately, however, he stresses the importance of addressing safety, efficacy, and risk issues before these cognitive enhancement techniques are broadly used. In addition, Blank also underscores the necessity of expanding the ethical debate concerning assessment of the long-term consequences of cognitive enhancer use for society.

In the second chapter, Veljko Dubljević ("Enhancing with Modafinil: Benefiting or Harming Society?") analyzes the physiological, social, and regulatory aspects of enhancement use of the atypical stimulant drug modafinil. He argues that the use of modafinil by the public has a place on the policy agenda because empirical evidence indicates that it offers both cognitive performance maintenance and augmentation, and this fact has attracted the attention of the public. After a thorough analysis of the relevant characteristics of modafinil, he concludes that a moderately liberal, permissive regulation regime might be appropriate, but, due to possible physical and social dangers, such regulation should create financial burdens and inconveniences and insist that users be sufficiently informed.

In the next chapter ("Toward an Ethical Framework for Regulating the Market for Cognitive Enhancement Devices"), Hannah Maslen examines questions related to the emerging market for brain stimulation devices that allegedly enhance cognitive performance. Maslen argues that since these cognitive enhancement devices (CEDs) are not marketed as therapeutic devices, they are regulated according to "basic product safety standards." She observes that current regulation in the United States and European Union do not include as medical devices those brain stimulation devices intended for the enhancement of cognitive performance. The European Union's Medical Devices Directive and the U.S. Food, Drug, and Cosmetic Act only consider devices to be medical devices if their purpose is for the treatment, diagnosis, or prevention of disease—which is not the case with CEDs. However, Maslen points out that because of the potential risks associated with these devices, they should be

regulated as medical devices. The lack of a regulatory framework for CEDs should not mean a "minimal risk approach," one that allows consumers to determine what level of risks they are willing to accept. On Maslen's view, because people might attach more value to the direct benefits of a procedure, and if the effects of cognitive enhancement are higher than the side effects of treatment, then the risks versus benefits ratio is difficult to determine. Consequently, Maslen concludes that strict regulations should mandate manufacturers to provide "comprehensive, substantiated information about the effectiveness, risks, and safe use procedures associated with their device" (Maslen, p. 20).

Mark Blitz, in his contribution ("A Constitutional Right to Use Thought-Enhancing Technology"), bluntly asks the question of whether, in the United States, there is a constitutional right to cognitive enhancement. He argues that, based on the First Amendment of the Constitution, freedom of speech guarantees that Americans have the right to enhance their mental abilities. In addition, it also means that the government and officials cannot prohibit anyone from extending their natural mental capacity. But, according to Blitz, the First Amendment protects freedom *of speech*, which refers to linguistic tools such as books, conversations, or prayers. Consequently, one interpretation of the First Amendment would indicate that "when our tools of cognitive enhancement come from the more hazardous and extensively regulated realm of medical treatment," these rights and interests are not protected because of their potential unintended consequences (Blitz, p. 2). For Blitz, this is a plausible interpretation of the constitutional status of cognitive enhancers, but he challenges this perspective and offers an alternative stance. He argues that because the Supreme Court protects "an autonomy of self," a case can be made for the use of cognitive enhancers as an exercise of such autonomy. As he puts it, "the Constitution's protection of individual autonomy does not simply vanish in environments where government must closely monitor and regulate activity in the interest of health and safety. Autonomy protection instead takes a form that is compatible with such health and safety protection" (Blitz, p. 2).

In the next contribution ("Drugs, Enhancements, and Rights: Ten Points for Lawmakers to Consider"), Jan-Christoph Bublitz analyzes the issue of neurotool regulation. Bublitz underscores the fact that debates over cognitive enhancement have taken place mostly in academic settings, and, consequently, concrete steps toward the regulation of currently available neurodevices have been neglected. In other words, the transition from conceptual and speculative examination of enhancement to the development of regulatory frameworks has not occurred and, unfortunately, has not resulted in an adequate consideration of the concrete issues arising from the use of emerging neurotechnologies in the social context. To address this gap, Bublitz proposes building bridges between these various discourses by

suggesting that lawmakers should observe 10 key points to be included in any regulatory framework. These 10 points, Bublitz argues, follow general legal principles and "form the outer structure of a reasonable rights-based regulation" (Bublitz, p. 12).

In the final chapter of the third section of this volume ("Cognitive Enhancement in the Courtroom"), Jennifer Chandler and Adam Dodek consider the implications of the use of cognitive enhancers in the judicial system to improve the cognition of judges. Looking at evidence from various studies, they call attention to how the judicial decision-making process is affected by nonlegal factors and that the potential for bias in judges is similar to that in other human beings. For this reason, they argue that there are ethical and theoretical arguments to support the idea of a legal obligation to enhance the decisional capacities of individuals working in the judicial system. That said, Chandler and Dodek question whether, at present, an obligation to use cognitive enhancers has any ethical ground under codes of conduct and guidelines of judicial practice that emphasize good physical and mental health and continuing education. In their estimation, it is too early to say whether the use cognitive enhancers in the court system to improve cognition should be rendered mandatory.

Concluding Remarks

We recognize that a comprehensive account of the debate over cognitive enhancement is beyond the reach of this volume. There are many important aspects that have not been included that could have rendered this collection of essays—and the overall debate—richer and broader. Additional sociocultural, religious, and national perspectives could provide critical insights to move the debate forward, a debate often characterized by political ideologies or highly conceptualized positions. However, despite these limitations, this volume offers a rich overview by leading scholars in neuroethics of the most pressing issues related to the development and social acceptance of cognitive enhancers in various contexts outside the clinical world, such as in the marketplace and the legal system. Most contributors to this volume start from the premise that the use of neurotechnologies for nonmedical purposes is not adequately regulated in democratic societies. In order to avoid decisions based on arbitrary grounds, the enhancement debate should be viewed critically from different conceptual, normative, cultural, and regulatory perspectives. We are convinced that this volume lays out the groundwork for further analysis and a continuing dialogue between key stakeholders working to harvest the potential benefits of cognitive enhancers.

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Part 1

CONCEPTUAL IMPLICATIONS

2

Toward a More Banal Neuroethics

NEIL LEVY

The prospect of enhancing ourselves is exciting. It excites both attraction and repulsion. It opens up vistas that previously featured only in dreams: the promise that we might acquire powers that we had attributed to the gods of myth. For many people, this represents a great opportunity, or an opportunity for greatness. For many others, these same vistas are profoundly disturbing. For these people, cognitive enhancement does not promise godlike powers; rather, it threatens our humanity. For them, cognitive enhancement risks making us less, not more, than human.

Erik Parens[1] has insightfully connected these two attitudes to two impulses that have played a major role in modernist (and postmodernist, if there is any such thing[2]) thought, although for Parens the attitudes themselves, and the conflict between them, is much older, finding expression in the very first book of the Bible. These impulses can be seen in the conflicting understandings of the paradigmatically modern ideal of authenticity. Whereas what Charles Taylor[3] calls the "boosters" of modernity understand authenticity as self-creation, the knockers of modernity understand it to require being true to a pre-existing self. Both these attitudes are characteristically modern (the knockers' opposition to modernity is itself as characteristically a modern attitude as the boosters promotion of it). Noting that both attitudes are deeply modern, Parens points to what both sides share. Each is attached to the characteristically modern ideal of authenticity, albeit they understand authenticity differently. Moreover, adherents of each do not find the values and attitudes of the other either unfamiliar or entirely unattractive. Modernity boosters—who from now on I will refer to as *optimists*—operate out of what Parens calls the creativity framework, which emphasizes our obligation to transform life, whereas knockers—who from now on I will call *pessimists*—operate out of the gratitude framework, which emphasizes our obligation to be grateful for what we have been given. But although each operates out of this framework, if we are honest, we will admit that we are each quite comfortable in both, although

typically more comfortable in one than the other. Both frameworks resonate with us. The conflicts of modernity are not merely between thinkers; they are internal to each of us.

I believe that Parens is right in claiming that both frameworks resonate to some extent with each of us. Unlike Parens, however, I think they are very deeply modern attitudes; attitudes that are deeply constitutive of we moderns. Although both attitudes no doubt have premodern roots, they become central only in modernity. The optimistic impulse that leads to embracing cognitive enhancement is recognizably a descendant of Enlightenment faith in progress and rationality and, even more closely, of the celebration of technology that characterized the science of the Victorian era and the art of the Italian futurists. The suspicious attitude of the pessimists is just as recognizably a descendant of the Romantic reaction to the Enlightenment, with its celebration of nature, of tradition, and of the wisdom of the ages. Optimism and pessimism both find powerful artistic expression in the modern novel and contemporary cinema, thereby illustrating how both resonate with all of us. The utopias of the optimists and the dystopias of the pessimist find ready audiences; often the very same audience. So deeply ingrained in all of us are these conflicting attitudes that many successful films, for instance, combine both in uneasy tension. The Frankenstein myth warns against the dangers of meddling with the natural order, thereby communicating the pessimistic attitude, but it owes much of its fascination to its depiction of what might, just, be technologically possible.

Given how deeply these two attitudes resonate with we moderns, a kind of ambivalence is the predicable response to the prospect of powerful new technologies. We should expect most of us to feel strongly about technologies that seem to promise to transform us: many of us will be strongly attracted, many strongly repelled, and many—perhaps most—strongly attracted *and* repelled (depending on temperament and the extent to which we have been shaped by the conflicting myths of modernity). For Parens, these facts entail that we have an obligation to give expression to both impulses. For him, both frameworks demand equal respect, and we are required to balance both. None of us genuinely inhabits only one framework; moving between them, being ambivalent, is itself the thoughtful and authentic response.

It is, however, one thing to say that both frameworks resonate with each of us and quite another to say that each is intellectually respectable. Our attitudes are the product of a messy mix of enculturation and innate dispositions; that we have them tells us something about our history and our culture, not about their truth. To see this, we need only to note that for us contemporaries, negative implicit attitudes toward people of other races and to women and homosexuals resonate with most of us (even with women and homosexuals) at the same time that we are explicitly committed to equality regardless of race, sex,

or sexual orientation.[4] Clearly, it is false that the conflicting attitudes are each equally worthy of respect, that the thoughtful person ought to move between them, seek to balance them or to see wisdom in ambivalence. That both sides resonate with each of us does nothing to show that truth is not decisively on only one side.

Elsewhere,[5] I have suggested that what Parens calls the "gratitude framework" has empirical commitments that are false; the truth lies decisively on the creativity side (although I also believe that many of the claims that have been justified on the basis of the gratitude framework are in fact true: a false framework may sometimes lead to true claims). Neither side has a monopoly on truth in its particular claims, but one side only operates out of a justifiable framework. In this chapter, however, I want to make a different claim, one that should be acceptable to proponents of both sides (and indeed to those who think that ambivalence has its merits): the fact that we experience the conflict to which Parens points is a significant obstacle to the neuroethical assessment of new technologies. The ambivalence that these technologies trigger in us makes us especially bad at coming to a proper view of their merits and dangers. For this reason, I will suggest, we ought to avoid triggering this ambivalence rather than (as Parens suggests) embracing it.

The profound ambivalence to which Parens points is a reflexive response to the new and the unfamiliar. Once a technology comes to be widely used, in fact, both reflexively generated attitudes fade. The familiar, with its all too accustomed powers and limitations, no longer holds out the promise of a novel transformation and no longer triggers optimistic fascination. It is taken for granted, its presence is seen as natural and inevitable, and it no longer arouses pessimistic fears (think of the way that Heidegger[6] explicitly contrasts bridges with the products of "technology").

Optimism and pessimism track novelty and the unknown, not genuine transformative possibilities nor genuine dangers. Technologies become familiar and monotonous despite their genuine transformative power and despite the enormous harms they might bring (sometimes, in a single package, they bring both: the internal combustion engine has transformed our sense of space, quite literally reshaping urban environments and making international travel routine, and it has contributed very significantly to what seems likely to be catastrophic climate change, yet we feel neither the appropriate awe nor the appropriate fear at its use and ubiquity). The history of our recent responses to technology therefore warrants the following induction: any genuinely or apparently novel technology will trigger the optimistic and pessimistic attitudes, one or the other in each of us, and both in many. These reactions will be strong. And they will be unreliable.

Rather than thinking, with Parens, that because both attitudes resonate with us both ought to be respected, the induction suggests that *neither* should

be respected. We ought to set them aside, just because they are the expected responses to novelty rather than to anything specific about the technology under consideration. But a further conclusion follows, too: setting them aside will be extremely difficult because the attitudes will play a subterranean role in our attempts to assess the technologies on their merits.

Ambivalence and Cognitive Dissonance

The evidence warranting this conclusion comes from another branch of neuroethics—its theoretical branch, sometimes called the *neuroscience of ethics*,[7] as well as from allied work in the cognitive sciences. A number of researchers have argued that moral judgments are (at least sometimes) caused by the rationalization of intuitions, where an "intuition" is an immediate inclination to regard an act, an event, a process, or an artifact as good or bad in some way. Intuitions are often accompanied or even constituted by emotions: the agent may feel disgust or approval at whatever triggers the intuition. But we are typically unwilling or unable to rest content with our intuition. Human beings are reason-giving and -exchanging creatures: it is important to us that we have reasons for our judgments, and "it just seems wrong" is obviously inadequate as a reason. Moreover, as recent history makes vivid, people quite frequently have intuitions that, in retrospect, they recognize as unjustified: disgust toward homosexuals, for instance. Because we are reason-seeking creature, we automatically generate reasons to explain our intuitions and to justify them. We do so automatically and unconsciously, without introspective insight into the process and its causes. This can be shown by manipulating subjects' intuitions, thereby causing them to confabulate reasons that support a judgment that is due only to the manipulation.

Consider the enormous body of experimental work on cognitive dissonance. It has been demonstrated on dozens of occasions that subjects can relatively easily be manipulated into giving sincere reports of their reasons for judgments that are actually due to situational pressures.[8] One classic paradigm involves asking subjects to write essays in favor of views that they are unlikely antecedently to find attractive. For instance, college students might be asked to write essays supporting tuition increases at their college. Subjects who are paid a sufficient amount of money to explain, to themselves and to others, their agreement to write the essay typically will later claim that they reject the argument of their own essay. But subjects who have been paid too little to attribute the writing to a financial inducement will often express agreement with the argument they developed. Because they cannot explain their behavior by reference to the payment, they explain it instead by reference to their beliefs. They *confabulate* mental states that they antecedently lacked.

Confabulation is not merely of mental states: subjects can be induced to confabulate reasons. Delgado[9 (pp. 115–116)] elicited head movements in patients by direct stimulation of the brain with electrodes (the patients were being prepared for neurosurgery so their brains were exposed). His patients offered reasons for their movements: "I was looking for my slippers," "I was looking under the bed." Another famous example involves "split-brain" patients who have undergone a commissurotomy for intractable epilepsy. The commissurotomy leaves the two hemispheres of the brain less well connected than is normal; although this does not affect behavior under most conditions, it is possible in the laboratory to present stimuli to each hemisphere independently of the other. Confabulations have been evoked multiple times using this technique. For example, in one famous experiment, an image of a chicken claw was presented to a patient's left hemisphere while the right hemisphere was shown a picture of a snowy scene. The patient was then instructed to choose the picture from an array that matched what he had seen, using each hand. Each hemisphere controls the contralateral hand; hence, the left hand chose a picture that matched the image presented to the right hemisphere—a shovel—while the right hand picked a chicken. But language is lateralized to the left hemisphere, so the language production systems had no access to the reasons why the left hand had chosen the shovel. Asked why he had chosen these two pictures, the person confabulated a reason: "The chicken claw goes with the chicken, and you need a shovel to clean out the chicken shed."[10 (p. 90)]

There is also direct evidence for the confabulation of moral reasons, although it is worth mentioning that the direct evidence is weaker than is often thought. The example most often cited is Wheatley and Haidt's study,[11] in which posthypnotic suggestion was used to induce a feeling of disgust in participants. Those subjects in the disgust condition rated various moral transgressions as significantly worse than those in the other condition, although the transgressions were identical. One case described an action that was free of all possible wrongdoing:

> Dan is a student council representative at his school. This semester he is in charge of scheduling discussions about academic issues. He [tries to take/often picks] topics that appeal to both professors and students in order to stimulate discussion. (The words in square brackets are the variants presented to subjects: the word "often" triggered the disgust response in participants, so the alternative wording was used to avoid the response in some participants.)

Participants in the disgust condition rated Dan's action as significantly worse than controls. They misattributed the disgust they felt as a result of the posthypnotic suggestion to the action itself. This has often been cited (not least by

Haidt himself) as evidence that moral judgments may be confabulated. But, in fact, the effect size is very small: rather than causing subjects to move from judging that Dan's actions are innocent to thinking that they are wrong, the manipulation caused them to go from thinking that Dan's actions were very clearly innocent to thinking that they were clearly innocent.[12] Nevertheless, given the extensive evidence from a very large number and variety of experiments for confabulation of reasons, it is extremely likely that people sometimes confabulate moral reasons.

Ambivalence, I suggest, strongly sets the scene for confabulation of reasons. Hence, if Parens's claim that we typically will feel strong but conflicting attitudes toward new technologies is correct, it will be extremely difficult for us to come to well-considered judgments with regard to them. The lesson of more than 50 years of research on cognitive dissonance is that people find it extremely hard to tolerate internal conflict and will seek to resolve it, even at the cost of confabulating what seem transparently bad arguments. It is worth noting that bad arguments abound in the literature on bio- and neurotechnologies: when intelligent people produce bad arguments and stick to them, despite having their flaws pointed out to them, we should postulate motivated reasoning.

Consider, for a signal example, Michael Sandel's frank admission of how he came to the views he expresses in his well-known book, *The Case Against Perfection*.[13] Sandel believes that arguments against enhancement framed in the standard vocabulary of moral philosophy, the "language of autonomy, fairness, and individual rights," all fail badly. But rather than conclude that there is nothing wrong with the technologies he considers, Sandel concludes that the unease they generate in him, which causes a "moral vertigo," must be justified by the invention of terms and concepts that go beyond those standardly invoked. In particular, Sandel invokes the idea of giftedness. But the concept of giftedness, which makes central a kind of accepting gratitude as the appropriate response to the unforced gifts of nature, is either entirely arbitrary or simply false.

It is false if the claim is supposed to be that gratitude requires that we accept what we are without intervening in its unfolding. That is false, because we are only what we are as the result of constant intervention. This is true both of the species and of individual lives. As Buchanan[14] emphasizes, human beings have been shaping the species in a variety of ways for as long as there have been human beings. We engage in assortative mating, for instance: we do not procreate willy-nilly but in ways that, implicitly, we think will produce better offspring (with "better" being measured in all sorts of different ways: there are innate tendencies to mate in ways that promote what evolutionary biologists call *inclusive fitness*—roughly, the tendency to cause copies of one's genes to propagate—but there are also a variety of cultural forces that lead people

to adopt other notions of fitness). More interestingly, to my mind, cultural forces are constitutive of the kinds of animals we are. Indeed, elsewhere, I have argued that that is our (biological) nature: we are by nature cultural beings, coming into the world relatively unformed and unfinished and requiring culture to make us what we are.[15] Simply accepting what we are is not an option for us: we are not what we are except by constant intervention.

If the advice is instead that we should stop intervening any further, that we should use only the techniques and technologies that were available to our parents and no new ones, then the advice is both arbitrary and in any case fails to be action-guiding. It is arbitrary because it offers us no reason why previous applications of new technologies (the invention of writing, the distribution of cognitive labor, the coming of agriculture and the city, and so on, each of which has profoundly transformed us) were acceptable, but we must draw the line now. Why? No reason is given; certainly the slogan "because we ought to be grateful" is not a reason (not, at any rate, a reason that applies to us alone and not our ancestors). Furthermore, it is extremely unclear that we *can* follow the advice. Modernity is characterized by constant changes; so much so that it is far from clear that we can remain the same utilizing only the technologies available to our parents. We are instead very likely in the situation of the characters in Lampedusa's novel *The Leopard*: if we want to stay the same, we're going to have to change.[16 (p. 29)] Accepting what we have is no more open to us than it is open to the surfer to accept the wave: if we do not actively ride it, we will plunge into the water.

Earlier, I focused on Sandel's claims, but I might easily have picked any of the bioconservatives. For all of them, slogans tend to replace reasoned claims at critical junctures in their arguments against enhancement. As Buchanan says, these writers "continue, in the face of articulate, fair, and powerful criticism, to deploy grand-sounding, but deeply ambiguous catchphrases and slogans at the heart of their views, and never take the trouble to try to translate them into sound arguments."[14 (p. 3)] These writers continually appeal to the fact that enhancement technologies may lead to inequalities or may express parents' intentional wishes to shape their children, entirely ignoring the fact that this is as much true of private schooling or piano lessons as the use of methylphenidate or transcranial direct current stimulation, or they appeal to the alleged wisdom of evolutionary biology without any awareness of its messy details, the compromises it entails and costs we bear. Finally, and pervasively, they appeal to what is natural, overlooking the fact that *if* it is possible to define what is natural in a way that is sufficiently clear to place some things on one side and others on the other, then many things we ought not to accept will be on the natural side of the division. If anything is an interference in nature, then the use of antibiotics is; by itself, that shows the folly of appealing to nature when making ethical distinctions.

The situation that Buchanan apparently finds puzzling, in which "some of the most prominent figures in the debate persistently substitute high-sounding rhetoric for reasoning,"[14 (p. 2)] is, I suggest, an expected consequence of the fact that apparently genuinely novel technologies will arouse cognitive dissonance in us, thus setting the stage for confabulation. Dissonance creates conditions in which people are anxious, and their thresholds for accepting claims that assuage that anxiety drop considerably. As a result, dissonance will probably greatly increase the power of motivated reasoning, which is always a threat to rationality. Motivated reasoning, which has been experimentally demonstrated multiple times,[17] leads us to accept uncritically those claims that we find satisfying. It is hard to explain how intelligent people could allow themselves to substitute rhetoric for argument without postulating a heavy dose of motivated reasoning in their own assessment of their claims.

I have concentrated on the defects of arguments against enhancement, but my claim that ambivalence sets the scene for confabulation entails that motivated argumentation will appear on both sides of the debate. Although it appears to me that the faults on the pessimistic side are more egregious (an assessment that, it ought to be conceded, might itself be motivated), it is not difficult to find examples of bad arguments on the optimistic side as well. Optimists seem to me guilty of two common faults. The first is a simplistic focus on the rights of individuals alone, to the exclusion of anything else, and in particular a neglect of how individuals have their preferences and values shaped by social circumstances. Because our preferences, our very identities, are so pervasively shaped by social circumstances, the widespread adoption of any technology can be expected to alter us in ways that are hard to predict. This entails, in turn, that questions concerning the adoption of technologies are never just questions about individuals and their rights. The second fault of which optimists are guilty, it seems to me, is (ironically enough) itself a kind of conservativism. A common argument in favor of a laissez-faire approach to cognitive enhancement turns on the point, made earlier, that there seems to be no principled difference between the new technologies and many older ones. My claim that new technologies arouse ambivalence in us that subsides once the technology becomes familiar predicts that people will respond to the two quite differently since no special anxiety will be invoked by the familiar. Unsurprisingly, then, the analogy between the old and the new leads optimists to think that the new technology is acceptable. That is a conservative conclusion, insofar as it takes the familiar as acceptable just because it is familiar, without examining its genuine merits and demerits. If, as I claim, the novel arouses ambivalence and makes us search for ways of assuaging it, it is unsurprising that optimists too readily accept the merits of the familiar just because doing so allows them readily to settle on a position with regard to cognitive enhancement.

The Way Forward

Parens argues that the appropriate position with regard to enhancements is to accept and embrace our ambivalence. I think just the opposite is true: if we are to come to well-justified assessments of the value of particular uses of particular enhancements, we must take steps to avoid triggering it. The ambivalence that these new technologies provoke in us is the result of strong and conflicting feelings, of attraction and revulsion; this state is uncomfortable and sets the stage for mechanisms that reduce our dissonance by confabulation. Ambivalence causes us to accept weak arguments uncritically or to accept the replacement of arguments with slogans and rhetoric: "its against nature," "it expresses a desire for mastery," "it is playing god," and so on, on the one hand, and "we already allow similar interventions" or "we each have a right to choose for ourselves," on the other.

How can we avoid triggering this ambivalence? It is far from easy. I have claimed that the apparent novelty of cognitive enhancements can be expected to lead to its triggering all by itself. One thing we can do is avoid focusing on the apparent novelty. We can avoid the hype. In discussing cognitive enhancements, we (I certainly include myself in this) tend to attribute to existing interventions powers greatly beyond those they actually have or to bypass discussions of actual enhancements in favor of idealized and extremely powerful technologies. Although discussions of what might one day be possible and even of technologies that probably will never exist have a value (because these kinds of discussions allow us to explore the boundaries of our concepts in ways that abstract from the messiness of real life), it may be that these discussions have set the tone for a polarized and unsophisticated debate because the focus has been on technologies at their most unfamiliar and therefore their most anxiety-provoking. Even when we focus on the existing technologies, a concentration on their technical details may have a similar effect on debates. If we avoid hyping the technologies, we may be able to assess them with less ambivalence and, correspondingly, less anxiety, and the standards of our arguments may rise.

We can avoid the hype by following the lead of the optimists, at least part way, and focusing on the ways in which the new technologies resemble older and much more familiar technologies. Consider the use of propranolol for memory alteration and anxiety reduction. Perhaps propranolol is more powerful than older drugs, but drugs with memory and anxiety dampening effects have been around for literally thousands of years: the best known and most widely consumed is, of course, alcohol. Is propranolol all that different from alcohol in relevant ways? Quite clearly it is *far* safer than alcohol: David Nutt[18] has pointed out that were alcohol to be invented today, it is extremely unlikely

it would be made legally available; due to its sheer familiarity, it is available at every corner shop while far safer recreational drugs are banned. However, there are risks involved with overreliance on comparisons between familiar technologies and newer ones, as the ironic conservatism of the optimists illustrates: we avoid hype, but too often at the cost of taking the familiar technology as less worrisome than we should just because it is familiar. When appropriate analogies are available (as I believe they almost always are[19]), new technologies ought to be compared to them in a way that brings out not only the similarities between the new technology and the old, but also attends to the costs of each (so a new drug might best be described as "like alcohol, but with lower addictive and abuse potential, negligible risk of mouth or liver cancer, and no risk of provoking violence"; where possible, risks ought to be quantified).

It might sometimes be better still to avoid the analogies altogether and focus on the effects alone. Thus, a new technique might be assessed on the basis only of its functionally described aspects, especially its effects (an intervention that increases fluid intelligence by 0.01%). One problem with this kind of description is that we are notoriously bad at properly assessing probabilistic claims and may give excessive weight to extremely small risks due to this fact. Analogizing avoids this particular problem: a serious adverse event rate of 12 in 10,000 may be a lot more frightening than a serious adverse event rate equivalent to that of daily aspirin.

It should be acknowledged that these methods of rendering cognitive enhancements banal might run the risk of also rendering genuinely ethically relevant considerations invisible. At first glance, the suggestion may beg the question in favor of consequentialism by highlighting only effects. This would be a mistake: there is nothing in the proposed description that should leave deontologists unable to assess rights violations. Nevertheless, there are other perspectives that might be occluded. For some ethicists, means matter (somewhat) independently of their consequences;[20] describing an enhancement without describing the specific means may leave them unable to mount their cases. To some extent, we can avoid the problem without departing from the level of functional analysis. In the philosophy of mind, the functional description of mental states includes not only their outputs but also their inputs; similarly, in describing a cognitive enhancer, we might describe, functionally, the way in which it produces its effects. This description carries risks of its own ("altering brain function by a pharmacological mechanism" will cause quite different responses in readers than "getting tipsy") and might not fully solve the problem. The other possible solution might consist in ensuring that rich descriptions of means follow an assessment that analogizes the new technique to something much more familiar and describes it functionally. Once we have settled convictions arising from the functional description of the technology,

it might be time to reintroduce the means to see whether it has features that ought to cause us to alter those convictions.

None of these suggestions is problem free. For instance, the suggestion that consideration of the details of the means (where those details are independent of what may be captured in a functional description) should follow the functional assessment still leaves the proponent of the view that means matter morally at a disadvantage given the amply documented evidence for *order effects*, which entail that considerations introduced earlier shape our reception of those arising later. We ought not to expect perfection, here or elsewhere. My suggestion is that the judgments to which we will come if we take steps to avoid triggering our ambivalence will be less hysterical and better grounded than those to which we tend to come today. I do not suggest that they will be ideal, nor even that we won't make mistakes that we might have avoided had we not taken these steps. My claim is only that, on average, we will make fewer and smaller mistakes than otherwise.

Finally, it is worth emphasizing that I do not expect to convince everyone, and that may not be a bad thing. A variety of thinkers assessing technologies from a variety of perspectives may be a good thing in itself, so the continuing existence of people who reject my claims may actually aid our overall capacity to come to reasoned judgments about the permissibility of new technologies (see Sunstein[21] for evidence on how groups of deliberators with opposing perspectives may outperform individuals). It is worth noting that the literature on motivated reasoning indicates that although we are bad at assessing claims that we have a motivation to accept, we are very good at identifying problems with arguments we are motivated to reject.[22] If nothing else, the existence of people who come to conclusions different from those that they might have reached through the proposed banalization of neuroethics may help us identify flaws in the arguments of those I convince.

Conclusion

I have argued, contra Parens, that ambivalence is an obstacle for reasoned reflection in neuroethics, not the conclusion to which we ought to come. Ambivalence is uncomfortable; because it is so easily triggered by new technologies (and here I am in agreement with Parens), it sets the stage for confabulation and the tendency to rest content with arguments that allow us to resolve it, independently of their actual value. I suggest that we ought, where possible, to avoid the ambivalence that Parens celebrates. Doing so is, I concede, not easy. Moreover, it is very likely that any strategies we utilize to avoid triggering ambivalence will have costs of their own: they will bias deliberation

in other ways. Nevertheless, I have suggested, the bias is likely to be smaller than is currently the case and our assessment correspondingly better justified.

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3

Why Less Praise for Enhanced Performance?

Moving Beyond Responsibility-Shifting, Authenticity, and Cheating Toward a Nature-of-Activities Approach

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Introduction

Good performance often attracts praise. But suppose that Llana improves her performance on a Latin language test by using modafinil or transcranial direct current stimulation (tDCS) to enhance her ability to memorize new words (e.g., see Gilleena et al.[1]; or Meinzer et al.[2]). Would Llana be due less praise than if she had obtained the same grade but without cognitive enhancement?

Those who endorse the *less praise intuition* (LPI)—for instance, lay people in our own and in others' studies—might appeal to responsibility-shifting, authenticity, or cheating arguments to support the intuition that less praise is indeed due to people like Llana. However, we draw on examples from performance enhancement in sport and professional contexts to demonstrate that these arguments leave something out, and then we develop a better justification for LPI. On our account, praise is diminished not because it is shifted to someone else, because it is due to an inauthentic self, or because an otherwise good performance is blemished by cheating, but because enhanced actors engage in very different activities; because of this, we need different yardsticks to assess their performance.

This chapter offers a novel perspective on the issue of praise in the presence of cognitive enhancement,[i] but it also presents an outline of a methodology for ethical reflection on performance enhancement more generally.[ii]

LPI and the Negative View of Enhancement: Empirical Data

Based on previous research (e.g., Caviola et al.[6], Faber et al.[7], Faulmüller et al.[8], Schelle et al.[9]), we thought it likely that LPI may be fueled by the public's negative attitude toward pharmacological performance enhancement. In contrast to previous studies that presented hypothetical scenarios to the participants (e.g., Scheske and Schnall[10]) or subtly alerted participants to possible concerns (e.g., Forlini and Racine[11]), we wanted to investigate which concerns over the use of enhancement lay people raise (1) given the actual current status of enhancement in society (i.e., its current medical development, social distribution and acceptance, existing legislation, etc.) and (2) without being prompted to any specific concern in advance.

To this end, we conducted a survey in a controlled laboratory setting that included 102 university science students (72 female, 30 male) with a mean age of 22.7 years. Our questionnaire contained a neutrally phrased description of pharmacological enhancement, which stated that some medical substances that were initially developed to treat disease can also improve performance in healthy individuals. To avoid raising concerns that may otherwise not have occurred to our participants, we stated our questions in as indirect and neutral a manner as possible: "In what kind of situations should healthy people take performance-improving substances, if any? If they should not take them, please explain why."

Participants were handed the questionnaire and were asked to write down their responses. To ensure coding reliability, participants' written answers were coded by two trained independent coders and then analyzed using a content analysis technique that arranged answers into clusters of similar content; the frequency of answers in each cluster was then determined. The two coders concurred in 90% of cases; in the remaining 10% of cases, they reached agreement after discussion. Using this qualitative research approach, we cannot ascertain the causal relationship between specific concerns—for instance, whether competitive fairness would still be an issue even if distributive fairness could be assured. However, we can assess whether, given the current social status of enhancement, lay people care about a certain concern in the first place (e.g., if they mentioned fairness at all) and thus get a sense of the relative prevalence of various concerns.

Our overall finding confirms that *lay people have a generally negative view about enhancement*: even though they were asked about situations in which the use of enhancement might be accepted, 34% of participants responded that no such situation exists. The remaining 66% described at least one situation where enhancement might be acceptable, but the vast majority of these

situations were characterized by absences of potential concerns. For example, several participants responded that enhancement might be acceptable if the situation were *not competitive* or if the substance had *no physical side effects*. Underlying concerns could thus be identified from these seemingly positive answers.

Even without prompts, participants raised a range of concerns about enhancement. The most commonly cited concern related to the unintended side effects of enhancers on the user's health or on their behavior (60% of participants). Fairness and/or competition and/or cheating were mentioned by 54% of our participants. (Because folk reasoning is not as fine-grained as philosophical arguments, we cannot distinguish between these three related factors in our data.) Other concerns included the risk of addiction or dependence (11%), whether the use of enhancers entailed breaking laws or rules (9%), and whether enhancement might undermine users' confidence in their own abilities (7%). No significant correlations between these clusters were found, suggesting that participants who raised a concern from one cluster were not more likely to also emphasize a concern from another cluster.

Leaving aside concerns about side effects, *cheating* loomed prominent, which is in line with implications of other recent research for different forms of enhancement (Faber et al.[12]). Cheating was mentioned more often than breaking laws or rules, and, given that these two concerns were not correlated, we surmise that worries about cheating cannot be simply restated as worries about rule or law violation. Put another way, enhancement use may still be perceived as cheating even if it is consistent with current rules or laws. And the concern that enhancement might undermine a user's confidence in *his or her own* abilities suggests that lay people have a sense for concerns about ownership of action and/or personal identity, what we here call the responsibility-shifting and authenticity arguments for LPI.

Theoretical Justifications for LPI

Although lay intuitions are sometimes stated in different language, they still nevertheless express the same three concerns as those we mention above—concerns that may be offered as rational justifications for LPI. Here, we demonstrate the form that these concerns take and what role they play in philosophical literature and in public debate about enhancement in sport and education.

RESPONSIBILITY-SHIFTING

The responsibility-shifting justification for LPI can be stated as follows: people who enhance their performance through the use of certain substances or

techniques deserve less merit-based praise for their accomplishments because those accomplishments were produced by the enhancers and through the effort of their manufacturers, rather than by the agents' actions and efforts. In the debate about doping in sport, this concern gains expression in the claim that if doping were not disallowed, then we would eventually have competitions between physicians not athletes.

The core intuition here is that enhancers, their producers, or physicians—and, importantly, not athletes—are the real agents in enhanced performance, whereas in nonenhanced performance athletes remain the real agents. But, first, in our view this intuition rests on an implausible metaphysics of action. We find it utterly mysterious why anyone would suppose that enhancement techniques strip agents of their contribution to what they achieve. Second, actual enhancing techniques just do not work like that. Enhanced cyclists must still train hard, they often pedal for hours in races, and this costs them physical and psychological effort. Likewise, enhanced students must still study, expend intellectual effort, write their own assignments, and sit their own tests. Neither enhancers nor enhancer producers do the training, the pedaling, the study, or the writing. Arguments suggesting otherwise rely on a factual mistake about what enhancers actually do (Cf. Mehlman[13], pp. 492–493).

A milder version of the responsibility-shifting argument is that although enhancers do not literally strip agents of their contribution, they are nevertheless the dominant factors. Here, the claim is not that in sport, for instance, competition between scientists will literally replace competition between athletes, but that technological competition will become a prominent and decisive factor. Consequently, the argument runs, a prominent portion of praise for accomplishment must shift from athletes to scientists. However, in our view, this milder version of the responsibility-shifting argument still rests on the same factual mistake. For instance, steroids merely promote faster recovery from injury and training, but they do not replace any of the human agency. Extraordinary human effort and talent are still the decisive elements in producing outstanding athletic performance. Likewise, cyclists' use of the hormone erythropoietin (EPO) or blood-doping techniques to increase their blood's ability to carry oxygen to the body's cells by increasing the red blood cell count (World Anti-Doping Association[14]) does not determine the result of a cyclist's performance any more than altitude training does, regardless of the controversy that these techniques might raise in the media (e.g., Heathers[15] and Mazanov[16]).[iii] They certainly do confer advantage to those who use them over those who do not, but they do not necessarily reduce the contribution of those who use them in terms of their effort, talent, and ability.

AUTHENTICITY

The authenticity justification for LPI is that those who enhance their performance are due no or little merit for their accomplishments because enhancers alter personal identity and thus merit accrues for these accomplishments to different people.

Because, along with others (DeGrazia[17], Juth[18]), we find the metaphysical reading of this argument implausible—that enhancers bring about changes in numerical identity, that they temporarily bring new people into existence—we will only discuss a weaker moral reading. On this weaker reading, enhancers that alter people's mind may also create new moral subjects, with their own records of achievements and merits. Morality and law already recognize that substance-induced mental capacity alterations (e.g., alcoholic intoxication) can diminish one's responsibility (e.g., Dimock[19]). However, although the analogy with enhancement might initially seem promising, a critical disanalogy is that blame is reduced in alcoholic intoxication cases (when it is; often it is not) when some major mental capacity—typically the minimal capacity for rational thinking and for self-control—falls below some threshold. This is patently not what would happen in cases of enhancement where capacity is increased. Substances affect people's responsibility when they adversely affect their relevant capacities, not because by altering their minds they bring into existence new moral agents with their own records of merit and demerit (e.g., see Vincent[20], or Maslen et al.[3]). Thus, we think that even the weak reading of the authenticity justification fails to justify LPI.

CHEATING

The cheating justification for LPI is that because enhanced agents obtained their achievements either through intentional fraud or through unintentional acquisition of unfair advantage (e.g., as when an athlete unknowingly gains a performance boost from medications legitimately taken to treat a disease), their praise should be reduced either by the amount of blame due for engaging in fraud (e.g., because we think that it blemishes their otherwise good performance) or by the value of the advantage that they gained which others did not (e.g., see Fukuyama[21]).

Yet again, in our view, the cheating concern fails to fully justify LPI. In brief, the fraud version of this concern makes praise reduction dependent on the presence of blame for intentional cheating, but yet intentional cheating is not the only way for athletes to get in trouble. And the unfair advantage version is not completely convincing because it focuses on the ethical implications of the violation of a rule of fairness, which opens it up to the counterobjection

that absent the ban, absent the cheating. If an unlevel playing field is the only ground for concern, then why not level the playing field by allowing everyone to enhance? (Savulescu et al.[22])

SUMMARY

This section had two explicit aims. One, to convey the gist of the responsibility-shifting, authenticity, and cheating concerns. Two, to cite some reasons why we find these concerns unconvincing.

A New Justification for LPI

Still, in our view, there *is* something to LPI, and this section will elaborate what we think this something might be. We develop an idea that Schermer[23] and Roache[24] have voiced about the cheating concern with enhancement—an idea about how activities are defined and characterized—into a novel, broader, and more direct way of justifying LPI. Our approach is novel because, to our knowledge, nobody else has cited, considered, or empirically investigated this idea qua justification for LPI. It is broader because it identifies a common thread that ties together and perhaps even explains what really lurks beneath the other three concerns. And it justifies LPI directly rather than via another concern.

THE POINT OF ACTIVITIES

Human activities have different points. Sometimes the point of an activity is an external goal (e.g., earning money through paid work), while at other times its point is internal (e.g., having a meaningful occupation). A combination of internal and external goals is probably most common, but one or the other kind of goal may be prominent in different activities. For instance, share trading is probably predominantly about making money, medicine is predominantly about healing, and the military is predominantly about defense of the realm. This need not prevent stock brokers, surgeons, and military personnel from being fulfilled, vested in, and proud of what they do. Although if they did what they do, but failed to attain those external goals, then criticism would be legitimate. Other activities, however, are predominantly defined through their internal goals. Chatting with a friend is not predominantly about information exchange but about spending time together in a particular way. People run not just to reach a given destination faster than if they had walked but often just to engage in that kind of physical activity. And fiction is read not merely to learn stories but as an activity in itself. Consider someone making the following complaints: "Chatting is such an inefficient, incomplete, and imprecise way

of conveying information!" or "But a motorbike would be way faster!" or "Can't you just read the synopsis?" An incredulous stare would be a fitting response to someone who so badly missed the point of these activities. We call activities prominently defined through their external goal *goal-directed activities* and activities prominently defined through their internal goal *practice-oriented*.

CHANGING THE NATURE OF AN ACTIVITY

The distinction between *constitutive* and merely *regulative* rules (e.g., Rawls[25], Searle[26]) provides a helpful tool for making our point.[iv] Namely, some rules are so critical to their activities—because they define and not just regulate them—that changing those rules would involve abandoning the point of those activities. And to the extent (and in the ways) that the new point is less valuable than the old point, this may justify a very distinct kind of complaint as well as a distinct kind of criticism when such rules are infringed (Foddy and Savulescu[28]).

In goal-directed activities, rules might regulate how external goals should be pursued, but they do not define the nature of those activities. For instance, road rules might stipulate that drivers stay on the right side of the road or that indicators must be used before changing lanes. But someone who drove on the left side or failed to indicate before changing lanes would no less be driving than someone who obeyed the road rules. Rules of such activities can be changed without *the point of those activities being lost*. We think the activities of surgeons, pilots, soldiers, and scientists fall into this category. As long as patients are healed, travelers are brought to their destinations, territories are protected, and scientific breakthroughs are attained, the points of surgery, civil aviation, military, or science (respectively) will still be realized. Such rules may promote safety, efficiency, coordination, or perhaps moral or aesthetic aims (to name just a few examples), but they only regulate not constitute these activities. Consider another example. Musicians' use of beta-blockers to reduce anxiety and related tremor (Savulescu et al.[22]). Since the point here is to put on an excellent live performance, the use of beta-blockers does not impede the attainment of this external goal. If anything, it promotes it. The point here is surely not to test musicians' ability to overcome stage fright, anxiety, and tremor. On the other hand, the use of beta-blockers would be conceptually problematic in such activities as archery, pistol shooting, snooker, and the like precisely because the point of these activities is (partly) to master control over one's nerves. The next paragraph discusses similar cases.

In contrast, at least some rules of practice-oriented activities are constitutive. Such rules define which practices are essential to those activities—they stipulate practices within those activities that constitute those activities' internal goals—and, in abandoning or infringing such rules, one abandons or misses the point of those activities. Constitutive rules define

what practices are central to even engage in those activities, not merely lay out regulations for fair or effective (or whatever else) conduct (Rawls[25] Searle[26]). Constitutive rules impose conceptual limits on the way in which the respective activities may be performed to even count as instances of those activities. Clear examples come from sport. If one shows up at a marathon on roller-skates (Whitehouse et al.[29], Schermer[23] and Murray[30]), one would infringe both regulative and constitutive rules of marathons and so one would do something "wrong" in two different ways. Ethically, one would attempt to get an unfair advantage. Conceptually, one would be missing the point of running a marathon because covering that distance on roller skates is a *different kind of sport*. Crucially, this latter sense of "wrong" (the conceptual wrong) is morally neutral—the roller skater would be doing something wrong in the mere sense of not even doing what the constitutive rules stipulate they must do to even engage in that activity.

Admittedly, one might object that even in mostly practice-oriented activities like sport, many of the constitutive rules are arbitrary. So, why should anyone care about whether the nature of that activity is changed by, for example, allowing roller skates or enhancers to be used? In response, we think that it would be a mistake to suppose that because such rules are arbitrary, nothing would be lost by changing them. For instance, although arbitrary, such rules may nevertheless be imbued with historical or symbolic significance. The marathon has always been exactly 42,195 meters long. And there is a significant historical reason for that: the marathon was instituted in commemoration of the legendary run of the Greek soldier Pheidippides, who, after the Battle of Marathon, covered 42,195 meters to bring the victory message from Marathon to Athens. This is at least a prima facie reason to not change such rules. A marathon, as we know it, is about running 42,195 meters.

On the other hand, it is also true that some rules of sport and games are just plainly arbitrary. Apart from respect for a consolidated praxis and possible meanings getting attached to it over time, there are no substantive reasons for having 90-minute football games instead of 86- or 94-minute games. Hence, in the presence of good reasons in favor of change, such rules could perhaps be changed without sacrificing anything important.

Still, many rules in sport and education fall somewhere between these two extremes. They are neither as vital as the ban on wheels in marathons nor as arbitrary as allocating 90 minutes to football games. Some examples might be using wooden versus fiberglass poles in vaulting (Whitehouse et al.[29]), using manual versus computer-assisted instrumentation in car racing, and using calculators and digital resources at school. We think that an (official) introduction of enhancers into sport and education would be a similarly incompletely arbitrary rule change, and it may therefore be potentially problematic.

COARSE-GRAINED AND FINE-GRAINED DESCRIPTIONS OF ACTIVITIES

Last, how important we take a given constitutive rule to be for a particular activity will also in part depend on just how fine-grained a description of that activity we adopt. As Wittgenstein[31] argued, no single feature is shared by all games. Arguably, both professional rugby and bouncing a little rubber ball against the wall in front of you while sitting alone at your desk can be called "a game." Also, the same (in some sense) games can be very different in different times, places, and circumstances. There were car races 60 years ago just as there are today; there are football games between children in many courtyards around the world and there are professional football games; academic research is sometimes conducted using books, pens, and paper and at other times with digital tablets, online research tools, and word processors. On coarse-grained descriptions, 1950's and today's car racing are the same game, a children's courtyard football game is as much a football game as a professional football match, and academic activity of the 1970s is the same as today's activity. However, on more fine-grained descriptions, these are significantly different activities.[v] If one considers how much cars have changed—their tires, their embedded technology, how driving techniques have evolved, and how the rules of racing have changed—one will recognize that today's car racing is not the same sport as 60 years ago. Similarly, once we notice the huge differences in rules, skills, training, stakes, and so forth between professional and children's football games, how can we maintain that they are identical games? As for academic activity, digital research tools, word processing, and instant electronic communication have drastically reduced the time needed to conduct, write-up, referee, edit, and publish research. Under a fine-grained description, academics today are engaged in a very different kind of activity than their colleagues 30 years ago.

In a nutshell, our point is that cognitive enhancers may be deemed to have a similarly profound effect on a range of intellectual activities if those activities are described in fine-grained detail and if at least some of those details are taken to constitute rather than merely regulate those activities (Cf. Santoni de Sio et al.[5]).

LPI REVISITED

A better rationale for LPI may be offered by looking at sport and education as activities to which constitutive rules and fine-grained descriptions apply.

Consider an athletic activity (*A*) or a learning activity (*L*) in which enhancers (*E*) are not currently used. On a sufficiently fine-grained description, athletes and students who started using *E* would engage in markedly different

activities—A_E and L_E—than the ones for which praise would be distributed to others, namely *A* and *L*. They would be engaged in enhanced-*A* and in enhanced-*L*. Hence, by taking seriously constitutive rules and a fine-grained description of activities, it is possible to see why enhanced athletes and students may deserve less or even no praise for their accomplishments. It is not that enhancers or enhancer-producers acted in their place. It is not that by enhancing themselves agents became (temporarily) numerically or morally different persons. Finally, it need not even be that the praise that would otherwise be their due needs to be counterbalanced by the unfairness of the competitive advantage that they gained or because they intentionally tried to cheat. Rather, athletes or students who use enhancers would be due less or even no praise because they simply did not engage in the same athletic or learning activity. Because they engaged in *a different activity*, a different yardstick must be used to assess their performance. Praise might still be due to the enhanced athletes and students for A_E and L_E, respectively, but not for *A* and *L* simply because they did not engage in those activities.

This is our nature-of-activities justification for LPI, and we think that it allows us to capture the true concerns that lurk beneath the other three justifications while avoiding their drawbacks.

First, there is a grain of truth behind the responsibility-shifting justification; namely, that praise for an activity *under a given description* may indeed be precluded through the use of enhancers. But the claim that praise is diminished *because it is shifted elsewhere* overlooks that praise may still be due to the agent—perhaps even more praise, for all we know—but for the activity *under another description*. For instance, we think that enhanced athletes like Oscar Pistorius still deserve praise.[vi] In fact, they may display a huge amount of physical and psychological skills in their performance. However, on a fine-grained description, running on prosthetic legs may be a very different sport altogether, and there may even be compelling reasons to resist changing the constitutive and regulative rules of that sport as it currently stands. From this particular standpoint, it may indeed have been a mistake to admit Pistorius into the conventional competition.

The concern for authenticity or personal identity also becomes understandable. By engaging in certain activities, people acquire certain roles. Those who regularly play football in a team *are* football players. Those who enroll in and attend university courses *are* university students. Moreover, by focusing on more fine-grained descriptions of activities, more fine-grained descriptions of the corresponding roles will become relevant. For instance, depending on the kind of team or championship in which they play, football players may be professionals or amateurs. Depending on the course in which they are enrolled, students may be philosophy or medicine students.

Similarly, depending on whether or not they use enhancing substances while preparing for or sitting an exam, language students may either be nonenhanced or enhanced, like Llana from our opening example. We thus propose that the concern about authenticity is wrong-headed to the extent that it suggests that by enhancing themselves, an agent may become a different person or moral subject, one with a separate record of actions and performances. However, it also contains a grain of truth because it points to the fact that the use of a certain enhancing substance can make agents acquire different roles and hence make them open to evaluation qua different kinds of players.

Finally, the nature-of-action justification for LPI has important similarities but also differences with the cheating justification. Both justifications rely on the idea that less praise springs from the agent's violation of a rule of a practice. However, the cheating justification amounts to the idea that enhanced agents deserve no or less praise for their accomplishments because of the counterbalancing effect of an injustice. An implication of this justification is that if LPI depends on cheating, and cheating amounts to unfair advantage over others, then allowing everyone to enhance should defuse LPI. Absent the ban, absent the cheating; and absent the cheating, no ground for LPI. But it seems to us that this retort fails to acknowledge that we may have legitimate grounds to be conservative—to not change the constitutive rules of some activities, but rather to dig our heels in in protest when someone violates those rules—whereas the nature-of-activities justification recognizes this point. Whereas the cheating justification would have us attribute the diminution of praise to the presence of a blemish (intentional cheating or unfair advantage) that must be deducted from the praise that would otherwise be due, in contrast, the nature-of-activity approach claims that less (or even no) praise is due for that activity because the agent engaged in a *different* activity. The *less* praise intuition may actually be a *no* praise intuition. The nature-of-activity justification makes sense of the negative stance against enhanced agents but through the idea of their violation of a constitutive rule of a given practice as that practice currently stands. Furthermore, this justification also explains why changing the rules of the game—for example, simply allowing everyone to use enhancers—won't always suffice to silence moral concerns. Sometimes a rule prohibiting enhancer use may be required to preserve the point of that activity. And those who violate the rule are, in this case, still open to a negative evaluation—even if they are not gaining any unfair advantage—simply because they are *missing the point* of that activity and perhaps because doing so might contribute to water down that activity (at least under a certain fine-grained description).

LPI, Our Nature-of-Activities Justification, and the Enhancement Debate

How does the nature-of-activities justification for LPI bear on the debate about when enhancement should be permitted, encouraged, prohibited, or mandated?

First, on our account, in mainly *practice*-oriented activities—perhaps sports and education—the use of enhancers may present a challenge to the current nature of those activities, and this may potentially expose enhanced agents to legitimate criticism.

Second, our view also entails that people who use enhancers need not necessarily be described as undermining their own agency or personal identity and that they need not be stigmatized as cheaters. Our view leaves open the possibility of a favorable stance on the use of enhancers in sport and education. And although there may indeed be reasons to refrain from altering incumbent constitutive rules of given activities, these reasons need not be so weighty that they can't be overridden by other considerations. For instance, Savulescu et al.[22] argue that since we will never eradicate doping in sports, it is better to permit regulated use of enhancers to ensure that athletes' health is adequately monitored. We need not stick to incumbent fine-grained definitions of actual activities at all costs, and, in the long run, the deep-seated features of some activities may gradually erode from pressure due to cultural and social change that eventually makes them into something completely different (Savulescu et al.[22]).

We also think that our approach suggests a better methodology for reasoning about this topic than other approaches. First, it marks the distinction between mainly *goal*-directed activities like professions and mainly *practice*-oriented activities like sports (and perhaps education). Moreover, the nature-of-activity approach encourages fine-grained analyses of practice-oriented activities, which makes possible tailored answers to moral questions about enhancement. Not only may we need different rules for the use of enhancing substances by adults and children, but we may also need different rules for different sports (e.g., professional vs. amateur sport) or different kinds of formative activities (e.g., undergraduate vs. graduate exams; exams aimed to assign people to professional positions versus prevalently formative exams like tests internal to a single academic course). We need to think reflectively and reason about what point different activities might have and whether that point would be foregone by allowing enhancers. Each fine-grain defined activity may have its own specific point, this point may have a larger or smaller moral or societal value, and this value may be fostered or jeopardized by enhancers (Santoni de Sio et al[5]).

An evaluation of the values at stake and the effectiveness of policies aimed at protecting those values must be made before reaching a decision about the permissibility of enhancement in given activities.

Notes

i. This chapter concerns, therefore, the possible impact of cognitive enhancement on one kind of backward-looking responsibility: praise. For a general discussion on the possible impact of cognitive enhancement on moral and legal responsibility, see Maslen et al.[3] For a discussion on the possible impact of cognitive enhancement on forward-looking responsibility (i.e., duties) see also Santoni de Sio et al.[4]

ii. This methodology has been further developed in Santoni de Sio et al.[5]

iii. Some may still think that the responsibility-shifting reason for LPI applies at least to some forms of radical enhancement like Oscar Pistorius's amputation of both legs and their replacement with artificial limbs. As a child, Pistorius underwent bilateral leg amputation due to being born without fibulas in each of his legs. He wore artificial prostheses since early childhood, and he mastered them to the point of becoming a successful sprinter. In 2012, he competed in able-bodied Olympics, and although he did not fare as well as he expected, with time, technological advancements will create prosthetic legs that are superior to flesh and bone. At that point, if athletes with prosthetic legs were still allowed to participate in able-bodied races, then, to remain competitive, able-bodied athletes wishing to participate in those races would also need to undergo bilateral leg amputations. Some may think that under such circumstances such athletes should relinquish some praise for their performance because the decisive element would now be a device designed by engineers and implanted by surgeons. However, even in this case, we think that such a responsibility-shifting concern would be based on the unwarranted assumption that artificial limb–equipped athletes would make a less-than-decisive contribution to their achievements in the form of physical and psychological effort and intrinsic talent.

iv. Also see MacIntyre[27] for the distinction between internal and external goods.

v. On this point, cf. Vincent[20: 318–320] and Vincent[32] who discusses the constantly changing nature of activities and the related changes to moral and legal obligations.

vi. See note viii.

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4

Moral Enhancement, Neuroessentialism, and Moral Content

FABRICE JOTTERAND

Introduction

The emergence of novel technologies to intervene in the brain to alter or control human behavior has opened the potential to new perspectives to address sociopolitical and human problems. Some commentators argue that, in the light of past and recent acts of violence, the traditional means of family or parental supervision, education, socialization, and the role of social institutions for moral development have failed. They contend that there is a need to improve human character by biotechnological means and that, therefore, we ought—indeed, may even have a moral obligation—to consider moral bioenhancement as a complement or an alternative to traditional means of moral development.[1–3] Although currently there is no evidence that supports the "science of moral bioenhancement" and therefore one might argue that the issue is a moot point, it is nevertheless important to address this hypothetical question to distinguish among hype, hope, and reality.[4] In addition, an outright rejection of techniques to enhance or alter human behavior is misguided because some psychiatric disorders (e.g., psychopathy) have moral pathologies that resist current treatment options.

Elsewhere, I outlined the reasons for my skepticism concerning the possibility of enhancing people morally through biotechnological means.[5,6] My critique focused on a misconceptualization of moral judgments, one that does not take into account an important distinction in moral psychology between moral capacity (the ability or the disposition to respond morally) and moral content (the role of particular beliefs, moral actions, and ideas). I pointed out that psychopharmacology and neurotechnologies alter the capacities to act morally (the same way that alcohol affects—negatively in this case—one's ability to

make good judgments) but are unable to provide any moral content, which provides the basis for the justification of moral beliefs.[7]

Although not explicitly stated but philosophically implied, the conceptualization of morality by some proponents (notably Savulescu, Douglas, Persson, Reiner, etc.; for a more nuanced view, see Specker, Foquaert, Rause, Sterckx, and Schermer[8]) of moral bioenhancement require particular epistemological commitments and neuroessentialist assumptions (i.e., "we are the brain"). In what follows, I examine these assumptions, show why such premises are problematic for the development of a sophisticated framework of morality at the intersection of neuroscience and moral philosophy, and explain why these premises cannot support the possibility of moral enhancement (*moral* in the strong sense of the word, which encompasses moral capacity or the disposition to respond morally, and moral content or particular beliefs and ideas about notions of the good, the right, and the just). First, I provide conceptual clarity on key concepts in the moral enhancement debate, including the distinction between psychopharmacology and neurotechnologies as means to cognitive enhancement, the meaning of moral enhancement, and the crucial distinction between moral capacity and moral content. Second, I critique neuroessentialism, pointing out that there is a danger in reducing human behavior to neurobiology and the potential to misconceptualize human moral psychology. Third, I expand my critique of neuroessentialism, particularly with regard to the concept of moral agency, and offer a viable alternative based on social practices.

Neuroessentialist Premises in the Moral Enhancement Discourse

DEFINITIONS

Before we turn to a critique of neuroessentialism within the context of moral bioenhancement, key conceptual issues need definitional clarity. First, we need to distinguish between psychopharmacology and neurotechnologies as means to cognitive enhancements.[i] Psychopharmaceutical enhancers are drugs initially designed to treat a variety of neuropsychiatric disorders (Alzheimer's disease, Parkinson's disease, cerebral palsy, traumatic brain injury, etc.) but that can have enhancing cognitive effects in healthy subjects.[9–11] The effects of these drugs on cognition are complex and encompass the altering of mental capacities such as executive functions (inhibition, problem-solving, planning, etc.), memory, spatial and verbal learning, attention, and mood enhancement.[11,12] The drugs that may affect cognition include modafinil (Provigil), dextroamphetamine, methylphenidate (Ritalin), fluoxetine (Prozac), donepezil (Aricept), and propranolol (Inderal).[13–17]

On the other hand, the use of brain stimulation techniques for a number of neurological and psychiatric disorders is currently being investigated. These techniques include deep brain stimulation (DBS), transcranial direct current stimulation (tDCS), and transcranial magnetic stimulation (TMS), and they provide complementary or alternative treatment options for movement disorders and investigational interventions for psychiatric conditions and disorders including Tourette syndrome, severe depression, Alzheimer's disease, obsessive-compulsive disorder (OCD), and dystonia.[18–20] Studies indicate that the same neurostimulation techniques used for therapeutic purposes may have enhancing properties with regards to mood, cognition, working memory, attention, procedural learning tasks, motor learning, and visuomotor coordination tasks.[12,17]

The second concept to be defined is what we mean by moral enhancement. In the bioethics literature, enhancement usually "characterize[s] interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health."[21: 29] Enhancement, then, refers to the "augmentation of biological capacities beyond what is species-typical" in healthy individuals.[5,22] For some moral enhancement aims at the improvement of moral capacities such as empathy, solidarity, justice, shame, and forgiveness,[2,3,23] whereas, for some others, moral realistic options include the treatment of moral pathologies such as psychopathy.[24,25] Moral enhancement would focus on various dimensions of moral capacities: affective enhancement, motivational enhancement, and cognitive enhancement.

Third, a crucial distinction between moral capacity and moral content is warranted. In moral psychology, human behavior is explained as the interplay among affective, motivational, and cognitive processes. The various techniques allegedly enhancing morality focus on the alteration of affective/motivational processes (moral capacity), but they do not consider the question of the source of moral content outside one's psychological profile or genetic makeup. More precisely, two issues are at stake: (1) what is the role of reasoning in moral deliberation? And (2) how does one define conceptions of the good, the right, and the just? In short, one's genetic makeup or psychological profile certainly influences one moral identity, but it does not determine it. As I have stated elsewhere, "moral emotions can be modified and most likely affect moral judgments, but moral judgments require an epistemic framework [moral content] that guides moral behavior. This framework allows for a continuous shaping and assessment of one's moral beliefs and values, and provides a point of reference to moral emotions."[25] Hence moral capacity refers to one's ability or disposition to respond morally and involves the motivational, cognitive, and affective mental processes determining how one behaves when confronted with moral dilemmas. On the other hand, moral content constitutes the set of particular beliefs,

values, and ideas shaped by environmental, cultural, and historical factors in addition to rational and moral deliberation and moral theorizing. Moral content is determined by the process of reasoning about moral conundrums, and it influences the emotional and psychological states by ascribing specific beliefs and values during moral judgments.[26,27]

Neuroessentialism is the fourth and final concept to examine. Peter Reiner states that "neuroessentialism is the position that, for all intents and purposes, we are our brains."[28] Neuroessentialism holds the position that mental states, behavior, notions of self, and personal identity can be reduced to neurobiology. In the same way that genetics has been used to support that "we are our genes," neuroessentialism contends that "we are our brains." There is evidence that various psychiatric disorders are caused by chemical imbalance (e.g., Parkinson's disease is the result of low levels of the neurotransmitter dopamine, which influences motor and thinking areas of the brain) or that abnormalities in brain structure may increase the risk of deviant behaviors (e.g., psychopathy; neuroimaging shows abnormalities in brain areas of psychopaths associated with behavior [anterior cingulate], cognition [orbitofrontal cortex], and affect [amygdala]; see Kiehl[29]). In addition, changes in the brain caused by traumatic insults to brain structure (e.g., the case of Phineas Gage[30]), the purposive manipulation of brain structure (e.g., lobotomies[31]), the use of psychotropic drugs,[32,33] or the use of neurostimulation technologies[34,35] directly affect the behavior, personal identity, and mood of individuals.[5]

CRITIQUE OF NEUROESSENTIALISM

A narrow interpretation of the neuroscientific evidence could lead to a one-dimensional understanding of the mind–brain problem. Two major issues can be raised against neuroessentialism. First, there is the danger of reducing human behavior to neurobiology and using various techniques, psychopharmacology, or neurotechnologies to manipulate human behavior for social purposes. The hope is to use a neuroessentialist framework for the enhancement of certain character traits deemed socially desirable, as exemplified by Peter Reiner who states that

> the mores of society are widely discussed in the news media, sometimes when a prominent figure exhibits a lapse in ethical behavior but also in the vigorous public debate of the "culture wars". . . . One useful suggestion would be for neuroessentialists to join social theorists and educators in calling for improvements in moral and character education . . . thereby aligning social policy with the rise of neuroessentialism.[28: 170]

This alignment between social policy and science qua neuroessentialism to determine and/or alter behavior has an air of déjà vu in the history of psychiatry (i.e., phrenology). Italian psychiatrist Cesare Lombroso (1835–1909), considered the founder of modern criminology, elaborated a theory based on evolutionary principles and body, skull, and brain physiology. In his work—since discredited—he attempted to explain criminal behavior through an interpretation of physical deviances such as large jaw, large ears, thick skull, and certain neuroanatomy.[37] Although neuroessentialism and phrenology have different premises to support their claims, both perspectives attempt to explain behavior based on neuroanatomical characteristics.

At this point, based on clinical evidence, it seems unclear whether specific behaviors (e.g., psychopathy) are acquired in childhood or adolescence due to neuroanatomical abnormalities (e.g., damage to the orbital frontal cortex can affect affective and cognitive processes essential for moral deliberation). In addition, any explanation of human behavior based solely on neuroanatomical characteristics should warrant some caution. T. B. Benning points out that there is a danger of stigmatization grounded on alleged neuroscience evidence. As he writes, "a brain scan diagnosis of psychopathy legitimises the preventive incarceration of a 'high-risk' individual, and . . . a static neuro-structural deficit may lead to a therapeutically nihilistic approach to such an individual on the grounds that he is 'beyond rehabilitation.'" Combining these two positions—the perception of an individual as both dangerous and unchanging—may lead to a "lock them up for good" ethos.[38: 564] The same claim could be made with regards to moral enhancement, which could result in a type of social engineering based on certain behavioral standards or expectations.[2,8] The alignment of social policy with neuroessentialism could reinforce stigmatization and undermine cognitive liberty.[39–41,ii]

The second issue relates the human moral psychology. The way that some proponents of cognitive enhancement conceptualize morality does not capture the complexity of human moral psychology. Consider the following characterizations of morality:

> According to our preferred view, the core of our moral dispositions comprises, first, a disposition to altruism, to sympathize with other beings, to want their lives to go well rather than badly for their own sakes. Few would deny that this disposition is central to morality[42: 168]

or

> I [Douglas] will take it as a suggestion that we cause ourselves to have morally better motives . . . I understand motives to be the

> psychological—mental or neural—states or processes that will, given the absence of opposing motives, cause a person to act. Since I focus only on motives, I will not claim that the morally enhanced person is more moral, has a more moral character, or will necessarily act more morally than her earlier, unenhanced self. I will also try to avoid committing myself to any particular view about what determines the moral goodness of a motive.[3: 229]

One could also consider the project of enhancing morality by means of genetic manipulations, postulating the genetic basis of behavioral traits: "Since genes influence enduring behaviors, it might be possible to use biotechnology in a manner that would promote virtue, and thus serve as a means to improve ourselves, morally speaking."[43]

While recognizing that these three conceptualizations of morality do not represent comprehensively the moral enhancement debate, they nevertheless exemplify the potential failure to consider the complexity of human behavior and the nature of moral judgments. A reductionistic approach is problematic because, as stated previously, it limits morality to moral emotions but does not take into account that moral agents have developed particular understandings of notions of the good, the right, and the just that shape behavior and moral identity—a point more fully developed in the next section. In other words, moral intuitions do not operate in isolation but are informed by normative claims for their justification. This point is clearly made by Sinnott-Armstrong, who contends that "to determine whether moral beliefs [moral intuitions] really are justified, we need to move beyond psychological description to the normative epistemic issue of how we ought to form moral beliefs."[44: 48]

In addition, there is strong evidence that adaptive changes in neural pathways occur in the brain based on environmental changes (such as social context, family context, etc.). Therefore, to assume that "we are our brains" is misleading. As human beings and moral agents, individuals are shaped by external factors such as the environment, the cultural context, and narratives. The brain's ability to change its circuits and functions is the result of the brain interacting with external elements that, in turn, create a synergy between internal and external factors. As Glannon puts it, "the ability of the brain to alter its circuits and functions is not a property of the brain operating independently of external factors but of dynamic interaction between the brain and these factors."[45] This process describes *neuroplasticity*, which is the ability of the brain to adapt to these external factors. It refers to a "change in neural structures and is usually the result of activity-dependent change in the interconnections among cells that constitute the structures. Enduring changes in structure result from repeated activation of some cells and pathways more than others, following

the principle that neurons that fire together wire together."[46] The development of a sophisticated model of morality, one grounded on the latest advances in neuroscience concerning brain structure and functions, necessitates avoiding a blind trust in the ability of these modalities to address, in isolation, complex questions related to human behavior. Progress in understanding the brain and human behavior must align with the traditional disciplines of ethics, and vice versa.

This is not to say that there is no connection between brain structures or neurochemicals and human behavior. In the case of mental illness (especially neuropsychiatric disorders that affect behavior), "bad character" is not the issue but rather a neurochemical imbalance in conjuncture with environmental factors. However, in the context of moral enhancement, we are dealing with "normal and healthy" individuals who do not suffer from psychiatric conditions. Hence, the appeal to neuroessentialist constructs in discussions about the possibility of enhancing people morally is misleading.

Psychopharmacological and neurostimulation techniques assume that interventions on the brain, chemically or through electric stimulation, will heighten some character traits. This position is shortsighted because it does not take into account that environmental, cultural, and historical determinants shape the brain and mind. As Walter Glannon rightly states, "the mind emerges from and is shaped by interaction among the brain, body, and environment . . . . We are embodied minds in the sense that our mental states are generated and sustained by the brain and its interaction with external and internal features of our bodies. We are also embedded minds in the sense that the content and quality of our mental states is shaped by how we act within the social and natural environment."[45] Glannon's points corroborate psychiatrist Thomas Fuchs's critique of neuroreductionism (the biological reductionism of the mind to the brain); he argues that the expression "you are but a pack of neurons" or "you are just your brain" is a category error and scientifically erroneous (an alternative approach to neuroessentialism is provided in the next section particularly with regard to social practices). In his view, "the brain is only an organ, and it is not the brain, but the organism or the living person that has conscious access to the world."[47 cited in 45: 26] Moral agency requires individuals to engage in the world in relation to others, which in turn shapes and determines one's own (moral) identity (moral capacity and moral content). This point is further corroborated by Shapiro[48] who rejects neuroreductionism on the ground that the mind by itself is unable to perceive and interpret any outside information. In other words, the mind and the body complete each other. He defends a position called the *embodied mind thesis*, which stipulates that psychological processes, to be complete, depend on the inputs of the body. In short, as Shapiro puts it, perceptual capacities such as vision and audition cannot stand in "body-neutrality."[48]

Moral Neutrality, Practical Rationalities, and Social Practices

In this section, I expand my criticism of neuroessentialism particularly in relation to the concept of moral agency. If the premise that "we are the brain" is correct, it means that, in principle, human behavior can be altered or manipulated at will through psychopharmacological means or brain stimulation. Brain areas associated with basic and moral emotions (including the amygdala, thalamus, upper midbrain, medial orbitofrontal cortex, medial frontal gyrus, and right posterior superior temporal sulcus) can be manipulated to achieve particular behavioral outcomes. For instance, using techniques like functional magnetic resonance imaging (fMRI), a brain–computer interface can be developed to regulate brain activity for the treatment of disorders of cognition, emotions, and behavior (e.g., psychopathy, pedophilia; see Sitaram, Caria, and Birnbaumer[49] and Renaud et al.[50]). The approach of these procedures suggests the activation and the reinforcement of neural pathways in the brain associated with particular behaviors.[51,52]

Although these techniques might have the potential to treat or at least mitigate the symptoms of mental disorders such as psychopathy and pedophilia, it is nevertheless important to examine how patterns of behaviors are acquired. Specifically, closer attention should focus on the factors, such as upbringing, culture assumptions, social environment, and the like, that determine and shape one's moral identity and neurobiological makeup. Many neurobiological systems (e.g., the neural basis of morality) "must be 'tuned up' by experience in order to reinforce and motivate normal behavior, including moral behavior."[53: 46] In other words, individuals develop character traits and a moral identity shaped by their neurobiology but also by their upbringing, understanding of the good, and life experience. This dual dimension of moral development constitutes the internal and external constraints of moral agency.[5] The internal constraints concern the neural basis of morality or the capacity of an individual to respond morally grounded on his or her neurobiology and psychological makeup. But the capacity to respond to moral dilemmas is likewise shaped by external factors such as life experience, beliefs, values, and presuppositions. Moral decisions, then, need particular philosophical and moral perspectives developed within the social context of the family and the broader community, which in turn shape and refine particular moral emotions. To reiterate Sinnott-Armstrong,[44] moral beliefs are justified by moving beyond a purely psychological account of moral life to a normative framework that guides and justifies moral emotions. The justifiability of one's actions presupposes a specific understanding of notions of the good, the right, and the just based on a particular mode of practical reasoning as a tool for social interpretation.[54] Specifically,

this means that the idea of a philosophical and moral neutrality is illusory. Any discussion about morality presupposes a particular conception of rationality determined by a particular social environment and conceptions of the good and human flourishing. In short, a framework of moral agency presupposing a moral neutrality does not take into account the complexity of moral life, which includes emotional, motivational, and rational dimensions formed throughout one's life.

This last point becomes even clearer when we look at the nature of rationality and rational actions through the lens of the work done by Alasdair MacIntyre[54] whose inquiry on the question of practical rationality provides insights pertaining to the question at hand. He rightly notes that rationality and rational actions are structured differently depending on the social context, time in history, and location. In his view, contemporary accounts of rationality and practical reasoning usually depict agents as uninformed in their rational deliberations by some processes antecedent to any action. In the words of MacIntyre,

> [In] contemporary accounts of practical reasoning . . . we are presented . . . with agents as if detached altogether from any conception of or perception of the good or goods . . . such an individual exemplifies what I will borrow a phrase from the late A. A. Zhdanov to describe rootless cosmopolitanism. Such individuals speak . . . from a standpoint dictated by a stage in the dissolution of social traditions at which no form of practical rationality is any longer possible.[54: 129, 135]

An alternative to the "rootless cosmopolitanism" framework of practical reasoning and the resulting dissolution of social traditions would be to consider moral deliberation and the development of moral agency as part of an initiation into practices and their inherent skills and virtues for the attainment of the internal goods of these practices. This process of initiation takes place in various social contexts and includes domains such as science, politics, games, arts, and family life.[55] Importantly, each practice has a history in which particular goals, skills, and virtues (or standards of excellence) have been identified, refined, and accepted.[56] MacIntyre is quick to recognize that there is a potential for interpreting his line of reasoning as a form of relativism or perspectivism. However, his point is to stress that practical rationality (and its moral dimensions) does not occur in a vacuum. Individuals engaged in practical rationality inquire about it from some particular point of view within a social context that shapes right practices as exemplified within communities.[54] For instance, the game of chess, the sport of golf, or the practice of medicine requires socialization into the nature, goals, and standards for their practice, which have been

established, critiqued, and accepted by the community of chess players, golfers, and physicians, respectively. Any new participant will need to be socialized in these communities and will be required to understand the basic social rules, standards, and ends of the activity before being identified as a chess player, golfer, or physician. Ultimately, MacIntyre contends that human beings need to identify characteristics (concept of the good) that will help them flourish within a social context at a particular time in history.[54] The application of practical rationality entails a process of reasoning and learning about the ends of human existence and the goods necessary to achieve these ends.[57]

To summarize, MacIntyre[57] holds that moral deliberation is an endeavor in which an individual constantly engages in the evaluation of internal and external constraints essential for moral agency.[5,57] First, moral agency develops within a social context embedded in a particular narrative. Although neurobiology certainly influences and shapes the moral development and makeup of individuals, personal journeys through life, education, interests, and human relations likewise determine one's moral identity. Second reflections about the nature of the good are essential for human flourishing. Human beings are constantly engaged in reasoning about what constitutes the ultimate ends of human existence and how to achieve these ends. For MacIntyre, the failure to acknowledge that human beings are "practical reasoners about goods" results in their inability to flourish because they are unable to define and establish the nature and goals of practices.[57] These practices are determined by particular visions of the good life and define one's own understanding of human flourishing. Third, as individuals develop as moral agents, they learn through trial and error: that is, each person goes "through a process of learning, making mistakes, correcting those mistakes and so moving towards the achievement of excellence, [in which] the individual comes to understand her or himself as in via, in the middle of a journey."[56] The consolidation of these various learning experiences occurs in the application of practical wisdom (phronesis), which allows the integration of affective, motivational, and cognitive processes in a coherent entity. The final key point is the necessity to develop the skills for the integration of life experience and moral reasoning as necessary conditions for character development. The failure to do so would result in "intellectual blindness" and, ultimately, in the development of bad character because a person with such a trait does not have the knowledge to recognize what makes right judgment and action.[56] MacIntyre's framework allows us to make an important distinction between having character traits and having character. The former refers to behavioral attributes that describe how people carry out particular activities, whereas the latter describes more fundamental features of an individual's moral identity and ability to show moral strength.[5] Based on these definitions, moral enhancement technologies focus on some character traits to achieve particular ends but do not shape the more fundamental

moral attributes of a moral agent. Moral enhancement technologies place outside constraints to produce a particular outcome, whereas having character requires an internal process that motivates an agent to act based on reasons for action.[5] Building on the earlier distinction between moral capacity and moral content, and in the light of the preceding analysis, a robust understanding of moral agency cannot be limited or reduced to the alteration or manipulation of the brain structure or brain chemistry to enhance moral behavior. The notion of "moral" or "morality" intrinsically assumes an interpretation of human flourishing grounded on a particular understanding of the good. Technological means, as far as we know, do not provide any content to moral deliberation but only control affective and motivational responses to moral conundrums.

Moral Enhancement as Neurotechnological Gourmandize?

In the concluding section of this chapter, I raise the question of whether moral enhancement has a broader agenda. As a general concept, moral enhancement should not raise too many concerns. The continual reporting of acts of violence and wars and the potential outpacing of our ability to address moral issues raised by advances in science and technology constitute strong arguments to develop techniques for the moral betterment of the human species. The danger with this line of reasoning, however, is twofold. First, it promotes an approach to morality that does not take into account the complexities of human morality. It advances strategies that use knowledge gained through neuroscience research to conceptualize moral agency in terms of neurobiology, and, subsequently, it could lead to a type of social engineering that does not consider the plurality of moral identities. The premise of neuroessentialism—that "we are the brain"—and the urge to use technological means to enhance or alter moral behavior raises questions concerning human identity, but also raises real concerns about the potential "control of the masses" to achieve particular social ends. Neurologist and neuroscientist Hervé Chneiweiss questions whether cognitive enhancement does not mask a broader agenda beyond the mere betterment of the human cognitive capacities. In his view,

> the real risk resides in a hypertrophy of self, losing essential feedback from the eyes of the others. These fundamental changes should encourage us to understand the driving forces of our "neurotechnological gourmandize" and wonder if cognitive enhancement is not a mystification that covers up social pressure for enhanced productivity and behavior control.[58: 296]

Whether Chneiweiss is correct in his assessment would require an analysis beyond the scope of this chapter. However, the potential social pressure to promote the use of neurotechnologies to enhance productivity and control behavior ought not to be dismissed naively. Our "neurotechnological gourmandize" could entice us to find solutions by technological means to address questions that require a synergy between the various domains of human knowledge.

The second danger is that moral enhancement through technological means misconceptualizes morality. The emphasis on the neurobiology of the brain without a recognition of how conceptions of the good participate in the formation of right moral emotions does not provide a robust understanding of moral agency. Moral reasoning and moral emotions work in synergy to create moral judgments in a process in which moral reasoning serves as an evaluative mechanism to determine whether moral emotions are justified as part of a behavioral response to a moral dilemma. Moral enhancement cannot be reduced to the manipulation or alteration of moral emotions (affective and motivational capacities). It requires a robust framework that integrates findings in neuroscience (the neuroscience of ethics) and moral psychology and particular visions of human flourishing.

Notes

i. The following analysis is based on a section on cognitive enhancers in Jotterand, McCurdy, & Elger (2015).

ii. Sententia[39] defines cognitive liberty as "a term that updates notions of 'freedom of thought' for the 21st century by taking into account the power we now have, and increasingly will have, to monitor and manipulate cognitive function. Cognitive liberty is every person's fundamental right to think independently, to use the full spectrum of his or her mind, and to have autonomy over his or her own brain chemistry. Cognitive liberty concerns the ethics and legality of safeguarding one's own thought processes, and by necessity, one's electrochemical brain states. The individual, not corporate or government interests, should have sole jurisdiction over the control and/or modulation of his or her brain states and mental processes."[39: 222–223]

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5

Cognitive/Neuroenhancement Through an Ability Studies Lens

GREGOR WOLBRING AND LUCY DIEP

Introduction

Ability expectations are the basis of, and permeate many of the preferences and actions that have shaped society in the past and will shape society in the future. Exhibiting certain abilities is at the root of power to access privileges such as income, political influence, and employment,[1] and having power allows one to influence which abilities are seen as essential. In effect, it sets the tone for how we treat and label people who do not have those "essential" abilities. Cognition is one example of a cherished ability; the ableism of cognition (meaning that certain cognitive abilities are seen as essential) is often used as a tool to give one social group power over another. To provide a few examples: the power structure controlled by men constructed an artificial narrative that valued rationality as a cognitive ability expectation to the extent that it was seen as essential (ableism of rationality); men ultimately had the power to control the narrative around who were and were not deemed rational beings. The issue of rationality played itself out around the Suffragette's fight for women's right to vote, whereby the dominant narrative was that women were not rational and, as such, lacked an essential ability; this premise, in turn, was used to disable women in many areas, such as denying them voting rights.[2] The claim that women are irrational beings is still used[3,4] to justify sexism. Irrationality is also used as a tool to discredit ones opponents in many discourses[5,6]. *The Bell Curve*[7] is an example of using IQ, another cognitive ability expectation, to justify disabling racist tendencies and racism.[8] In general, numerous cognitive ability expectations are used to label people as lacking and to disable them.[9] Cognitive ability expectations are often linked to other ability expectations, such as being competitive. Sleeter outlined how "learning disability" was constructed as a category[10,11] in the United States in response to the raising

of cognitive ability standards in US schools in the 1960s for the purpose of keeping the nation in competitive standing against the Soviet Union after it launched the Sputnik satellite.[10,11]

Discourses around cognitive/neuroenhancements are part of our societal focus on cognitive/neuro abilities, are influenced by numerous ability expectations, and influence various ability-related dynamics. Our chapter is organized as follows. In the next section, we describe the field of ability studies, the framework of ability expectation and ableism, and its linkage to and difference from the academic field of disability studies. In the section "Ability Expectation Narratives," we present data on the imagery of the user in the brain–machine interface (BMI)/brain–computer interface (BCI) academic literature and discuss the results through the disability studies and ability studies question: what is the impact of such imagery on the self-identity security of the user (where one is accepted for one's set of abilities and where one is not forced, physically or by circumstance, to accept a perception of oneself that one does not agree with)?[12] In the section "Some Other Ability Expectations–Related Questions," we engage with other ability studies–related questions, such as: what ability expectations drive human enhancement in general and cognitive/neuroenhancements in particular? What is the impact of a given cognitive/neuroenhancement on ability inequality and inequity? What is the impact on ability security (where one is not forced to have a prescribed set of abilities to live a secure life[12] and what is the impact on ability privilege?[1] In the section "Anticipatory Governance and Ability Expectation Governance," we link the field of anticipatory governance to ability expectation governance, one area of focus by ability studies scholars that we link back to earlier sections. A final section concludes the chapter.

From Disability Studies to Ability Studies

Ability studies was formed as a field in 2008 to investigate which ability expectation (want stage) and ableism (need stage) hierarchies and preferences are evident within a discourse and the impact of such hierarchies and preferences.[8]

The disabled people rights movement coined the term "ableism" in the 1970s to highlight the negative consequences—the "disablism"—one experiences if one does not fulfill species-typical physical, mental, neurological, or cognitive ability expectations.[13] Disability studies scholars engage extensively with the meanings and dynamics of ableism and disablism.[14,15] Disability studies scholars and the disabled people rights movement question the claim that disablism (the problems faced by those who are labeled as physically, mentally, neurologically, or cognitively ability-impaired) originates within a body that does

not fulfill species-typical physical, mental, neurological, or cognitive abilities (the medical model of disablement). Instead, their premise is that many of the problems these people face are rooted in the societal environment that expects species-typical physical, mental, neurological, or cognitive abilities (the social model of disablement). A lively debate still exists around the origin of disablement. A second aspect of ableism questioned by disability studies scholars and the disabled people rights movement is the labeling of someone as impaired (a medical model of the body) because they do not have species-typical physical, mental, neurological, or cognitive abilities and the dynamic of species-typical normatization and normalization. Indeed, many people labeled as impaired do adhere to a social model of the body (see, e.g., Deaf Culture[16–19] and the discourse around neurodiversity[20–23]) and do not accept the deficiency label for their bodies. Indeed, "many disabled people perceive themselves in a cultural identity war with the so called non-disabled people where their self-identity understanding of being ability diverse and ability variant, as being a culture and not being ability deviant and ability deficient is rejected by many."[24] The debate about what is an impairment has existed for centuries and is especially evident since the appearance of the concept of the so-called normal person in the 19th century[25] and the appearance and manifestation of the dichotomy of normal versus pathological at the end of that same century.[25,26] "Normal" has no meaning in and of itself but needs a reference point.[25,27] Disabled people are a group labeled as impaired because they are linked to that part of the bell curve that indicates an underperformance in relation to the normal distribution of a given ability.

However, the cultural reality of ability expectation and ableism goes far beyond the group labeled today as impaired. We mentioned already the use of cognitive ability expectations and ableism to justify racism and sexism. Within ability studies, the very meaning of ableism has been reconceptualized to simply mean that one finds certain abilities essential. This reconceptualization allows for the investigation of ability expectations that are not directly linked to physical, mental, neurological, or cognitive abilities (such as being competitive, productive, or efficient) and for the analysis of these expectations that go beyond the species-typical state; this is an essential extension if one wants to investigate enhancements beyond the species-typical. With the reconceptualization of ability expectation and ableism comes the reconceptualization of disablism to mean the negative application of ableism toward biological structures seen as lacking essential abilities. This form of disablism allows us to investigate all negative uses of ableism, including those between people who are ability enhanced beyond the species-typical and the nonenhanced. Ability studies allows further for a positive notion of ability expectations and ableism, a discourse around which a social group may label a given ability expectation as positive or negative[28] and for the investigation of which ability expectations

can positively reinforce other ability expectations: which are in conflict with each other and which are neutral to each other.[29] Ability studies scholars do not only investigate how ability expectations and ableism shape the relationship between humans, but also how ability expectations and ableism shape the relationship between humans and animals[1,30,31] and humans and their environment[1,30,31] and the impact of enhancements on these relationships[1] (cognitive enhancement of animals is discussed as a way to decrease speciesism[1,32–34] and enhancement of humans is discussed in the context of human–nature relationships[1,35]).

Ability Expectation Narratives: The Example of BMI/BCI

Various social, ethical, economical, and regulatory issues related to BMI/BCI,[36–43] including cognitive enhancement enabled by BCI/BMI[44,45] and brain-to-brain interfacing,[33] have been covered in the academic literature. One area that has not been addressed yet is the image of the BMI/BCI user within the BMI/BCI academic literature. How one perceives oneself and is perceived by others is a key factor in human–human relationships. Ability expectations shape this perception. Cognitive abilities are often used as a tool to judge others. Sleeter's work thematized that the change in cognitive ability expectations in the United States in the wake of the Soviet Union's launch of Sputnik led to a decrease in acceptance of people who, up until then, fitted the norm. These people no longer fit the new cognitive ability norm and, as such, were labeled as learning impaired.[10,11] The discrepancy between self-perception and how one is portrayed by others rooted in ability expectation narratives is not only a problem for people labeled "impaired," but also for other social groups such as women and indigenous people. We present qualitative and quantitative data from two substudies that investigated the imagery of the BMI/BCI user within the BMI/BCI academic literature. We present qualitative data on how disabled people (one anticipated group of users) are portrayed. We discuss what the results may mean for disabled people and the future portrayal of neuro-/cognitively enhanced and nonenhanced people using the disability studies lens and the ability expectation and ableism framework.

DATA SOURCES

Substudy 1 is based on the academic databases ScienceDirect, Scopus, EBSCO (all), and Web of Science (accessed through the University of Calgary library on May 22, 2014). Substudy 2 is based on the academic databases ScienceDirect,

Scopus, OVID (all), EBSCO (all), Web of Science, and JSTOR (accessed through the University of Calgary library, July, 2012).[43]

SEARCH STRATEGY

In substudy 1, EBSCO (all) was searched for the presence of the phrases "brain machine interface" and "brain computer interface" in the abstract and the terms "patient," "disease," "chronic," "disabled person," "disabled people," "people with disabilities," "person with disabilities," and "gaming" in the search field "any field." Scopus and Science Direct were searched for the presence of the phrases "brain machine interface" and "brain computer interface" and the terms "patient," "disease," "chronic," "disabled person," "disabled people," "people with disabilities," "person with disabilities," and "gaming" in the search field (title, abstract, keyword). Web of Science was searched for the presence of the same phrases in the search field (topic). All abstracts of the articles found were uploaded as RIS files into the Knowledge Share (KSv2) software developed by Dean Yergens[46] to eliminate duplicate abstracts from the searches of the different databases. The abstracts were then combined into one PDF file for analysis in the qualitative data analysis software, ATLAS.ti.

In substudy 2, databases were searched for the phrase "brain machine interface." From this search, 1,058 articles were found, and the abstracts of all the articles were imported into Knowledge Share (KSv2).[46] This tool was used to systematically review the abstracts using the following criteria—include available articles, in English, that go beyond describing a technical aspect of BMI/BCI; exclude books, conference announcements, and purely technical articles. We used an abstracts kappa score (the primary and secondary researcher agreement) of 0.99. The full text of the $n = 71$ articles whose abstracts fulfilled the criteria were uploaded into the qualitative data analysis software, ATLAS.ti.

CODING AND ANALYSIS

All the abstracts obtained for substudy 1 and all the full-text articles obtained for substudy 2 were analyzed. A coding framework was developed that covered the research questions, and codes were generated for each article and abstract reflecting the narrative around the terms "disabled person," "disabled people," "people with disabilities," "person with disabilities," and the term "gaming." We analyzed the use of the term "gaming" because gaming is one area of mainstream consumer product development envisioned for BMI.[47] Table 5.1 covers substudy 1 and gives the article count of how a user is portrayed and how many articles covered the term "gaming."

Table 5.1 **Portrayal of the user and mentioning of the term "gaming" (ub-study 1)**

Superordinate Subject Category (technology product)	*Subject Code (user or application)*	*EBSCO (all) n =*	*Scopus n =*	*Science Direct n =*	*Web of Science n =*
Brain–machine interface		**763**	**1,377**	**169**	**694**
	Patient	36	238	35	105
	Disease	29	126	6	41
	Chronic	20	99	21	65
	Disabled person	0	0	0	0
	Disabled people	8	19	2	9
	People with disabilities	7	0	2	2
	Person with disabilities	0	4	0	0
	Gaming	0	2	0	6
Brain–computer interface		**3,184**	**6,148**	**570**	**3,202**
	Patient	461	946	116	463
	Disease	314	392	30	118
	Chronic	74	139	11	84
	Disabled person	0	0	0	0
	Disabled people	34	97	10	48
	People with disabilities	49	25	1	7
	Person with disabilities	0	0	0	0
	Gaming	8	3	3	83

LIMITATIONS

Our search terms were limited to "brain machine interface" and "brain computer interface" and did not use terms such as "neuro prosthesis." We also did not use every academic database. Therefore, we do not claim that our work captures all the work published; however, we believe the sample is large enough to allow us to reach some conclusions.

RESULTS

In substudy 1, reading those articles that use the terms "disabled person," "disabled people," "people with disabilities," or "person with disabilities"

(Table 5.1), only three articles used the terms without further qualifiers. All other articles used medical qualifiers such as *severe, severely, impairment, experience difficulties with motor task, motor disabled people, physically disabled people, serious disabled, to accelerate recovery, rehabilitation of, recover self-care ability*, and *disabled patient*. Gaming was covered in 97 BCI and 8 BMI articles. Of these articles, only three mentioned the term people with disabilities (two in abstract; one as keyword). Of the two mentioning people with disability in the abstract, one makes a difference between BCI developed for people with disabilities and for gaming.[48] The second one compares the functionality of a medical-grade system, the ANT device, and the gaming-grade Emotiv Epoc headset system[49] using "healthy" volunteers.

In the literature obtained in substudy 2, 67 out of 71 articles use the term "patient," and 21 use the term "impairment." The terms "disabled" or "disability" were used 25 exclusively with a medical connotation such as the identification of "medical conditions" such as *Parkinson's disease, spinal cord injury, amputation, stroke, amyotrophic lateral sclerosis, locked-in-syndrome, cerebral palsy*, and *advanced multiple sclerosis*. One article characterizes being disabled as something that continues to "trouble humanity today."[50] Some authors portray disability as impactful to society as a whole through increasing strain on individuals and the fiscal state[51] or prolonging personal, social, and economic burdens.[52] Some portray being deficient as "devastating to [one's] livelihood."[53] In tune with the medical portrayal of the user, the narrative of the utility of BMI/BCI also exhibits that sentiment. Restoration to "normal" abilities and prevention of loss of abilities are the two main utilities of BMI/BCI technologies covered. Often, the terms and statements "restoration,"[14,16] "[regain] significant functions,"[54] and "treatment"[50] are used in conjunction with terms that describe disability as "devastating,"[55,56] "fatal,"[57,58] and "severe."[58–60] Even for military applications, BMI/BCI technology is seen as having the potential to restore abilities to their injured soldiers[51] and to reduce future injuries and impairments through military combat using robotics operated remotely and using thought control.[51] A similar sentiment is shared with its potential implementation for space applications. It is perceived that BMI/BCI technology will allow for grander exploration missions without exposing an astronaut to the physical impacts of space.[61] As to concrete effects, BMI/BCI technology has been recognized as having the potential to allow individuals the opportunity to gain independence and to increase their quality of life.[50,58] Quality of life is often reflected in one's ability to interact and communicate with one's environment autonomously and to build relationships.[53,62,63] Guenther et al. (2009) states, "Perhaps the most debilitating aspect of profound paralysis due to accident, stroke, or disease is loss of the ability to speak. The loss of speech not only makes the communication of needs to caregivers very difficult, but it also leads to profound social isolation of the affected individual."[64]

Discussion

From a disability studies perspective, the results obtained are problematic for at least two reasons. One problem is the nearly exclusive coverage of disabled people within a medical narrative often coupled with negative ability-deficient language that denies disabled people the right to self-identity security. The second problem is that people labeled as impaired are not mentioned in articles that cover consumer applications of BMI/BCI, such as gaming. This might be understandable given that articles covering gaming application of BMI/BCI use neutral language such as player or positive language such as healthy[65] to portray the end-user and that involving people labeled as impaired might muddy the nontherapeutic angle of mainstream BMI/BCI gaming applications; nevertheless, not engaging people labeled as impaired ensures that their feedback on standards, gameplay, and integration—three elements identified as critical for the expansion of the BCI game market[65]—will be missing. This is problematic, given that BCI and BCI games are seen as having a strong influence on the future.[65]

Using the ability expectation and ableism framework, other problems are apparent, some of which we covered elsewhere.[43,66] To just stay with the imagery question: no article thematized the imagery of the user of nontherapeutic applications of BMI/BCI or the reality that the "patient" gains abilities through the use of the "therapeutic" device that go beyond the species-typical and what that might mean for the imagery of the so-called healthy. Covering "non-therapeutic applications of neurodevices (such as BCI games and those that purport to offer enhancements),"[67] the Nuffield Council on Bioethics recommended to the European Commission to consider "designating neurostimulation devices as products that should be regulated under the medical devices regime irrespective of the purpose for which they are marketed."[67] It is not clear what the consequences of this recommendation might be for the imagery of the end-user: for example, will some soon-to-be-user who is seen as healthy be redefined as "impaired?" Independent of the Nuffield Council on Bioethics recommendation, we might then see "normal" people defining themselves as "impaired" in order to receive BCI "health" products if they cannot receive them in other ways. A corresponding dynamics is seen in the issue of gender identity surgery, which in some places is paid for out of public funding if one then accepts the label of gender identity disorder.[68] What is unclear, however, is who will lose the label of impairment after they receive the BCI, and what will happen with the so-called healthy who do not have abilities linked to BCI products. Ability studies allows us to ask many other ability expectation dynamics–related questions.

Some Other Ability Expectations–Related Questions

One other question one can ask is which ability expectations drive human enhancement in general and cognitive/neuroenhancements in particular? The 2001 National Science Foundation report "Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology, and Cognitive Science," employed the ability expectation of productivity more than 60 times, the ability expectation of efficiency 54 times, and the ability expectation of competitiveness 29 times[8] to sell its message. A 2006 Association for the Advancement of Science workshop[69] concluded that the following ability desires were the main drivers for human enhancements: (1) to keep one's local and global competitive advantage, (2) to live securely, and (3) to maintain one's quality of life and one's consumer lifestyle. In the same report, it was stated that "personal interest in, or aversion to, using Human enhancement technologies depends on one's perceived social status, and how Human enhancement would affect his/her competitive advantage."[69] Other drivers identified include peer-pressure.[70,71] According to Donovan et al.,[72] who investigated how to achieve performance-enhancing drug compliance in sports, the likelihood of drug use will be highest when (1) threat appraisal is low, (2) benefit appraisal is high, (3) personal morality is neutral (e.g., "drug use is a personal decision—there are no victims"), (4) perceived legitimacy of the laws and enforcement agency is low, (5) relevant reference groups are supportive of drug use, and (6) there is high vulnerability on personality factors (e.g., low self-esteem, risk-taker, pessimist).[i]

Another topic one can investigate is the impact of a given cognitive/neuroenhancement on ability inequality and inequity. In short, there are two forms of ability inequality and inequity.[12] *Ability inequality* is a descriptive term denoting any (1) uneven distribution of access to and protection from abilities generated through human interventions, right or wrong, and (2) judgment of abilities intrinsic to biological structures such as the human body, right or wrong. *Ability inequity* is a normative term denoting an unjust or unfair (1) distribution of access to and protection from abilities generated through human interventions and (2) judgment of abilities intrinsic to biological structures such as the human body. Section 3 outlines one example of the second version of ability inequality and inequity, namely, the judgment of the human body and its abilities. Access to scientific and technological products is being debated for nearly every product and is an example of the first type of ability inequity and inequality. The access issue is also discussed in relation to cognitive/neuroenhancement,[71,73–78] BCI/BMI, brain-to-brain interfacing,[33] and the existence of a social group variously called the "techno poor," the "techno impaired," or the "techno disabled."[79,80]

The impact of BMI/BCI on ability security is another question one can ask. *Ability security* could be seen as part of the World Health Organization (WHO) framework of human security,[81] which consists of economic, food, health, environmental, personal, community, and political security.[82] Having species-typical physical, mental, neurological, or cognitive abilities is linked to certain privileges, such as employment, which can be seen to be part of economic and personal security. For example, according to the September 2014 US Bureau of Labor Statistics report, the employment-to-population ratio for people with disabilities aged 16–64 years is 28.4% for men with disabilities and 23.5% for women with disabilities. These numbers include people who look for work but cannot find work and people who do not look for work. The equivalent numbers for "ability normal" people are 78.0% for men and 66.1% for women. In other words, 71.6% of men with disabilities and 76.5% of women with disabilities do not work.[83] This statistic indicates that not being "ability normal" leads to a lack of access to employment. The United Nations Convention on the Rights of Persons with Disabilities highlights many other human insecurities that those who are seen as lacking required species-typical abilities face.[84] The question is how cognitive/neuroenhancement will play itself out with regards to ability security. Appel, in thinking about the US job market, states: "[w]e could look forward to a job market where prospective employees either enhance their brains or confront discrimination against un-augmented cognitive."[85] Given the dynamic around the appearance of the term "learning disability" and US employment realities for people labeled as impaired, it can be assumed that the unaugmented will face many of the same problems that people currently labeled as "impaired" face today. The same dynamic can be assumed in regards to other human securities. One can investigate numerous other ability expectation–related questions originating from various disciplines and stakeholders. Various academic fields also would benefit from engaging with the ability studies lens[13]; for example, it allows for the investigation of ability expectations intrinsic to ethics theories,[86] the evaluation of the utility of a given ethics theory for a given social group and their ability expectations, and the exploration of which ethics theories might lead to which conclusions related to the use of cognitive/neuroenhancements. To expand on just one field, we focus in the next section on anticipatory governance and propose that it should include a focus on ability expectation governance by investigating the impact, sustainability, and utility of existing ability expectation hierarchies and their impact.

Anticipatory Governance and Ability Expectation Governance

Anticipatory governance aims to understand the potential social, ethical, and political impacts of emerging discourses.[87] It entails foresight (constructing

plausible sociotechnical implications), integration (bringing together diverse fields such as social sciences and natural sciences), and engagement (bringing together public citizens, developers, engineers, policy-makers, and other actors to construct conversations around awareness, reaction, and knowledge development and sharing).[88,89]

In a 2006 Association for the Advancement of Science workshop on human enhancement, James Hughes, "stressed the importance of promoting 'techno-citizenship' and educating the global population on the science and technology behind enhancement. Technocitizenship is a term Hughes uses to refer to the rights and responsibilities of every person to be informed about important technological developments and contribute to the governance of an increasingly technology intensive society."[69]

Both Hughes's views and the purpose of anticipatory governance come with ability expectations that face many ability-related barriers. The right to be informed and to be able to contribute is seen as important for Hughes's techno-citizenship and for the operationalization of anticipatory governance. However, if it is a right to be informed, then the question is: who has to provide for the societal environment that allows one to act on this right? Who has the ability to provide the information to whom and in what way? Who has the ability to access the information? Who has the ability to know early enough that one has to be informed so that one can influence the anticipatory governance discourse of, for example, cognitive/neuroenhancement before the trajectory is already set? Who has the ability to get involved, who is not hindered by struggles of daily life that might allow little room for other endeavors? Is information distribution occurring in such a way that one has the ability to understand the issue? These are just a few ability-related questions that need answers, especially as they apply to socially disadvantaged groups. People labeled as impaired are underrepresented in many nontherapeutic discourses. To give one example; the Millennium Development Goals (MDGs) are seen as a milestone in global and national development efforts.[90] Their mandate ran out in 2015, and efforts were completed to generate a post-2015 development agenda.[91] Disabled people have stated for a long time that they are underinvolved in both the Millennium and post-2015 development discourse,[92] and one participation barrier identified by disabled people is the ability by "others" to control the imagery narrative around disabled people, one built on a pervasive medical narrative of disabled people.[92] The "Ability Expectation Narratives" section of this chapter provides evidence of such a pervasive medical narrative of disabled people within the BMI/BCI academic literature, thus highlighting an important consequence of that imagery: narratives around nonmedical applications of BMI/BCI, such as neurogaming,[47] are taking place without input from disabled people. The pervasiveness of a medical narrative of disabled people is not limited to BMI/BCI but is also evident in many science and technology discourses (e.g., social robotics[93]). The reality of "others" controlling

the imagery narrative about disabled people poses various questions for the cognitive/neuroenhancement governance discourse. Who defines/will define the nonenhanced and the enhanced, and who controls this narrative? Will we see "ability expectation creep" with the accompanying change in who is seen as healthy? We mentioned already the Nuffield Council of Bioethics recommendation[67] that links neurodevices to the health discourse. However, it is not clear what this really means in the end (e.g., "given that people will value these benefits [benefits of cognitive enhancement devices] to different degrees, and given the absence of the particular vulnerabilities that attend the medical context, the risk benefit assessment should err on the side of allowing consumers to decide whether the risks are worth taking"[94]).

Other ability expectations also that need governance, such as the do-it-yourself (DIY) ability expectation. DIY is thematized in areas such as personalized medicine,[95,96] synthetic biology,[97,98] democratizing science,[99,100] transcranial direct current stimulation,[101] cognitive enhancement,[102] and homemade brain interfacing,[33] as is the need to govern DIY.[103] Many different ability expectations are linked to DIY, and mapping out these ability expectations and their consequences might be worthwhile.

And there are other ability expectation questions that need to be explored as they relate to cognitive/neuroenhancement governance. We do not understand yet which abilities enabled by cognitive/neurointerventions will lead to what kind of privileges. We stated earlier that certain abilities give one the privilege of employment, that not meeting certain cognitive abilities led to the deficit label of "learning disability," and that various cognitive ableisms are used to give one social group power over another social group. It is less clear which cognitive ability enhancements will lead to which privileges within which societal context (cognitive ability expectations might differ between, for example, a post–knowledge society and a hunter-gatherer society). Using the lens of societal context, it will be important to answer questions such as:

- Which non–body-related ability expectations influence the push or rejection of cognitive/neuroenhancements?
- Which ability expectations exhibited around cognitive/neuroenhancements are sustainable?
- Which ability expectations will become important, are obsolete, are not accepted, or are futile?
- Which ability expectations will be in conflict with cognitive/neuroenhancements ability expectations?
- Which will be the new ability expectation conflicts enabled by cognitive/neuroenhancements, and between whom will be ability expectation conflicts exist?

Earlier, we identified ability expectation-related drivers for human enhancement. Discourses linked to these drivers will influence the answers to the listed questions. If the ability expectation of competitiveness, for example, is a main driver, then ability expectations that counter competitiveness will become obsolete, unacceptable, or futile, and cognitive/neuroenhancements that can sustain competitiveness will be favored (which means that they will require a certain safety level because low safety impedes on competitiveness and sustainability). Conflicts will continue to exist between the powerful and the marginalized, with inequality and inequity only being addressed as long as it benefits and does not impede competitiveness. New conflicts will arise between the cognitively enhanced (the more competitive) and the nonenhanced (the less competitive). However, if a given social structure decides that competitiveness is not the ability to cherish but the ability to live in a harmonious society, then the answers to our questions will be different. As to who will have control of the ability expectation discourses that influence the use of cognitive/neuroenhancements, data so far suggest that the marginalized will not control or even help to shape these discourses; instead, this role will belong to those who already are privileged.[104] Indeed although a lot has been written about democratizing science and upstream engagement, this has not led to a shared shaping of the discourse by the marginalized;[104] this is in part due to ability expectations that the marginalized cannot meet.[104]

Conclusion

The intent of this chapter was to introduce the reader to the ability studies field and the ability expectation and ableism framework. Some ability expectation aspects of relevance to cognitive/neuroenhancement governance are discussed using the lens of disability studies. However, disability studies is seen to apply to only one social group (the less than species-typical able).[13] Ability expectation dynamics of relevance to the governance of cognitive/neuroenhancement play themselves out not only in relation to the less than species-typical able and their relationship to the enhanced, but also between enhanced humans and "healthy" species-typical (nonenhanced) humans. As well, these dynamics influence human–animal and human–nature relationships.[1,32,33] Ability studies allows for a differentiated analysis of ability expectation dynamics and the engagement of a different mix of people and disciplines to enrich the governance of cognitive/neuroenhancement. To conclude this chapter, we leave the reader with a dialogue from the 2003 game *Deus Ex: Invisible War* that reflects the importance of ability expectation governance and other issues mentioned in the chapter.

Paul Denton: If you want to even out the social order, you have to change the nature of power itself. Right? And what creates power? Wealth, physical strength, legislation—maybe—but none of those is the root principle of power.

Alex D: I'm listening.

Paul Denton: Ability is the ideal that drives the modern state. It's a synonym for one's worth, one's social reach, one's "election," in the Biblical sense, and it's the ideal that needs to be changed if people are to begin living as equals.

Alex D: And you think you can equalise humanity with biomodification?

Paul Denton: The commodification of ability—tuition, of course, but, increasingly, genetic treatments, cybernetic protocols, now biomods—has had the side effect of creating a self-perpetuating aristocracy in all advanced societies. When ability becomes a public resource, what will distinguish people will be what they do with it. Intention. Dedication. Integrity. The qualities we would choose as the bedrock of the social order. (*Deus Ex: Invisible War*)[105]

Note

i. We argue elsewhere[68] that disabled people would be prone to take up enhancement-enabling products if they have access to them if they continue to feel unaccepted and unsupported as they are and if enhancement products might be seen as a way out of the problems they face.

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6

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 enculturalization 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 environing 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 concommitant 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 antisocial 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 bioethicist 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 Karas[60] 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 pubic 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.

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Part 2

INTERNATIONAL PERSPECTIVES

7

Cognitive Enhancement

A South African Perspective

DAN J. STEIN

South Africa is arguably a particularly useful country with which to think about issues in psychiatry and psychology. First, it is a country with remarkable past and present socioeconomic disparities; providing a context for thinking about how such disparities may impact on cognition, affect, behavior, and their disturbances.[1] Second, it is a country that has undergone a transformation from an apartheid system to a modern democracy; this change provides a context for considering how past traumas and a more recent focus on human rights, forgiveness, and reconciliation impact on psychological and psychiatric states.[2] Third, it is a low- and middle-income country (LAMIC); although it has some features in common with the Western, educated, industrialized, rich, and democratic (WEIRD) world,[3] it also has much in common with the many regions of the world that are still in process of industrializing.

Indeed, a broad range of questions in psychology and psychiatry have been productively investigated in South Africa.[4] There has, however, been relatively little focus on specific questions pertaining to cognitive enhancement.[5–8] This chapter will explore a number of issues that may be particularly relevant to considering cognitive enhancement in a LAMIC in general and to South Africa in particular. First, I consider the question of cognitive enhancement in a society characterized by significant socioeconomic inequality. Second, I consider the issue of cognitive enhancement as one aspect of well-being. Third, I consider the contrasting approaches of global mental health and clinical neuroscience. To start, however, I consider a conceptual framework that outlines different approaches to cognitive enhancement.

Conceptual Framework

I have previously put forward a conceptual framework for thinking about philosophical debates in psychiatry in general and issues in cognitive enhancement in particular.[8–11] This framework outlines two contrasting approaches to conceptual questions about the nature of science, language, and medicine, which in turn lead to different approaches to a range of psychiatric debates, including that of cognitive enhancement. The framework then attempts to provide an integrative perspective, with the aim of moving this series of debates forward. The contrasting approaches are intended to be heuristically useful, rather than to cover the work of any particular author.

A first approach may be termed classical and has its roots in medieval nominalism, the early Wittgenstein, and the logical positivists. In this view, there is an emphasis on science as knowledge of the lawful relationships between the data of the world and on language as providing operational definitions that can be used when putting forward such covering laws. A classical approach to categories holds that meaning can be fully specified in terms of our direct knowledge of the world and subsequent definitions and logic (e.g., a square can be defined in terms of its necessary and sufficient properties). Thus, in the health sciences, medical conditions can be defined in theory-neutral and value-free terms, and the underlying laws that account for the relevant data can then be determined.

A classical position may draw a firm line between treatment for medical conditions and enhancement of normal abilities. Some authors have argued on the basis of the principles of distributive justice that society need only provide resources for pathologies. Bioconservatives have argued that when medicine focuses on enhancement, it runs the risk of disturbing the natural order, a view that has been termed "pharmacological Calvinism."[12] In the United States, for example, the President's Council on Bioethics has argued that "[T]he naturalness of means matters. It lies not in the fact that the assisting drugs or devices are artefacts, but in the danger of violating or deforming the nature of human agency . . . biotechnology interventions act directly on the human body and mind to bring about their effects on a passive subject."[13]

A contrasting approach may be termed critical and has its roots in the work of authors such as Vico and Herder, the later Wittgenstein, and a range of continental philosophers. In this view, science is a theory-driven and value-laden process. Language provides a medium for understanding and for communication, rather than a precise tool for cutting nature at her joints. A critical approach to categories argues that language reflects a speaker's way of life and that meaning cannot simply be reduced to formal rules (e.g., our definition of a weed differs from place to place and time to time, reflecting particular contexts). Similarly, our social constructions of disease vary over geographical

space and over historical time, reflecting a variety of different theoretical approaches and different values.

A critical position argues that both treatments and enhancements reflect the power structures and social values of particular societies (e.g., consider the growing use of cosmetic surgery throughout the developing world). The extension of medicine to include enhancement technologies is consistent with its role in decreasing social deviance and is problematic insofar as it overemphasizes technology and dehumanizes people. Some psychotherapies may be useful in fostering self-knowledge, and some psychotropics may allow an interrogation and deconstruction of "reality." However, just as cosmetic surgery reinforces particular social values (e.g., equating women's looks with their value), so cosmetic psychopharmacology acts primarily as a conservative force, promoting inauthenticity and interfering with self-understanding.

An integrative approach attempts to incorporate key aspects of both the classical and critical approaches. While science is theory-driven, it can provide an understanding of the real structures and mechanisms that underpin the data of the world. Our language categories often reflect social practices and are typically fuzzy, but they can also be debated and refined in a reasonable way; we easily agree that some typical conditions (e.g., acute infection) are diseases that deserve treatment, but more atypical conditions (e.g., alcoholism) and interventions remain contentious and deserve ongoing debate (about considerations such as the harmfulness of the condition, about whether individuals bear responsibility for the condition, and about whether medical intervention is deserved).

An integrative perspective would be wary of any attempt to find a universal rule that differentiates between treatment and enhancement or, conversely, that rejects any possibility of a reasonable decision about where this line should be drawn. For any particular individual, conceptual and empirical work, weighing up the relevant facts and values can help determine what the best intervention is at any particular point in time. Although advances in biotechnology, such as cognitive enhancement, may be useful for a specific individual, they may also be associated with important costs; in the clinical setting, the benefits and costs of any particular intervention must be carefully weighed by the clinician and the patient in order to optimize decision-making.

Cognitive Enhancement in an Unequal Society

From a classical perspective, there is an objective, reality-based distinction between society providing each child with optimal opportunities for education and that society making available specific medical enhancements to improve cognitive ability beyond normative baselines. In a society characterized by

significant inequality, issues of distributive justice are likely to be viewed as particularly important, and this perspective may be used to argue that treatments for specific pathologies should be made widely available, whereas enhancements to improve cognitive abilities should be a matter of individual choice.

From a critical perspective, within any particular society, there is differential access to both educational opportunities and to a range of other resources (including cognitive enhancements); demarcations between these different kinds of resources are subjective and value-based. In a society characterized by significant inequality, interrogating social values is likely to be viewed as particularly important, and this perspective may be used to criticize the use of psychotropics (e.g., as facilitating the medicalization of social problems) and to promote the use of psychedelics and entheogens (i.e., drugs used to enhance religious or spiritual experience).

From an integrative perspective, the facts and values relevant to particular interventions need to be carefully weighed. In a society with significant inequality, some interventions are so strongly associated with positive outcomes that they should be made freely available. These might include access to early schooling (e.g., interventions aimed at enhancing early childhood development) and opportunities for further schooling later in life (e.g., interventions aimed at adolescent and youth development). However, evidence- and valued-based considerations may indicate that other interventions, such as psychotropic enhancement, bring relatively little "bang for the buck" and should not be prioritized.

In considering issues around neuroenhancement, it has been argued that social resources should be conserved for treatment (rather than enhancement) and that enhancement may unfairly favor more privileged sections of society that can afford such interventions.[14] Various authors have also emphasized the importance of ensuring that neurotechnologies are not inappropriately used to strengthen asymmetrical relationships between individuals and groups.[15] In the South African situation, the use of cognitive enhancement by those with more resources arguably runs this risk. At the same time, a range of interventions (e.g., educational) are already being used by those with more resources and help to cement their status.

Empirical studies of costs and benefits of interventions may well be relevant to our judgments about cognitive enhancement. Significant numbers of various populations already appear to be using psychotropic agents for enhancement purposes,[16] although there are few data from low- and middle-income countries such as South Africa. There is no a priori reason to conclude that such agents are either helpful or harmful; indeed, given genetic variability, individual responses may be quite variable. Large numbers of the population are also attempting to enhance mental health through cognitive, behavioral,

and psychodynamic means. In the South African setting, traditional and alternative healers are also used for such purposes.[17] However, there is a dearth of empirical data on the efficacy and cost-effectiveness of such interventions, particularly in low- and middle-income countries. Arguably, appropriate nutrition and exercise are likely to be among the most efficacious and cost-effective positive mental health interventions in both higher and lower income contexts.

Controversies About Well-Being

From a classical perspective, the constructs of both disease and well-being can be operationalized in an objective, reality-based way. Furthermore, it makes good sense for clinicians to be offering interventions for well-being; such activities are consistent with a comprehensive definition of health (such as that put forward by the World Health Organization) and with the way in which democratic society encourages the "pursuit of happiness." From a critical perspective, however, concepts of disease and well-being are both best understood as socially constructed. We need to be very careful about the way in which such constructions reflect predominant social structures and values and deflect attention from underlying structural inequalities that need to be confronted and altered.

From an integrative perspective, there is—and there should be—significant debate about the construct of "well-being." My view and your view of well-being may reasonably differ. For example, although there is likely to be substantial agreement about some typical components of well-being (e.g., resilience to stress), there may well be controversy about more atypical components (e.g., concepts of career consolidation). Thus, for example, in rural South Africa, notions of well-being may not overlap with Western emphases on the importance of career as part of well-being. However, as in the case of categorizing particular conditions as mental disorders, a reasonable decision about the utility of interventions for well-being can be made on the basis of a rigorous assessment of the relevant facts and values.

When it comes to interventions for physical health conditions, we can easily agree that cosmetic surgeons who focus their attention on disfigured children are doctors. Analogously, we can easily agree that a surgeon who directs his or her attention on transforming a particular individual to look more like a favorite sports star is not a doctor but rather a "schmoctor." Furthermore, for a particular individual, we can reasonably debate whether a particular cosmetic surgery procedure to enhance appearance is doctoring or schmoctoring. Similarly, mental health clinicians may reasonably be interested in key aspects of addressing well-being (e.g., improving resilience after trauma seems a laudable goal in South Africa). It may be harder to accept, however, that mental

health clinicians who help individuals, say, "tune into the energies of the universe" are doctors rather than schmoctors. Similarly, although pharmacological interventions may theoretically improve interpersonal relationships[18] (and so contribute to the reconciliation project in a setting such as South Africa), there are immediate theoretical concerns (would such reconciliation be experienced and perceived as authentic?) and empirical concerns (would clinical benefits outweigh risks?). Again, however, we can reasonably debate whether particular mental health interventions aimed at mental enhancement are doctoring or schmoctoring.[19]

Such debate is in part about the validity of the goals of intervention (e.g., surgery to look like a favorite sports star does not seem to be a health issue), and it is in part about their cost-effectiveness (e.g., South African society may be able to bear the costs of cosmetic surgery for major disfigurement but not for enhancement procedures). Similarly, society may decide to focus on treating patients with severe mental disorders, rather than to fund clinical interventions to enhance resilience. A broad range of interventions can potentially help humans to flourish mentally, including education, participation in the arts, and the like. It remains contentious as to whether interventions to improve positive mental health should fall primarily within the purview of mental health clinicians, given the treatment gap for serious mental disorders.[19]

In low- and middle-income setting such as South Africa, where such gaps are particularly large, it remains important to argue that there is "no health without mental health."[20] Given that mental health services have long been underresourced in these settings, we must continue to struggle for and aim to achieve parity in the resourcing of physical and mental health services, whether focused on prevention (including resilience and well-being) or on treatment of severe disorders. Toward such ends, policies are required that emphasize that mental and physical health services are equivalently prioritized and that indicate how the human rights of those suffering from mental disorders will be vouchsafed during the development of such services. Such policies should ensure that mental health will be integrated into general preventive and curative services and that these will be made available in community settings.[21]

Integrating Neuroscience and Global Mental Health

The field of global mental health is perhaps one of the most relevant to addressing mental health interventions in South Africa. This field has emerged in response to growing awareness of the considerable contribution of mental disorders to the global burden of disease, the underdiagnosis and undertreatment of mental disorders (particularly in low-and middle-income countries, where

the vast majority of the world's population live), and an important research gap (with only 10% of expenditure on health research devoted to problems that primarily affect the poorest 90% of the world's population).[22] The literature in this emerging discipline has focused on a number of principles, including the argument that mental health services and research are important for development, growing evidence that mental health services are effective and cost-efficient, and that access to mental health services is a human rights issue.[23] From this perspective, questions about cognitive enhancement are unlikely to be foregrounded, with the exception of emphasizing the value of measures that ensure healthy development for all.

A focus on neuroenhancement is perhaps more consistent with a contrasting important approach that has emphasized that psychiatry is a clinical neuroscience. This view argues that psychiatry focuses on brain disorders, that there is a need for more translational investigations (moving from bench to bedside), and that our growing knowledge of the neurogenetics and neurocircuitry of these conditions will ultimately lead to new approaches to diagnosis and treatment.[24] The literature on psychiatry as a clinical neuroscience has also focused on a number of principles, including the argument that many psychiatric disorders are best conceptualized as neurodevelopmental disorders, that improved understanding of the pathophysiology of such conditions will lead to more targeted interventions, and that a personalized psychiatry addressing a patient's specific molecular and neuronal profile is needed.[23] This approach is arguably more encouraging of enhancement interventions, insofar as it emphasizes that behaviors lie on dimensions and insofar as it leads to a personalized medicine aimed at assessing each individual's strengths and vulnerabilities and intervening accordingly.

For those based in low- and middle-income countries such as South Africa, these two approaches appear to have a number of important differences. Clinical neuroscience emphasizes individuals' biology and personalized medicine, whereas global mental health focuses on the health of communities and on key, generally applicable interventions. Clinical neuroscience emphasizes the need for new interventions and the importance of translational science that moves from bench to bedside, whereas global mental health focuses on adapting existing interventions and on the importance of implementation science that scales up interventions from the bedside to beyond. On the other hand, it is relevant to emphasize that recent consensus views of research priorities in psychiatry and mental health emphasize the necessity for both approaches.[25] Furthermore, these different approaches to psychiatry arguably offer complementary approaches to informing psychiatric diagnosis, etiology and risk factors, and treatment development.[23] Similarly, they may also allow for an integrated approach to considerations of cognitive enhancement in low- and middle-income countries such as South Africa.

First, there is a need for the development of a cross-cultural neuroscience that is able to provide a comprehensive understanding of the range of variations found in non-WEIRD populations.[23] In South Africa, the system of apartheid notoriously discriminated against different groups on the basis of putative racial origins. Although the dawn of democracy and processes such as the Truth and Reconciliation Commission have initiated important changes in people's perceptions of the Other, it would not be surprising if apartheid had enduring effects on social cognition and on health disparities. Against such a backdrop, neuroscience research that reifies population group differences would necessarily be highly inflammatory. On the other hand, it is important to explore biological and social mechanisms that are relevant to understanding individual and population-level diversity in cognition, affect, behavior, and outcomes such as health in the country. This requires using the tools of both neuroscience (e.g., focused on biological mechanisms) and global mental health (e.g., with its awareness of social mechanisms).

Second, there are potential synergies between the clinical neuroscience and global mental health perspectives for improving and optimizing preventions and treatments. There are practice gaps and adherence gaps in both low- and high-income countries; thus, throughout the globe, there is a need for better dissemination of clinical evidence and a need to enhance adherence to treatment. In addition, there is individual variation in treatment response in both low- and high-income countries; thus, throughout the globe there is a need to improve our understanding of pharmacogenetic and other factors underlying such variation. There is unfortunately no mosquito net for mental disorders;[26] instead, there are multiple risks for and causes of these conditions, and a multilayered and multisectoral approach to prevention and treatment is therefore required. This approach would necessarily address enhancement and well-being insofar as it focused not only on early recognition and prevention of psychiatric disorders, but also on living and working conditions that enable healthy psychosocial development, positive interactions within and between social groups, social protection for the poor, antidiscrimination laws and campaigns, and promotion of the rights of those with mental disorders.[23]

Conclusion

In this chapter, it was noted that, in a country with significant inequity, there will be an understandable concern that neurotechnologies are not inappropriately used to strengthen asymmetrical relationships between individuals and groups, while, at the same time, a range of enhancements are already being employed by those with more resources. It was also suggested that, just as

it is important to debate rationally whether atypical conditions are diseases deserving of treatment, we should also rigorously debate the facts and values pertaining to whether particular mental health interventions aimed at enhancing well-being are in fact good doctoring rather than being merely "schmoctoring." Finally, it was suggested that clinical neuroscience and global mental health provide complementary perspectives on diagnosis and treatment and that, in a country like South Africa, it is important to explore biological and social mechanisms that are relevant to understanding individual and population-level diversity in cognition, affect, and behavior and then to target such mechanisms using the tools of both clinical neuroscience and public health.

The chapter began by suggesting that South Africa is a particularly useful country with which to think about issues in psychiatry and psychology. Certainly, low- and middle-income countries have some important distinguishing features that may require special attention during debates on cognitive enhancement. At the same time, issues relevant to South Africa are arguably not entirely unique: social inequality and health disparities exist also in high income countries. This point perhaps also opens up the possibility that African solutions may be relevant to a range of other countries. There is certainly a need to close the research gap that exists across the globe, and, similarly, it would seem important for neuroethics to be an international field that encourages the development of a cross-cultural neuroscience and that ultimately contributes to global mental health.

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8

Cognitive Enhancement

A Confucian Perspective from Taiwan

KEVIN CHIEN-CHANG WU

Introduction

In recent decades, human enhancement has become a topic hotly debated in academia.[1] Similar to the field of thanatology, which addresses death, dying, homicide, suicide, euthanasia, and assisted suicide, the scholarship in human enhancement is broad in its scope and deep in its subtleties. The line between disease treatment and enhancement as improvement is blurring.[2] All the human developmental stages, including prenatal, perinatal, and postnatal, are potential timings for enhancement. In contrast to physical enhancement and longevity enhancement, which have their own subdivisions, mind and behavioral enhancement can be further categorized into cognitive enhancement, moral enhancement, mood enhancement, and more.[3,4] As we focus on cognitive enhancement, a nonexhaustive list of the variety of technologies utilized in the broadest sense may include genetic management, education, mental training, physical exercise, social institutions, information technology, food nutrients, psychoactive drugs, and other neurotechnologies such as brain–machine interfaces, transcranial magnetic stimulation, or direct current stimulation.[5,6]

Almost everyone wants to be smart, but how we get there matters. Debates are vigorous about the ethical permissibility of cognitive enhancement through these new technologies, and a few of the issues included in these discourses are autonomy, liberty, human nature, authenticity, playing gods, hyperagency, fairness/justice, and risk–safety assessments. Basically, most of the ethical discourses about cognitive enhancement are constructed by scholars in Western countries. With rare exception, even most of the empirical data about cognitive enhancement also originates from Western countries. To enrich the ethical and empirical inquiry into cognitive enhancement, it is important to explore how, in different cultures, different styles of thinking—such as Confucianism—might

bring forth a different insight into this issue. This might enhance the quality of debate as governments struggle to construct a technology policy of cognitive enhancement with cultural sensitivity.

The meaning of cognitive enhancement is vague and ambiguous in the literature. Different definitions of cognitive enhancement may have different discourse implications. For example, if we recognize enhancement only in contrast to medicine, enhancement technology will be somewhat extraordinary; if we simply take enhancement as methods for betterment, then enhancement technology may become trivial.[6] However, for the purpose of this chapter, which links cognitive enhancement to the Confucian discourse, it is necessary to adopt the second interpretation of enhancement since the contrast between enhancement and medical treatment is not a major theme in Confucianism. As regards the scope of cognitive functions in cognitive enhancement, memory, perception, attention, information processing (including reasoning and decision-making), and intelligence will all be included. Some scholars define cognitive enhancement broadly and include cognition, emotion, and motivation.[7] However, to a Confucian understanding of cognitive enhancement, self-cultivation (*xio shen*) as an important way to enhance virtues in oneself in the Confucian discourse actually includes both knowledge and morality aspects. Therefore, the chapter will address moral enhancement as part of the Confucian conceptualization of cognitive enhancement.

In the second section, the chapter delineates briefly the major arguments for and against cognitive enhancement and addresses the need for a Confucian perspective. In the trend of globalized individualistic bioethics (or neuroethics specifically), Confucian theories can enrich ways of seeing and managing issues of cognitive enhancement. In the third section, the chapter reviews the current Confucian discussions on human enhancement (e.g., genetic enhancement) and the variety of Confucian reasoning therein. Although some scholars argue that there is basic tension between biotechnology and Confucian values, other scholars argue that with provisos and limitations Confucians will be open to adopting human enhancement. Bundling the Confucian discourses on human nature, self-cultivation, and harmony, the fourth section explores what a Confucian ethic for cognitive enhancement might look like. When neurotechnology can be used for self-cultivation in ways harmonious with humanity and nature, Confucians will see no reasons why cognitive enhancement should be prohibited. In a democratic society, the public attitudes' toward technology is important for policy-making. The fifth section describes the results of a public survey in Taiwan regarding whether cognitive enhancement is acceptable. Although Taiwan has a Confucian cultural heritage, not all Taiwanese people are deeply influenced by Confucianism, whether knowingly or unknowingly. The majority of those surveyed disagree that cognitive enhancement is acceptable to society or for self-cultivation. The author explores possible reasons for

these results. In conclusion, based on literature review and empirical data in Taiwan, the author proposes Confucian incremental policy-making for cognitive enhancement in the interim.

Discourses on Cognitive Enhancement: Pros and Cons

A review of the literature has shown that cognitive enhancement involves a variety of ethical (at both individual and population levels), philosophical, and religious issues. In general, core arguments for and against the adoption of cognitive enhancement can be grouped into five categories: (1) risk, safety, cost, and benefit; (2) freedom, autonomy, authenticity, and hyperagency; (3) fairness and justice; (4) human nature; and (5) playing god(s). Because this chapter addresses secular issues only, category (5), which deals with religious arguments on the offense to god(s)—although not without its merits—will not be discussed.

RISK, COST, AND BENEFIT

The risk, safety, cost, and benefit of cognitive enhancement can be analyzed both at the individual and population levels. However, the permissibility of cognitive enhancement at the population level is the necessary condition for addressing whether an individual should use cognitive enhancement technology. The arguments are similar to discourses in public health ethics and law. Borrowing the principle of proportionality in the continental law system, we can set up three criteria to evaluate the adoptability of cognitive enhancement technology: (1) the technology can appropriately enhance cognitive functions, (2) the technology is the least restrictive way to enhance cognitive functions, and (3) the benefit of the technology can appropriately overweigh the considerations of risk and cost.[8] As regards the first criterion, we need scientific evidence to demonstrate that the technology at issue can fulfill its promise to enhance some specific cognitive function. Although not without its criticism, the discourse of evidence-based medicine advises meticulous examination of the efficacy (in the laboratory) and effectiveness (in the real life) of technology based on its level of evidence excellence. According to the discourse, meta-analysis of randomized control trials is the best evidence for adopting a technology at the population level.[9] If no better choice is available, principles of evidence-based medicine for adopting technologies are useful in the criterion 1 situation. Criterion 2 is related to autonomy, liberty, and freedom, and thus will be addressed later. Criterion 3 is related to how we evaluate the risk, cost, and benefit. Usually, during the test of each cognitive enhancement technology based on criterion 1, we may get a profile of the side effects of the technology.

However, the time scale is a problem for this kind of test due to the fact that considerable costs are associated with the clarification of a long-term risk profile, such as the potential of addiction, late-onset side effects, diminished effectiveness, and overconfidence. Moreover, the calculation of cost and benefit/effectiveness is itself a focus of debate.[10, 11] For example, what should be included when calculating cost and benefit/effectiveness? In the broadest sense of evaluation, even autonomy and justice have their values that can be transformed into cost and benefit. Also, the kind of format that should be adopted must be deliberated in advance. For example, there are a variety of value calculation formats, such as risk–benefit analysis, cost–benefit analysis, and cost-effectiveness analysis.[12] In addition, some scholars argue for the adoption of a precautionary principle that much favors the status quo when facing the uncertainty and the possibility of catastrophe engendered by potentially beneficial technology.[13] For these scholars, the burden of proof for the safety of a new technology rests on the technology promoters. Generally speaking, human–machine collaboration seems to be the most promising technology for enhancing cognitive performance; in some specific memorizing skill training, the efficiency could increase up to 1,000%.[14] Biomedical enhancement technology only carries limited effects (10–20%).[5] How much benefit is worth the cost and risk is also an issue needing inputs from the social level. Because each cognitive enhancement technology must be evaluated empirically and separately for a specific goal, laying out a framework for conducting the evaluation already serves the purpose of this section.

FREEDOM, AUTONOMY, AUTHENTICITY, AND HYPERAGENCY

Simply put, the "authentic self" is seen "when we exhibit or are in possession of what is most our own: our own way of flourishing or being fulfilled."[15] Those who are against enhancement worry that we might reach a level of self-alienation, becoming no longer our true selves, in which we are separated from our non–technology-mediated experiences. Proponents of enhancement, instead, often emphasize the aspect of self-discovery and self-creation in utilizing enhancement technology because it is an individual's right and liberty to choose her own way to the "good life." Parens (2005) argues for taking an intermediate position by reconciling these two frameworks of authenticity on a case-by-case basis. As will be shown later, Confucianism emphasizes the dynamic change of self and harmony with nature.[16] The essential or true self is not important in the process of self-cultivation.

Autonomy as self-regulation is the hallmark of modern bioethics.[12] For those favoring enhancement, making competent and informed decisions to

use cognitive enhancement technology is the demonstration of autonomy. Furthermore, the level of autonomy may increase with the enhanced level of cognitive abilities. Using cognitive enhancement, a person can thus obtain enhanced cognitive freedom based on his or her free choice.[15] On the other hand, those against the technology worry that, in a future world wherein the technology is widely used, many might actually use the technology because of social pressure incurred through competition,[17] because they want to be the same as others, through fear of discrimination, and the like. Based on this perspective, it is doubtful whether an individual choice to use cognitive enhancement technology is autonomous and has cognitive freedom.[18,19] However, on the other hand, in our daily lives, we already experience different kinds of social pressure for us to behave appropriately, and we would not deem this a loss of autonomy or freedom. For example, as information technology is improving our lives, the "social pressure" to use the technology might not be a bad thing. In addition, it is an empirical question whether the social pressure for adopting enhancement technology would be greater than what we encountered today. For those under huge social pressure to use enhancement technology, it may be necessary to design a supportive system so that they can lead a different and meaningful life in the enhanced context. Because an incremental enhancement policy[i] might diminish inappropriate social pressure to conform,[20] a stage-by-stage Confucian scheme of self-cultivation might be one of the choices.

Hyperagency means "a state of affairs in which virtually every constitutive aspect of agency (beliefs, desires, moods, dispositions and so forth) is subject to our control and manipulation—and that this quest undermines one or more of the conditions for a flourishing, meaningful and worthwhile existence."[21] Worries about hyperagency include loss of fixed reference with feelings of instability, choice overload, diminished satisfaction with one's current life, and increased appreciation of one's current life as absurd.[21] Actually, it needs empirical psychological inquiry to demonstrate whether the availability of a variety of enhancement technologies definitely would lead to the doomsday scenarios just depicted. But, even if we assume the possibility of their occurrence, an incremental cognitive enhancement policy per se might render people capable of handling these feelings or cognitive overload. Because self-cultivation in Confucianism could combine cognitive and moral enhancements, the possible impact of hyperagency, if it exists, might not be that detrimental.

FAIRNESS AND SOCIAL JUSTICE

Even if cognitive enhancement may be good for an individual wanting to improve his capability and productivity, discourses against cognitive enhancement emphasize the negative social impact of enhancement on fairness and justice. Following this train of thought, the high price of the brand-new

cognitive enhancement technology would render the poor unable to utilize the technology and thus aggravate the discrepancy between the rich and the poor in their social achievements. To solve this problem, the state may adopt a national policy, which might be very expensive, to make cognitive enhancement technology accessible to everyone at a fair price.[22,23] This policy can also lessen the problem of cheating in competition when the competition rules allow the use of the technology and thus level the playing field. However, under the ideology of market competition, cognitive enhancement may be taken as a positional good (i.e., being a good due to its relative social scarcity), the value of which would be reduced if everyone has it. Therefore, some scholars argue that it is "no good" for everyone in the long run if this sort of policy is adopted.[24] There are two problems in the positional good argument. First, competition is not necessarily the major goal in all social practices.[25] That is, we should not use sports as the model for other important social activities. Take education as an example: if what we care about is improvement of students' knowledge rather than ranking their performances in examinations, there is nothing we can call cheating or a loss of positional good. Second, cognitive enhancement has its own intrinsic good. Social good still exists in the long run even if there is no positional good between individuals.[20] Finally, how we allocate resources among cognitive technologies and other social practices is an important issue of distributive justice. There are a variety of theories of distributive justice, such as utilitarianism, libertarianism, maximin in Rawls's justice theory, Sen's capability theory, prioitarianism, sufficientarianism, and more.[25] How to measure the values to be distributed is linked to the previous discussion of cost and benefit/effectiveness estimation. In a democratic society, it is up to the public to engage in deliberations on which distributive justice theory or which combinations of theories should be implemented for people to lead good enough lives together. To summarize, fairness and justice is a real problem for the adoption of cognitive enhancement technology, but it needs solutions through collaboration at the societal level and does not make cognitive enhancement absolutely impermissible.

HUMAN NATURE

Some discourses against human enhancement are based on the technology's modifying human nature. However, there are a variety of definitions of human nature. Some argued that human nature represents the traits exhibited by all and only human beings.[26] But this is too strong a definition because many recognized human beings may not have the traits so defined. Machery argued that human nature is a collection of characteristics formed as a result of evolution and shared by most humans.[27] The definition has two problems. First, the criterion of "shared by most humans" is too strong because many characteristics

that could be deemed "human nature" are not shared by both males and females. Also, the focus on evolution is too narrow because many human characteristics are the result of gene–environment interactions, in which culture and socialization may play important roles. Daniels proposed that human nature has three components: a population concept that must be examined by aggregating traits at the population level; a disposition concept, meaning that traits may vary among different situations; and a selective theory-laden concept based on which traits chosen as part of human nature actually depend on what we count as important to us for explaining what humans are and do.[28] To make the traits more operationalized, Ramsey defined human nature as a "life-history trait cluster," the aggregated patterns of individual life history traits.[29] Thus, manifestations due to genetic and cultural/environmental interactions are included in human nature.

With this understanding and in contrast to the definition given by Fukuyama,[30] human nature is also a diachronic concept and not limited to genetic endowment only. That is, as time passes, human nature develops during its mutually embedded interactions with the environment. Human nature thus is a representation of both accumulated and here-and-now practical human characteristics, but nothing essential and eternal. "Human nature, then, is a generalization regarding the aggregating, purposeful yet open-ended disposition of human beings over time, and is nothing more or less than an ongoing attainment of relational virtuosity within our inherited natural and cultural legacy."[31:129] However, recognizing that human nature has intrinsic value as given[24, 30] and that it is the presupposition of many discourses on morality (such as responsibility),[32] those against human enhancement argue that human enhancement will alter or destroy human nature and is, therefore, not permissible. Daniels worries that we are far from knowing how to manipulate some known traits to make super-human capabilities. Even when we do know, he doubts that it is easy to get from here (the current technology achievement) to there (modifying human nature) because the technology has to be implemented on the whole population with their agreement on what selected core traits (e.g., virtuous instead of cunning) will be acted upon.[28] On the other hand, Buchanan deems human nature a useless concept in the debate on human enhancement. According to him, human nature has good and bad aspects and thus we are justified in altering human nature by getting rid of the bad. In addition, if enhanced humans preserve the ability to judge what good is, they still can direct and evaluate the modification of human nature without the faults depicted by those who are against human enhancement.[33] Obviously, Buchanan is against the usefulness of the essentialist conception of human nature. The dynamic characteristics of the diachronic conception of human nature could be compatible with his formulation of how to enhance people and at the same time preserve their good moral sense. Also,

the diachronic conception of human nature could partly ease Daniels's worry because we only need to project our enhanced near-future based on our current understanding of what constitutes human nature and its anticipated good. Thus, based on the diachronic conception of human nature, we could develop an incremental human enhancement policy in which incremental cognitive enhancement will not dramatically change human nature over a short period of time. Because people's moral inclinations are preserved, they can always pause and think before adopting a more adventurous cognitive enhancement policy. Thus, human nature still can play a role in the arguments about cognitive enhancement. In Confucianism, human nature is an important part in the theoretical construction of self-cultivation; as such, it is worthwhile to explore how Confucianism may contribute to the discourses about cognitive enhancement.

To summarize, there have been abundant discourses on the pros and cons of cognitive enhancement. However, these are mainly Western points of view. This brief review also hints at the potential contribution of Confucianism to the debate. In the following section, I will first review some of the arguments about enhancement (genetic enhancement as the majority) from an Asian perspective and then explore how Confucianism may contribute an alternative discourse that addresses the permissibility of cognitive enhancement.

Discourses on Cognitive Enhancement: Asian and Confucian Perspectives

As the discourse of individual-based bioethics has gained power in recent decades, reflections on the possibility of global bioethics have been ongoing. For example, in 2002, Kluwer published two books, *Cross-Cultural Perspectives on the (Im)possibility of Global Bioethics*[34] and *Confucian Bioethics*,[35] in which perspectives from Asian cultures—such as Confucianism—was utilized to address traditional topics in bioethics and whether a global bioethics is possible. Arguing for individual permission as the basis of a moral community, Engelhardt proposed that we must respect local moral particularity even if it turns out to be one that does not cherish authentic autonomous choices.[36]

Just as genetic diversity is good for the survival of human beings, the diversity contributed by cultural inheritance systems to the ethical discourse may also aid our pursuit of human flourishing.[37] In the domain of human enhancement, Asian or Confucian perspectives have been a minority voice. In the literature reviewed here, the majority of such work was limited to a general comment on enhancement or genetic enhancement. None addressed cognitive enhancement specifically. Therefore, the following sections will first examine

these general discourses and then explore what a potential Confucian approach to cognitive enhancement could be.

Similar to Western bioethics discourses in human enhancement, there are no harmonious voices in Asian or Confucian discourse either. It does seem, however, that a conservative attitude toward human enhancement is more prevalent. Ida, a lawyer from Japan, argued that support for the unlimited manipulation of the human body for enhancement comes from the mind–body dualism embraced by Western societies since Descartes. In addition, he observed that, as an artificial instrument cognizing and controlling nature, science and technology also contribute to reasons for enhancing human nature to a maximal extent. In contrast to this Western perspective, Ida argued that, in Japan and other Asian countries, human beings and their body parts are part of nature; they are not merely objects succumbing to artificial and extrinsic enhancement technology. Construing the enhancement of human nature by technology as a violation of nature, he advised that we seriously restrict the adoption of such enhancement.[38] Similarly, Qiu, a Confucian bioethicist in China, argued that most Confucian scholars are against the adoption of biomedical technology.[39] Arguments following this line of reasoning include that (1) reproductive biotechnology does away with the conjugation of Yang (male) and Yin (female) by a couple and thus violates familial integrity,[40] (2) human cloning objectifies children and is not ethically acceptable,[41] (3) human cloning disrupts the harmonious human relationship because children are manufactured without sex and love,[42] and (4) in addition to the disruption of orderly familial relationship that is important for the nurturance of human nature, genetic engineering also harms the human dignity of children.[43] Qiu himself made three arguments against human enhancement: first, without the justification of disease treatment, enhancement violates filial piety and body integrity (a child's body is given to it by its parents) in Confucianism; second, a cloned or genetically enhanced child is not delivered through affectionate conjugation between a husband and a wife and thus its creation disrupts the familial and even social order; and third, genetic enhancement and human cloning may disrupt the harmony between humans and nature and unpredictably endanger the holistic order within the world.[39] Lee, a Taiwanese Confucian scholar, argued that it is permissible to remedy those situations (such as diseases) not meeting the Way (*dao*) (i.e., Rule of Nature and humanity) because humans can fulfill and promote the Way (*ren neng hong dao*). According to him, humans can thus participate in nature transformation by expanding the Way. However, he rejects the adoption of enhancement technology because it violates the Way and may create unknown hazards for the future of humanity.[44]

On the other hand, some Confucian scholars are more open to the adoption of human enhancement. For example, taking the ethic of giftedness promoted by Sandel[24] as his starting point, Fan proposed a Confucian ethic of

giftedness and accepted genetic enhancement with some limits. Based on his understanding of Confucianism, he argued that children, as gifts from familial ancestors and parents, are endowed with the vitality and, according to Mencius (372–389 BCE), the inborn capacity for the cultivation of virtue (*de*). Within family-oriented Confucian ethics, the care of children as gifts must aim also at promoting reverence for ancestors, family determination, and the values of family in its continuity, integrity and prosperity.[45] To determine the permissibility of genetic enhancement technology in a Confucian community, it is not a question of whether genetic enhancement violates nature, but instead one of a situational analysis of whether a particular genetic enhancement technology encroaches on the core values of Confucianism. Thus, he argued that it is not permissible in Confucian thinking to intentionally modify, through genetic technology, Asian children's characteristics so that they more closely resemble Caucasians because it is disrespectful of the ancestors. Accordingly, the conception of children through "natural" interracial intercourse seems permissible for Fan. Also, for Fan, it is not permissible through genetic technology to intentionally conceive homosexual children because this would bring forth the disruption of Confucian family values that value conjugation between one male and one female. Notwithstanding these and similar caveats, in principle, Confucianism is not against genetic enhancement. Although not agreeing with Fan's narrow argument on respecting the ancestors and family values,[46] Wu added one more caveat, emphasizing that although there are different versions of human nature in Confucian thought, such as the *xing shan* (nature of beneficence) in Mencius and the *xing er* (nature of maleficence) in Xunzi, these two authors advised us to engage in self-cultivation and to strive to raise the level of human flourishing by strengthening good human nature or transforming evil human nature.[47] The issue is not so much about whether genetic enhancement would modify human nature, but instead about whether genetic enhancement is an appropriate approach to self-cultivation.[46] For some Confucians, too much focus on the physical in genetic enhancement, based on parents' personal desires and hopes to dominate nature, actually might hinder the process of individual moral self-cultivation through learning (more details in the following section)—it is akin to, as Mencius said, "pulling up seedlings to make them grow." Thus, in addition to Fan's Confucian concerns about disrespect for parents and ancestors, for some Confucians, the disruption of moral self-cultivation to realize or, in Xunzi's version, to avoid the realization of human nature is also a side constraint of genetic enhancement.

Equipped with these rich debates, now let's turn to the issue of cognitive enhancement. If cognitive enhancement is a kind of genetic enhancement not related to human cloning or germline genetic engineering, then there will not be as much concern with the disruption of the harmony between humans and nature or with dooming the generations to come. In addition, in the case

that enhanced cognition is actually beneficial to the postnatal project of self-cultivation in Confucianism and would not disrupt family integrity, it may be that some of the just-mentioned Confucian scholars would not oppose cognitive enhancement as fiercely as they did general genetic engineering and enhancement. Especially if an incremental policy of cognitive enhancement is adopted, there is still a chance to modify the direction of enhancement so that fine adjustments that take into consideration Confucian family values are always available to different generations.

A Confucian Discourse for Cognitive Enhancement as Part of Moral Self-Cultivation

When it comes to postnatal cognitive enhancement, Confucianism may actually favor the adoption of such technology if it promotes self-cultivation. However, before we get to the core arguments, it is important to deal with a preliminary issue of whether Confucianism would object to external technologies acting on human bodies. The Qing Dynasty, the last of Imperial China, in its last decades saw imperial governance failed again and again in its military and diplomatic encounters with Western countries that had democratic governments and advanced scientific achievement. It was noted that since Confucian discourses condemned the adoption of innovative and indulgent technologies, it was no wonder that China was surpassed by these Western countries. The famous sinologist Joseph Needham was more neutral in his comments, stating that Confucian scholars actually did not pay intense attention to creating and utilizing technologies, but would have been open to those technologies that help people get things done practically. However, since Confucian scholars lacked the passion to conduct experiments to seek out the abstract principles or rules of nature, which was the core theme of Western scientific research, China finally lagged behind its Western counterparts in science development.[48] To wit, in the Confucian worldview, once practically needed, technologies can be created and adopted if they do not violate the core values of Confucianism. Furthermore, the term "cognitive enhancement" might be misleading when used in relation to Confucian self-cultivation projects because in Confucian discourse body and mind are not two widely separated categories, as they are in many traditional Western bioethics discourses. The correct translation of Confucian mind (*xin*) should be "heart-mind" because it combines cognition, emotion, and physical perceptions at the same time. Thus, the metaphysics of mind in the Western philosophy would better be called, in Confucian thinking, a *mesophysics*[ii] of heart-mind, one that lies between the Way and the physical body.[16] This kind of mesophysics is robustly revealed in the criminal liability system of ancient China, in which physical and mental handicaps were lumped

together as excuses for responsibilities.[49] Thus, in Confucianism, there is no problem accepting a technology that acts specifically on mind or body if the target is the heart-mind.

Confucian ethics emphasizes humaneness or compassion (*ren*) and relations in moral judgment. Compassion and love for others start in the family, graded by the closeness of relationships, and is finally extended to all others.[50,51] The ideal of self-cultivation at the individual level is to achieve the ideal of *ren* such that a cultivated person would exhibit all the core virtues in his or her daily practices. The Confucian self-cultivation project is stated clearly in the *Great Learning* (*Ta Hsüeh*), in which everybody is encouraged to adopt steps to cultivate the self morally, put one's family in balance, bring the state into order, and then bring forth enduring peace to the world.[52] For the purposes of this chapter, it is interesting to note that the *Great Learning* stipulates that, before properly performing self-cultivation, one has to set straight one's heart-mind; before appropriately setting straight one's heart-mind, one has to bring one's innermost consciousness to the extent of wholeness; before appropriately bringing one's innermost consciousness to wholeness, one has to maximize one's comprehension. Finally, "only once all things in the object world have been reached through the correct conceptual grid can one's range of comprehension be expanded to the utmost."[52:6] According to *Analects* (17:8), Confucius taught his student Zilu that it is important for a gentleman to learn, for personal growth, to avoid drawbacks in his cultivation of compassion, wisdom, promise-keeping, straightforwardness, courage, and firm action. Thus, if cognitive enhancement could pass muster in concerns of safety, cost, and benefit, Confucians would not have much reservation in adopting postnatal cognitive enhancement for the project of moral self-cultivation. In Confucianism, humans are part of nature; thus, in seeking harmony between humans and nature,[16] maximizing knowledge about the things in the world in combination with self-understanding and management is very important. Furthermore, if moral self-cultivation is deemed a technology of moral enhancement, then, peculiarly, it is not that cognitive enhancement makes moral enhancement necessary, but that moral enhancement needs cognitive enhancement for its successful implementation. This could partially ease academic debates on how to address the relationship between cognitive enhancement and moral enhancement. Jotterand worried that a one-dimensional discourse on enhancing moral capacity without the guidance of the contents of morality is empty.[53] DeGrazia argued that, utilizing the overlapping consensus[iii] scheme, it is possible to find the minimum scope of moral perspectives that could be the targets of moral enhancement.[54] If this is feasible, the Confucian project of self-cultivation based on compassion actually sets up an alternative systematic scheme for combining personal, social, and biological measures for moral enhancement. John Harris

worried that biomedical moral enhancement that manipulates emotion and motivation might infringe on individual freedom.[55] Harris's worry leads us to consider just when we are free enough to make our own autonomous decisions. To adopt the paradigm of incompatibilism in construing human freedom and responsibility, either we are not responsible for anything at all (causal determinism), or we are not influenced by anything in making our autonomous choices (philosophical libertarianism).[56] However, it is against intuition and scientific evidence to think that we are not influenced at all by any situational factors.[57] Perhaps a better question is to ask how much influence is too much. In other words, Harris's worry of manipulation could end where acceptable influence is recognized. Compatible with this finding, in the Confucian framework, individual autonomy is always relation-based (father–son, monarch–feudal official, husband–wife, elderly–youth, friend–friend) and embedded in the human community.[58] At the same time, a person always has to take responsibility for making the virtuous choice considering the peculiar situation she faces. As a model person gathering all the good points of different ancient sages, Confucius was praised by Mencius as a sage of timeliness, one who always adjusted his behavior appropriately according to circumstances (Book V, part B1).[50] Based on the Confucian paradigms of relational autonomy and moral self-cultivation, a cultivated individual (*junzi*) is as free as one who is free in the compatibilist paradigm. Merely causal determinism does not deprive a person of his freedom. In addition, it is hard to imagine that we could have a total-control cognitive enhancement technology that renders people automatons in moral decision-making; this, if it could be developed, is contrary to the goal of moral self-cultivation and cannot be acceptable to Confucianism. Therefore, the adoption of incremental postnatal cognitive enhancement technologies as instruments for self-cultivation is permissible according to the Confucian paradigm.

Public Attitudes Toward Cognitive Enhancement in Taiwan

In democratic societies, the public's attitudes toward technologies are important reference points for governments to develop technology policy. Moving beyond the deficit model of the public understanding of science (i.e., the public usually is ignorant about science and needs science education), recent literature has emphasized the intertwined relationship of science and society in which trust in science and the democratic governance of science become crucial.[59] Surveys of the public's understanding of science have been treated traditionally as tools for revealing the public's ignorance of science. However, they can be valuable in other ways as well. In fact, conducting a survey does not rule

out other qualitative measures (e.g., deep ethnography) as methods for finding richer meanings in science and technology issues.[60] A survey may form just one of the preliminary data points for facilitating public participation in cognitive enhancement development.

The public's attitudes toward genetic enhancement are diverging among different Asian countries. Conducted in 1993, the International Bioethics Survey showed that China, India, and Thailand were most positive about genetic enhancement; in Japan, Australia, and New Zealand, the majority of surveyed people rejected the utilization of such technology; the Philippines and Singapore were in the middle. It was found that people surveyed expressed preferences based on a weighing of both the risks and benefits of enhancement technologies.[61] If survey results are taken at face values, then Ida's arguments[38] are compatible with public's attitudes in Japan. However, it seems that people surveyed in China did not hold opinions similar to those of Confucian scholars who are against genetic enhancement.

Because the investigation of the public's attitudes is lacking toward cognitive enhancement in Taiwan, in November 2013, the author conducted a telephone survey of a representative sample of people in Taiwan. The sample comprised 1,020 persons aged 17–80 years. Survey questions include:

1. Does Confucian thinking of loyalty, filial piety, humanity, love, credibility, righteousness, harmony, and peace influence your ways of managing life and affairs?
2. Do you understand neuroscience?[iv]
3. Do you agree that it is socially acceptable to use coffee to enhance your energy levels?
4. Do you agree that it is socially acceptable to use pharmaceuticals or brain devices to enhance intelligence?
5. Do you agree that it is socially acceptable to use pharmaceuticals or brain devices to enhance physical strength?
6. Do you agree that pharmaceuticals and brain devices for enhancing intelligence could be counted as part of self-cultivation in Confucianism?
7. Do you agree that pharmaceuticals and brain devices for enhancing physical strength could be counted as part of self-cultivation in Confucianism?
8. Do you agree that the use of pharmaceuticals and brain devices for enhancing intelligence is against Heaven's mandate (i.e., what is conferred and ordered by Heaven)?
9. Do you agree that the use of pharmaceuticals and brain devices for enhancing physical strength is against Heaven's mandate?
10. Is it unfair that, compared to the rich, the poor could not afford the use of pharmaceuticals or brain devices for enhancement?

Of the surveyed people, 84.2% believed that they adopted Confucian thinking in managing their life and affairs. However, only 20% of surveyed people thought they understood neuroscience.

With the exception of coffee (acceptance 63.4%), the majority of the surveyed people did not accept the use of enhancement technologies for the purposes listed in the questionnaire: intelligence enhancement (acceptance 27.2%), physical strength enhancement (acceptance 34.2%), intelligence enhancement technology as a way for self-cultivation (acceptance 15.9%), and physical strength enhancement technology as a way for self-cultivation (acceptance 18.7%). Less than half of those surveyed deemed enhancement as being against the mandate of Heaven: intelligence enhancement technology against Heaven's mandate (agreement 41.9%), physical strength enhancement technology against Heaven's mandate (agreement 43.2%). Nonetheless, 67.2% of people deemed it unfair that the poor could not afford the use of enhancement technologies compared to the rich.

Comparisons of these attitudes (acceptance and use for cultivation) between subgroups of adherents to Confucianism and nonadherents did not reveal any significant difference ($p>0.05$). Similarly, no significant differences ($p>0.05$) were found in comparisons between subgroups of those who understood neuroscience and those who did not, and also between subgroups of fairness and unfairness. However, the subgroup deeming enhancement technologies to violate Heaven's mandate are more likely ($p<0.001$) to hold negative attitudes toward the technologies than the subgroub that does not. It is worthy of emphasis that even if the subgroup of nonviolation is the majority, most of those surveyed still do not have positive attitudes toward enhancement technologies.

It seems that the Taiwanese public's attitude toward enhancement technology is more similar to that of Japan than of China. Judging from this analysis, concerns about Heaven's mandate may be one of the reasons for some people to oppose the adoption of enhancement technologies. However, since the majority of those surveyed did not think enhancement technologies violate Heaven's mandate, there is doubt whether Ida's similar arguments of respect for nature could be the whole story in Taiwan. In a review of genetic technology news reports in 2001–11 in Taiwan, the peculiar finding was that these reports tended to hold an optimistic attitude toward genetic technologies. The mention of risk was less than 40%.[62] Using Chinese keywords for "cognition" and "enhancement" to find Web news reports about cognitive enhancement in Taiwan, a Google survey conducted by the author only yielded scant results, in which only several materials translated from English into Chinese addressed the potential side effects of transcranial direct current stimulation, modafinil, and methylphenidate (Ritalin). At the moment, it is not likely that media plays an important role in shaping the public's negative attitude toward enhancement

technologies since the negative information was neither easily retrievable nor popular in Taiwan. Furthermore, it is possible that Confucianism might offer a variety of potential discourses both for those for and against the adoption of cognitive enhancement technologies, which is similar to the contradictory views on human nature proposed by Xunzi and Mencius. As well, some people who claim to comply with the doctrines of Confucianism might turn out to not know much about Confucianism or to not utilize Confucian ideals in their survey responses. Their attitudes may reflect their general impression on the risk of different technologies in Taiwan.

To summarize, Taiwan is still in a nascent stage of developing public understanding of cognitive enhancement technologies. We need further detailed work on the public's understanding based on ethnography, focus groups, detailed public surveys, and public deliberations to clarify how people might use a variety of Confucian arguments to decide on the adoption (or rejection) of cognitive enhancement technology. It is possible that those who uphold Confucianism actually do not make decisions on the adoption of the technology based on Confucian arguments.

Conclusion

The chapter proposes an incremental technology policy of cognitive enhancement as part of the scheme of Confucian moral self-cultivation. The ideal of stage-by-stage moral self-cultivation not only cares about the individual, but also about the welfare of the family and, by extension, the world. This ideal intends to create a different approach to the Western bioethics debates on whether moral enhancement is prerequisite for cognitive enhancement since cognitive enhancement is actually part of the early steps of Confucian moral self-cultivation. Confucians do not oppose technologies in principle and would innovate when a certain instrument is practically needed, and the lack of advanced development of science and technology in late imperial China may have been due more to politics than to Confucianism.[48] Many of the Confucian scholars reviewed here argued against genetic biotechnology because it violates nature, human dignity, conjugation values, and familial piety (including respect for ancestors). But the adoption of technology for postnatal cognitive enhancement does not violate the values of concern to these scholars because it does not involve birth and conjugation. In addition, these scholars did not lay out their reasoning as coming clearly from the Confucian project of self-cultivation and historical investigations of the Confucians' attitude toward technology. The arguments proposed by the author actually show another line of Confucian thoughts on the potential acceptance of cognitive enhancement. Because cognitive enhancement

is wrapped in the moral self-cultivation scheme, ideally, the worry of catastrophic harm to the world rendered by cognitive enhancement can be lessened.[63] If not holding to hard determinism, we still have the freedom to do good and make efforts not to do bad. As DeGrazia argued, the freedom to do bad things actually is not of high value in our life goals,[54,55] and this may be one of the risks worth taking in developing the technology of cognitive enhancement through the Confucian moral self-cultivation project.

Implied in the chapter is the meta-ethical stance of not embracing a universal moral fact in all possible worlds. Technology policies for cognitive enhancement might differ among cultural regions, kinds of technologies, and diachronic stages. As revealed in the survey results, the Taiwanese public seems unenthusiastic in pursuing cognitive enhancement. However, it warrants further ground theory work whether these attitudes reflect their interpretations of Confucian thinking, influences by Western thoughts, a popular general distrust of technology, and the like. This finding at least reminds us of the importance of public understanding of science and the democratic approach to constructing science and technology policy. As vividly depicted by the famous science and technology studies scholar Jasanoff, in different societies, there are different styles of civic epistemology—"the institutionalized practices by which members of a given society test and deploy knowledge claims used as a basis for making collective choices."[64:55] The Confucian moral self-cultivation scheme as presented in this chapter might not be adopted in the long run, but the Confucian "designs on nature" as part of seeking harmony with nature may still prevail in technology-related policy-making in Taiwan.

Notes

i. Based on the definition of *The Encyclopedia Britainnica*, incrementalism is "a theory of public policy making, according to which policies result from a process of interaction and mutual adaptation among a multiplicity of actors advocating different values, representing different interests, and processing different information" (http://global.britannica.com/topic/incrementalism). Thus, following the incremental enhancement policy, no dramatic change, as usually seen in a large full-scope ambitious enhancement plan, is going to be adopted. The focus is the process of negotiation and adaptation and the handling of the intermediate issues, even though the dynamic and continuing policy might in the long run reach an endpoint very much different from the origin. In this way, the total negative impact induced by tremendous change might not occur.

ii. Metaphysics deals with the nature of being and the world, which is abstract and shapeless. Physics, in a biological sense, deals with the concrete and touchable body. Hence, mesophysics deals with the heart-mind, an entity situated between these two levels and having both characteristics at the same time.

iii. *Overlapping consensus* is a term used by John Rawls to connote how people might reach the same political judgment on issues such as principles of justice even though they

do not share the same conceptions of justice. Thus, if people do not insist on resolve their disagreement on the most fundamental issues, they still could reach consensus on political judgment at the population level. See Rawls, J. (1971), *A Theory of Justice* (revised ed.), Harvard University Press, 1999, p. 340.

iv. Before the questions are asked, the definition of neuroscience is read verbatim on the phone to those surveyed.

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9

Enhancing Cognition in the "Brain Nation"

An Israeli Perspective

HILLEL BRAUDE

Introduction

Metaphors are important tools to think with; yet they also may contain concepts not consciously intended by their devisors. The "Brain Nation" is a metaphor posited by former Israeli President Shimon Peres to depict Israel's excellence in the field of neurotechnologies, especially those cognitive enhancement technologies associated with brain communication.[1] The "Brain Nation" describes Israel's reliance on its intellectual resources in a country relatively free of natural resources and challenged by many geostrategic issues. Additionally, the metaphor of the "Brain Nation" appears to privilege higher cognition, as if all forms of scientifically produced neurological enhancement axiomatically result in positive individual and social transformations. However, the project of cognitive enhancement—a project that aims to fulfill the Enlightenment dream of controlling our human condition through reason—is inevitably accompanied by its shadow side. For this reason, discussions regarding the question of human nature and identity, not to mention issues of justice and fairness, accompany these innovations in cognitive enhancement. The greater the technological prowess in transforming human nature, the greater the need for sustained ethical reflection. Surprisingly, in light of Israel's technological achievements in the field of neuroscience, concomitant ethical reflection on the applications of cognitive enhancement technologies is sorely deficient. Thus, compared with other developed countries, sustained moral reflection about their work by researchers or other social scientists, philosophers, and neuroethicists at Israeli scientific institutes is relatively nonexistent. Seeking to begin to redress this imbalance, I reflect in this chapter on the moral context

of cognitive enhancement technologies. Underlying my analysis is the question of whether the Israeli context provides a particular cultural or historical experience that informs, or even should inform, the technological development of and ethical attitudes toward cognitive enhancement. In addition to a general overview of the ethical aspects pertaining to transcranial magnetic stimulation (TMS), I focus on the innovative applications of TMS by two Israeli companies, Brainsway and Neuronix. Brainsway and Neuronix are international companies based in Israel that provide potentially revolutionary technological applications for the treatment of diverse psychiatric and mental conditions and are also pioneering TMS as a form of cognitive enhancement. However, reflecting the present state of neuroethics in Israel, the ethical discourse around these cognitive enhancement technologies is largely limited to discussions of safety and efficacy and does not at all refer to the moral dimensions and ethical ramifications of these neurotechnologies themselves. In contrast with the development of these cognitive enhancement technologies, I conclude this chapter with a brief description of an educational approach toward cognitive enhancement developed by the late neuropsychologist Reuven Feuerstein (1921–2014). Developed initially in response to the urgent need to help children survivors of the Holocaust (Shoah), Feuerstein's method reflects a universally valuable approach to cognitive enhancement that is rooted in the particularistic Jewish concept of *tikkun olam*—the moral imperative to heal the broken world.

Israel as the "Brain-Nation"

Israel presents a singular example of a national context where ideology, conflict, commerce, and dreams intersect at a single point: cognitive enhancement. Israel has been valorously characterized as a "start-up nation" that nurtures scientific innovation and entrepreneurship.[2,i] The former Israeli President Shimon Peres[ii] has articulated the vision of the Israeli neuroscience industry as the vehicle to transform Israeli society from being the "start-up nation" to the "Brain-Nation." A 2010 analysis of the Israeli brain research and technology landscape commissioned by Peres emphasized two key areas of research excellence in brain communication: the brain–machine interface (BMI) and therapeutic neurostimulation devices. Cognitive enhancement lies at the heart of these two endeavors and is, arguably, the essential determinant for becoming a "Brain-Nation." Israel Brain Technologies (IBT)—a nonprofit organization—has been formed to put into effect Peres's vision. As described on their website, IBT aims to help pave the way toward the development of a successful, world-leading neurotechnology industry in Israel.[1] IBT intends to promote effective research into understanding the brain, but, more importantly, to effect innovative diagnostic and treatment technologies. Industrial development and

commercialization lies at the base of IBT's activities, and cognitive enhancement is an explicit goal of its ambitious national program.

At the inaugural meeting of the IBT, President Peres stated that governments everywhere are facing a crisis of governance. He has come to the conclusion that people "cannot govern the world without at least understanding how does [*sic*] the brain govern us." Peres also stated at this meeting that it is "[t]he greatest hope that we shall begin to understand how does [*sic*] our own brain function, and then we shall not be beggars of the brain, but choosers of its machinery, of its function."[1] Thus, Peres considers it imperative for leaders of society to understand and control our foundational cognitive structures in order to alleviate the human condition and to become true masters of our fate.

The IBT represents President Peres's belief in the ability of technology to provide solutions for seemingly intractable social and political problems. In his political realism (or perhaps pessimism?) and technological optimism, Peres's conception of enhancing individual and societal cognition through neurotechnologies resembles other advocates of cognitive and even moral enhancement. Peres might well agree with philosopher John Harris's argument that we have a moral duty to enhance our cognition, even to the extent at which we humans will change into another, "better" species.[3] Peres is not the first to talk of national mental well-being or the so-called "mental wealth of nations."[4] Peres is singular, however, in supporting a concrete initiative to help foster the Israeli neurotechnology industry as a national project. Additionally, the national (Zionist) struggle to maintain Israel as the Jewish homeland provides a particular political context for the desire to improve national mental capital and well-being through cognitive enhancement neurotechnologies.

The State of Israeli Neuroethics

In speaking of Israel as a "Brain-Nation," President Peres evokes the popular association of Jews with high intelligence.[5] Another metaphor, "The People of the Book," also has this intellectual resonance but additionally contains allusions to heightened ethical reflection and cognitive development associated with a millennia of Biblical study and Rabbinical Talmudic commentary (e.g., regarding laws of torts and ethical relationships with one's neighbor). With this intellectual and ethical tradition in mind, one might expect, therefore, to encounter an equally strong ethical sensitivity pertaining to neuroscience research and its practical applications in Israel. The nature of neurobiological research and applications and the sensitive Israeli sociopolitical context, as well as the strong emphasis on ethics in traditional Judaism should result in a strong emphasis on neuroethics in relation to neurotechnological advancements. This is, unfortunately, not the case. The bioethics landscape in Israel,

including neuroethics, is still in its infancy. Only a few academic bioethics positions exist in Israel, and clinical medical ethics does not yet exist as a professional discipline at Israeli hospitals and medical institutions. Because they focus on "pure" scientific research, the advanced scientific centers and institutes, such as the Haifa Technion and Weizmann Institute, do not directly fund any humanities or neuroethics research positions.

If one of the roles of bioethicists is to help translate complicated moral dilemmas into simple language comprehensible to the lay person, then the dearth of professional bioethicists in Israel also indicates a lack of public awareness about complicated biotechnologies and their associated ethical dilemmas. This does not mean that Israeli neuroscience operates in a moral vacuum. Stringent ethical guidelines exist pertaining to the ethics of human subject research, including neurobiological research. However, ethical oversight is, for all intents and purposes, limited to local Helsinki Committees, the equivalent of internal review boards (IRB)'s in the United States. Reflection on broader ethical dilemmas arising from the development and application of neurotechnologies does not occur in these committee meetings.

Transcranial Magnetic Stimulation

TMS provides a useful example with which to analyze the issue of cognitive enhancement technologies in Israel. TMS refers to the transmission of an electric current into the brain via electromagnetic induction by means of a stimulating coil placed externally on the scalp. This current passes unimpeded through the skull causing the transient depolarization of neurons and generating various physiological and behavioral effects depending on the region of brain being stimulated. Since its development in the 1980s, TMS has proved a valuable technique, together with brain mapping methodologies, with which to study cortical excitation and inhibition as well as cortico-cortical and cortico-subcortical connectivity and interactions.[6] Repetitive TMS (*r*TMS) refers to regularly repeated TMS delivery to a single site on the scalp. *r*TMS is a potentially invaluable tool for modulating brain cortical excitability.[7,8] Strictly speaking, TMS is still an experimental technique, albeit with increasing clinical applications. In 2008, the US Food and Drug Administration (FDA) granted approval to the first TMS device for the treatment of refractory depression.[6] TMS has been approved as an "on-label" treatment for depression by the regulatory agencies of different countries, including Brazil, Israel, Australia, and Canada.[6] *r*TMS is increasingly being used to effectively treat various psychiatric and neurological conditions, including depression, mania, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD), schizophrenia, and Parkinson's disease.[9–11]

As a novel therapy, particularly, one associated with changing brain function, rTMS requires close ethical supervision. Guidelines for the safe and ethical application of TMS were drawn up at a consensus conference organized by the US National Institutes of Health (NIH) in 1996[12] and further refined at a follow up conference in Italy in 2008.[8] Applying rTMS according to these specified guidelines seems to be an essentially safe procedure. TMS has been associated with causing transient headaches or local pain in 30–40% of patients treated for depression.[13] Serious adverse side effects associated with rTMS, such as induction of seizures, hypomania, and suicidal behavior, have been reported in very rare instances.[8] Because of the possibility of inducing seizures, some patients with medical conditions such as a personal history of seizures or epilepsy, a previous head injury, or the presence of any known factors associated with lowering the seizure threshold are discouraged from undergoing TMS treatment.[14] Other less serious side effects of TMS noted in the literature include insomnia, dizziness, nausea, numbness in the right temporal and right cervical zone, transient headache, and scalp discomfort.[14] Possible long-lasting cognitive sequelae pertain to the cumulative effects of repeated sessions of rTMS. Summarizing two important studies on this issue, Rossi et al. conclude that side effects related to cognition include "excessive tiredness, concentration difficulties, memory difficulties, and were reported to be mild, transient and to be 'very rare.'"[8: 2022] However, since the precise mechanism of action of TMS is still unknown, caution must be applied. The absence of cognitive changes does not obviate the possibility of neuronal changes occurring.[8] The informed consent process needs to take account of these uncertainties by providing full disclosure of the risks that are known, as well as making explicit the possibility of as yet-unknown longitudinal effects.[15] Because TMS is perceived as an essentially safe procedure, it is possible that researchers and practitioners of TMS will become lulled into a false sense of complacency in its application. Vigilance is called for at all times, as well as a conscious recording of side effects, particularly pertaining to mood changes and personality transformations. Moreover, as highlighted in this chapter, it is not sufficient simply to examine the technologies themselves and their application. Consideration of the moral context in which research is being developed also needs to be included in the moral calculus.[iii]

Neuronix and Brainsway

rTMS is a neurotechnology particularly suited for innovation. As Horvath et al. note, TMS is characterized by a broad, permutated methodology associated with the possibility of varied coil shapes, as well as varied stimulation pulse characteristics and varied stimulation sites and varied power levels.[6] Two

Israeli companies, Brainsway and Neuronix, have capitalized on the permutability of TMS to develop patents for unique "deep TMS" coils. Brainsway has developed a novel deep TMS H-coil that induces a magnetic field reaching up to 3 cm beneath the surface of the scalp, as opposed to standard rTMS "figure-of-eight" coils that induce an effective depth of approximately 1 cm.[16,17,iv] The H-coil is primarily used to treat major depression. In 2008, Brainsway received the European Union's CE Mark, which permits the marketing and sale of its Deep TMS device in the European Union.[18]

A successful multicenter clinical trial for the assessment of the efficacy and safety of deep TMS in subjects suffering from major depression disorder demonstrated significant remission in 32.6% of the enrolled subjects. Following this trial, the US FDA granted Brainsway's H-coil approval for the treatment of depression in patients who did not benefit from alternative medication treatments.[16,19,20] It is of interest to note that no serious adverse events have been recorded with the use of the H-coil to treat depression, although the coil is more powerful than standard coils and stimulation is delivered at parameters that are above those presented by Rossi et al.[8] as standard rTMS guidelines.[16] In addition to clinical depression, clinical trials are under way to use deep TMS to treat a number of clinical conditions including Alzheimer's disease, cannabis and cocaine addiction, autism, bipolar disorder, obesity, Parkinson's disease, PTSD, stroke rehabilitation, schizophrenia, Tourette syndrome, and blepharospasm.[18] Shares in Brainsway are currently traded on the Tel Aviv Stock Exchange (TASE).

Neuronix is the second major Israeli company that specializes in the use of rTMS to enhance cognition. It has developed a Non-Invasive Cortical Enhancer (NICE) technology that combines cognitive training exercises with rTMS and that, like Brainsway, uses a deep TMS H-coil. Neuronix capitalizes on the research demonstrating the positive effects of rTMS on cognitive functions, including executive function, learning, memory, and attention.[21] Neuronix claims that the concurrent use of these rTMS with cognitive training (rTMS-COG) has a synergistic effect on the alleviation of memory loss associated with Alzheimer's disease.[9] The procedure consists of a 6-week intensive treatment, including five 1-hour sessions of concurrent application of focused TMS and tailored cognitive exercises designed to fit each patient's specific abilities. The NeuroAD treatment protocol places the patient in a custom Neuronix chair fitted with a computer and capable of magnetic stimulation to the brain. The chair first stimulates the relevant brain areas with deep TMS, and immediately thereafter the patient is presented with computer-based cognitive tasks. The NeuroAD technology reacts to the patient's responses and adjusts the difficulty level accordingly.[9] NeuroAD's technique uses TMS to stimulate Hebbian-like learning through the strengthening of synaptic efficacy and long-term potentiation of neural networks in order to enhance memory in patients suffering from Alzheimer's disease.

Neuronix's NeuroAD system is the first medical device in the world that has been approved for the treatment of mild to moderate Alzheimer's disease.[23] In 2011, Neuronix received the Medical Device Quality Management standard certification by the Standards Institution of Israel.[24] Neuronix's patent-protected technology received approval by the European CE Mark and is still waiting for US FDA approval.[25] It is important to note that this approval is primarily for the safety of the technology and does not provide a warrant for its therapeutic efficacy. However, clinical studies supported by Neuronix claim to demonstrate that patients with Alzheimer's disease have shown measurable cognitive improvement with the NeuroAD technology after just a few weeks of treatment. The results apparently showed marked reversal of disease progression, with patients improving to a state comparable to 2 years before treatment initiation. Trials also appeared to indicate that this clinical improvement is maintained for at least 6–12 months after treatment.[22] Although the precise biological mechanisms explaining these cognitive effects of rTMS on the brain are still unknown, the mechanisms involved with memory enhancement are thought to be explained in terms of an increase in synaptic plasticity.[9,26,27]

TMS as a Form of Cognitive Enhancement

There is a growing literature around the ethics of neuroenhancement technologies. Studies using noninvasive brain stimulation indicate that these enhancement technologies may be used to improve the functioning of normal individuals in at least three areas: cognitive skills, mood, and social cognition.[28] The technologies developed by Brainsway and Neuronix may be considered cognitive enhancers since they both are intended to augment cognition, even though their present use is primarily in the context of distinct neurological disorders or psychopathology. Strictly speaking, an enhancer only refers to an intervention aimed at improving normal function.[29,30] Overriding the artificial distinction between cognitive enhancement in healthy and diseased individuals, one influential definition defines cognitive enhancement as "any augmentation of core information processing systems in the brain, including the mechanisms underlying perception, attention, conceptualization, memory, reasoning and motor performance."[31: 961] Relying on this definition, Luber and Lisanby, in their comprehensive review of TMS, set it firmly as among a promising new set of cognitive enhancement technologies.[31] Their literature search returned 61 instances of performance enhancement associated with TMS, including the application of "brain stimulation techniques to aid [healthy] human operators in performance of work."[31: 965] Moreover, on the basis of the possible multiple mechanisms involved with TMS enhancement, the authors conveniently group the TMS enhancement effects into three classes based on

the possible multiple mechanisms involved: nonspecific effects of TMS, direct modulation of a cortical region or network that leads to more efficient processing, and disruption of competing or distracting processing.

How do Brainsway and Neuronix evaluate themselves as providers of deep TMS as a promising form of cognitive enhancement? Both Brainsway and Neuronix have yet to respond to the detailed questionnaires that I sent them regarding their therapeutic methodologies, ethical oversight, and attitudes toward their applications as a form of cognitive enhancement. In consequence, my analysis here is limited to information that is available in the public media and academic journals. Brainsway and Neuronix are two companies specifically heralded by IBT as representative of Israel's success in neurotechnology. They are economic success stories. They represent the innovativeness of Israeli entrepreneurship and the ability to move scientific research to clinical applications. Their ethical guidelines appear to be in consonance with international consensus regarding the safety of rTMS.[8] The fact that they are now international companies and that their devices have been approved at the level of the US FDA and European CE reflects the global nature of neuroscience research and technology. Closer analysis of their therapeutic applications and research methodologies would undoubtedly provide rich material for further neuroethics analysis regarding the clinical and commercial uses of TMS as a form of cognitive enhancement. From the publicly available information, it is fair to state that the positivity with which they report the therapeutic efficacy of their technologies glosses over the still largely experimental nature of these cognitive enhancement technologies and the ever-present ethical dilemmas that may be associated with the electrical modulation of the brain. Observation and analysis of ethical issues that arise from their clinical applications are limited to what is necessary in terms of standard ethical oversight of safety and efficacy and are limited to their use as strictly medical interventions. As such, they ignore or gloss over the fact that they are involved in providing "dual-use" interventions that may be used for the cognitive enhancement of healthy individuals, as well as for patients with distinct psychopathologies. Brainsway and Neuronix may be successful Israeli companies specializing in cognitive enhancement that epitomize President Peres's vision of the Israeli "Brain State," but, as purely commercial enterprises, they do not at face value combine their technological innovativeness with concomitant serious ethical reflection on the potential benefit–harm ratio of these technologies as discussed in the ethical literature on cognitive enhancement technologies nor on the broader ethical implications of their research. In summary, these two examples of commercial therapeutic application of TMS are emblematic of the lack of serious ethical reflection, and perhaps oversight, regarding the application of cognitive enhancement technologies in Israel.

Ethics Discussion

This analysis of TMS technologies in Israel has highlighted the fact that the Israeli context impels the entrepreneurial development of cognitive enhancement technologies while, for the most part, limiting the moral oversight of these technologies to standard issues of safety and efficacy and glossing over deeper moral philosophical questions raised by the development and application of these technologies. In the final section of this chapter, I provide some reflections on these deeper neuroethical issues. These reflections pertain directly to the development of TMS technologies as outlined in this chapter, although they can, of course, be extended to other cognitive enhancement technologies. I have divided up the ethical issues into the following: enhancement versus treatment, relationship between industry and science, neurocitizenship, the ethics of memory, and, finally, cognitive enhancement as a form of "*tikkun olam*."

ENHANCEMENT VERSUS TREATMENT

TMS is increasingly recognized explicitly as a promising cognitive enhancement technology that may improve normal cognition and action. The expanding clinical applications of Brainsway's deep TMS to treat borderline pathologies and Neuronix's NeuroAD device to stimulate memory demonstrate how the expanding clinical applications of TMS increasingly blur the distinction between treatment and enhancement. In this regard, the ethical debate about TMS is essentially no different from other medical forms of cognitive enhancement. The moral legitimacy of medical cognitive enhancement technologies recently endorsed by the Israeli Medical Association (IMA) would, therefore, undoubtedly also apply to the application of TMS beyond its present clinical applications. In a position paper for the IMA, Dr. Avinoam Reches, who for many years has chaired the medical ethics committee of the IMA, has articulated the position that the goal of modern medicine includes improving the personal quality of life, even in the situation of non-illness. "Medical enhancement" he argues, is ethical, provided there is clear benefit to the healthy individual, and the danger associated with it is marginal.[32]

The ethics of discourse is another important issue that sheds light on the ethics of neurotechnologies as enhancement or treatment. Thus, Duecker et al. have distinguished three domains regarding the application of neuroenhancement technologies that should be kept separate: (1) as a research tool, (2) as a therapeutic tool, and (3) applied in healthy people outside of neuroscience.[33] They note that "the different domains where neuro-enhancement is now or in the future applicable should be considered separately in discussions about neuro-enhancement, its values, its risks, its desirability, its development and its general pursuit."[33: 3] I would add that, although it is obviously

useful to separate the ethical discourse of these three domains, it is equally important to examine the points of contact between these domains for neurotechnologies and especially for a clinically effective and relatively benign technology such as TMS, where the domain boundaries are fluid. Moreover, it is important to analyze the scientific discourse in relation to marketing of particular applications. In claiming only to treat distinct clinical conditions and simultaneously expanding the range of clinical applications of TMS to increase market share, the proponents of TMS technologies gloss over the ethical issues arising from their application of a distinct cognitive enhancement technology.

RELATIONSHIP BETWEEN INDUSTRY AND SCIENTIFIC DEVELOPMENT

Israel presents an example of a small country where scarce resources are being channeled into the development of neuroscientific technologies. The emphasis on entrepreneurship in association with scientific research is a clear component of Israeli neuroscience research, particularly in centers of excellence such as the Weizmann Institute and the Haifa Technion. Neuroscience is at the core of the latter's initiative with Cornell University to develop an applied science and engineering campus in New York City, which will open in 2017 and emphasize technology transfer, commercialization, and entrepreneurship. Because there is such a strong imperative to translate scientific research into societal or financial gain, there is the danger of an in-built prejudice against ethical reflection that might be seen to hamper the applications of neuroscientific research. As highlighted in this chapter, the Israeli research context is far from having developed an adequate culture of neuroethics in parallel with its scientific achievements, characterized as it is by the relative lack of dedicated bioethicists, philosophers, and social scientists conducting research around the ethical aspects of neuroscientific research and applications. However, instead of being considered as tangential, or even as an obstacle to research, serious neuroethics reflection should be integrated into this research. It is the responsibility of scientists to reflect on the consequences of their research. Neuroethics as a discipline is characterized by a naturalistic ethics that emphasizes the close relation between facts and values in relation to brain science and the working of the mind.[34–36,v] The calculus of utility by researchers, administrators, and clinicians in scientific centers of excellence should not be solely in terms of financial gain, or even in terms of alleviation of suffering, but also in terms of the personal and social implications of these technologies. If done effectively, it is not unlikely that serious ethical reflection, including on the

methodology of research, can improve the efficacy and applicability of neuroscientific research.

NEUROCITIZENSHIP

A major concern about cognitive enhancement technology is the issue of fairness and social justice; that is, whether all people may have equal access. Another, perhaps more pressing social issue highlighted in this chapter is that of *neurocitizenship*. President Peres has highlighted his belief that advances in brain-modifying technologies will alter the social and political landscape. The size of Israeli society and its pressing sociopolitical needs might provide a suitable landscape both for the implementation of socially transformative neurotechnologies, as well as a laboratory for experimentation and observation. Peres has articulated the fact that the challenges of traditional forms of leadership require novel responses, as epitomized through brain interventions. The temptation to improve society through improving mental capital, or even to shore up political power through neural interventions, is an issue that might seem futuristic but that requires close ethical foresight. The traditional bioethics principles of autonomy, beneficence, and justice are not penetrating enough to deal with these issues that may transform the neurobiological foundations of human liberty; instead, they require sustained reflection in terms of biopolitics.[37] Guarding against ethical abuses for "creeping" technologies in Israel cannot be left simply to Helsinki committees and market forces, but requires its own cadre of researchers and thinkers across the intellectual and political spectrum.

THE ETHICS OF MEMORY

As regards a neuroenhancement device focusing on improving memory for patients suffering from Alzheimer's disease, comprehensive ethical discussion for the NeuroAD technology should include discussion on the ethics of memory enhancement. This analysis would undoubtedly parallel that concerning the prescription of antidementia drugs to improve memory in people with memory deficits, as well as the normal population.[38] Although the NeuroAD device may indeed prove beneficial for the treatment of Alzheimer's disease, this device could also be used to improve memory in a host of other contexts, thus giving rise to acute ethical and legal dilemmas. For example, is it ethical to provide neural prompts, such as TMS, for legal witnesses who claim not to remember pertinent facts pertaining to a case? The ethical issues relating to the application of deep TMS are not limited to the ethics of memory but to all forms of cognition enhanced through modulating neuroplasticity.[vi]

TIKKUN OLAM

A major theme behind this chapter has been to identify whether the particular Israeli context informs the development of cognitive enhancement technologies as well as the ethical and regulatory framework in which they are developed and applied. It is fitting to ask whether the development of cognitive enhancement technologies in Israelis is not itself driven by a perennial Jewish concern to heal a broken world, encapsulated in the Jewish concept of "*tikkun olam*."[vii] It is possible that a secularized transmission of this concept informs the motivations of Israeli researchers to develop world-transforming technologies. If so, the concept of *tikkun olam* might provide a valuable metaphor to mine for further ethical reflection on cognitive enhancement technologies and their application.

The most striking example demonstrating the link between the concept of *tikkun olam* and cognitive enhancement can be found in the discipline of neuropsychology, in the lifelong work of the late Professor Reuven Feuerstein, who pioneered a radical educational program around cognitive modifiability and enhancement. Feuerstein was the founder and director of the Feuerstein Institute (formerly the International Center for the Enhancement of Learning Potential [ICELP]) in Jerusalem.[viii] For many years, Feuerstein served as the Director of Psychological Services of Youth Aliya (Immigration), which was responsible for the various educational programs of Jewish immigrants to Israel from diverse cultural and educational backgrounds. Children from educationally deprived and non-Western backgrounds invariably fared poorly on standard psychological tests, including for IQ. However, Feuerstein refused to accept the normative validity of these tests and noticed that the children's performance improved during his personal interventions.[39] Feuerstein replaced the static goal of many diagnostic procedures with the dynamic goal of evaluating the manifest capacities of an individual and using these as the building blocks for future development.[40] These *learning assessment potential devices* (LAPD) function to evaluate the cognitive potential of the child but also form an integral part of the process of cognitive stimulation and development. In opposition to his teacher Piaget, who had proposed that a child's cognition develops through direct interaction with the external environment, Feuerstein's radical insight was to include a personal mediator between the environment and the child. The intentionality of the mediator in rendering the external environment meaningful to the child is of paramount importance in stimulating previously unforeseen potential in the cognitively impaired.

The moral context of the development of Feuerstein's program, called mediated learning exchange (MLE), is of central importance. Feuerstein's innovations were led by the moral conviction that cognitively devastated children should not be abandoned to the horizons delimited by cognitive tests.

This conviction led Feuerstein to the belief that these children had the potential to change, which motivated his subsequent attempts to develop assessment and learning tools to enhance and stimulate cognitive potential in order to effect change.[ix] MLE as an educational enrichment program modifies cognition in an ethically noncontroversial manner. At the same time, Feuerstein's use of "instrumental enrichment" tools, intended specifically to modify brain structure, highlights a psychological approach to cognitive enhancement that has not been adequately mined as an intellectual and moral resource. As a neuropsychologist, Feuerstein pioneered a pragmatic approach to enhance cognition in the cognitively impaired. The terrain is wide open for a philosophical analysis exploring the epistemological and moral foundations of his work, especially in comparison with Piaget and Vygotsky.[x]

Feuerstein's belief in the ability to transform the world of the cognitively impaired through his didactic tests and techniques was consciously informed by the concept of *tikkun olam*. Moreover, the concept of mediated learning is value-laden both theoretically and in its application. As such, MLE presents a valuable resource for sustained reflection around the ethics of cognitive modifiability through educational and scientific techniques. MLE presents a cognitive enhancement framework that is radical in its implication for cognitive improvement, even to the extent of creating human potential that does not yet exist in terms of current scientific knowledge of neuroplasticity. At the same time, it epitomizes a deep respect for the most vulnerable members of our community. Finally, it presents a method of radical cognitive enhancement rooted in the fragility and vulnerability of the human condition that contrasts with the hubristic belief in the possibility of transcending our human specieshood through technological control of human evolution. Ultimately, Feuerstein's methodology is rooted in a Jewish creationist mythology that posits the radical possibility of human transformation using the tools ready at hand, although initially created *ex-nihilo*.

Conclusion

In this chapter, I analyzed the issue of cognitive enhancement in Israel through focusing on the application of deep TMS by two companies, Brainsway and Neuronix. My analysis was driven by the question of whether the particular Israeli context provides specificity to the development of cognitive enhancement technologies, as well as the ethics discourse around these technologies. I argued that the spirit of entrepreneurship that characterizes the development of these neurotechnologies is not matched by the same level of ethical reflection. This technological-ethics deficit in turn reflects the relative lack of support for the humanities and neuroethics at advanced centers of science and technology in Israel. Ethical issues pertaining to these neurotechnologies that I have

highlighted include enhancement versus treatment, the relationship between industry and science, neurocitizenship, the ethics of memory, and, finally, cognitive enhancement as a form of *tikkun olam*. This metaphoric concept of *tikkun olam* is encapsulated in the pioneering neuropsychological work of the late Professor Reuven Feuerstein. I consider that a secularized ethics encapsulated in the metaphor of *tikkun olam* drives forward the development and application of neurotechnologies in Israel, suggesting that the neuroscientific terrain is fertile for the development of a sophisticated allied ethics discourse.

Notes

i. Israeli researchers hold their own as world leaders in neurobiology. Academic Centers of excellence include the Adams Super Center for Brain Studies at Tel Aviv University, the Leslie and Susan Gonda (Goldschmied) Multidisciplinary Brain Research Center at Bar-Ilan University, the Edmond and Lily Safra Center for Brain Sciences at Hebrew University of Jerusalem (ELSC), the Weizmann Institute of Science, and the Haifa Technion.
ii. Peres served as Israeli President between July 15, 2007 and July 24, 2014.
iii. By moral context, I am referring to the conscious as well as unconscious motivating forces that compel or restrict scientific research. These forces may be economic, cultural, religious, and ethical.
iv. For more detailed information about the H-coil, see Bersani et al.[14]
v. The moral naturalist position states that morality can be adequately explained in naturalistic terms. In other words, moral facts may be understood through analysis of natural facts about the world and are therefore amenable to scientific investigation.
vi. Perhaps of paramount concern is the possibility of changing the neural basis of morality itself, for example through affecting human empathy. The following description of Reuven Feuerstein's approach in neuropsychology presents an example that links cognitive and moral reasoning capacities and that is itself motivated by a deep moral imperative to improve the human condition without trying to overcoming the fundamental vulnerability of being human.
vii. *Tikkun olam* has roots in classic rabbinic literature and mediaeval Jewish mysticism or *kabbala*. Most recently, in the modern period, it has assumed connotations of social action and justice.
viii. Feuerstein's biography runs in tandem with the development of the nascent Israeli state following World War II and epitomizes an approach borne out of the meeting of Western psychology with the particular experience of Jewish national life in Israel post-independence.
ix. This chronology was stressed to me by Professor Reuven Feuerstein in a series of personal interviews a few months before his passing.
x. For an excellent philosophical analysis of cognitive science focusing on the work of Piaget, see Hundert.[42]

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10

Cognitive Enhancement Down-Under

An Australian Perspective

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Cognitive Enhancement in Australia

"Cognitive enhancement" (or "neuroenhancement") broadly encompasses a range of technologies and interventions that aim to improve concentration, memory, attention, or other cognitive functions in otherwise healthy people.[1] This definition may include various "brain training" techniques and novel neurotechnologies such as transcranial magnetic or direct-current stimulation.[2] However, most of the discussion about cognitive enhancement has focused on the nonmedical use of prescription drugs, in particular, stimulants such as methylphenidate, dextroamphetamine, mixed amphetamine salts, and modafinil. In Australia, amphetamine-related stimulants are largely prescribed to treat attention deficit hyperactivity disorder (ADHD), with modafinil being prescribed for narcolepsy.[3]

To date, cognitive enhancement drugs have not featured prominently in Australian health policy or public debates. This is in contrast to public debates in Canada,[4] the United Kingdom,[5] and the United States.[6] There are recurring media reports of "academic doping" among students in Australia, often appearing around exam periods, and misreporting of US data in ways that overestimate the prevalence of the behavior.[7] Most empirical research on the use of stimulant drugs for cognitive enhancement has focused on US college students and, to a lesser extent, on occupations that require extended periods of high-level cognitive performance, such as that experienced by military personnel,[8] medical practitioners,[9] and night-shift workers.[10] Discussions about the ethical, social, and regulatory implications of cognitive enhancement in

the Australian media and the academic bioethics literature have uncritically generalized data from the United States to many parts of the world.

In this chapter, we provide an overview of the state of knowledge about cognitive enhancement in Australia. The chapter provides a summary of Australian research about pharmaceutical cognitive enhancement among the general public and university students in the context of relevant regulatory and legal frameworks. It draws on understandings of Australian cultural values and literature about public attitudes toward enhancement in general as well as related views about the use of medications for nonmedical purposes. The chapter also sets out a research agenda for future work in the area.

Bursting the Cognitive Enhancement Bubble from Down-Under

Australian researchers have contributed to the international debate around cognitive enhancement in recent years by questioning the assumptions underlying what they have called the "bubble of enthusiasm" about cognitive enhancement in the bioethics literature,[11,12] in particular, assumptions in the bioethics literature about the safety of using prescription medications for cognitive enhancement.[13,14] The type and frequency of side effects of these medications have been studied in the context of treatment, but the risk profile for healthy individuals may be quite different. Specifically, the dependence potential of stimulants has not been well characterized.[14] We have also highlighted evidence that raises significant doubts about whether prescription stimulants actually enhance cognitive function in healthy individuals.[11,14] It is also yet to be demonstrated that the evidence of small, short-term positive effects of stimulants in healthy individuals[15] on laboratory tasks translate into better grades for students.[16] Without longitudinal studies, information about the side effects and efficacy of stimulant medications used nonmedically for cognitive enhancement remains anecdotal.

Data from the United States provide evidence of the misuse of prescription stimulants among college students. We have questioned and debated the extent to which data indicate that use is widespread and increasing.[11,14] A recent review of prevalence studies reported a range from 2.3% to 35.3% for lifetime use of prescription stimulants for US students.[12] It is unclear how these prevalence rates affect public health on campuses and among the general public in the United States. It is even less clear whether there are similar patterns of behavior in Australia. We have explored the attitudes of Australian students toward cognitive enhancement[17,18] and the prevalence of misuse of prescription medicine for cognitive enhancement among the general public.[19]

Our current program of work includes a study of the prevalence of cognitive enhancement among university students in Australia.[20] These studies are described in more detail herein.

The assumption of high prevalence is problematic because it is often used to claim that there is widespread demand for cognitive enhancement among college students.[20] Together, this alleged demand is often invoked uncritically as a justification for conducting more research on the safety and efficacy of medications used for cognitive enhancement.[21] The assumption that cognitive enhancement is prevalent depends on unquestioned assumptions about the motivations for nonmedical use of prescription medications. We suggest that there are varied motives for the nonmedical use of these medications and thus that the prevalence of nonmedical drug use differs from the prevalence of cognitive enhancement drug use.

We have highlighted the correlation between nonmedical stimulant use and the use of other substances. This calls into question the assumption that cognitive enhancement is a motive for use that is independent of other lifestyle factors. We have raised the question of whether those using stimulants for cognitive enhancement are using them to compensate for time spent in recreation or other nonacademic activities.[21] There is some early evidence that many types of substances are used by Australian university students for both recreational and cognitive enhancement purposes.[11]

Another potential motive for nonmedical stimulant use is self-medication for depression and lack of motivation.[22] In this case, the purported cognitive enhancers would be used therapeutically to treat the impaired cognitive functioning rather than to raise cognitive function above normal levels. Problems with interpretation of data on the prevalence of nonmedical use of prescription medication by university students have been important reasons for our skepticism about claims of the widespread cognitive enhancement use of prescription stimulants among US college students.[22]

One of our major concerns has been with the media reporting of nonmedical prescription use among US college students. The media have not always accurately represented current evidence on cognitive enhancement, often obscuring the motives for such drug use and playing down their potential side effects. This type of reporting may unwittingly encourage such drug use by implying that it is widespread and unproblematic.[11,23,24]

Our research has examined how the (print) media (1) communicates the prevalence of cognitive enhancement, (2) references evidence used to support claims of the increasing nonmedical use of stimulants, and (3) reports potential risks and benefits of cognitive enhancement. We have demonstrated that media portrayals often misleadingly and uncritically repeat questionable claims about the increasing/widespread use of stimulant medications from the academic bioethics literature.[25,26]

We conducted a thematic analysis of 142 newspaper articles published from 2008 to 2010 reporting the nonmedical use of prescription drugs for cognitive enhancement.[7] Our analysis revealed that the media reported the use of cognitive enhancing drugs as a common and increasing occurrence, giving biased appraisals of the putative effects of prescription stimulants. The majority of media articles (82%) portrayed the nonmedical use of prescription stimulants as common and/or increasing. Slight more than half (66%) of the articles cited the academic literature, although only half of the cited articles (36%) reported any data. Nearly all articles (95%) stated at least one possible benefit of using prescription drugs for cognitive enhancement, but only 58% mentioned any risks/side effects of nonmedical prescription stimulant use, biasing reporting in favor of the purported benefits. Only 15% questioned the evidence for the efficacy of prescription drugs to produce cognitive benefits to users.

We concluded that researchers and bioethicists have contributed to media hype about cognitive enhancement by reporting studies that overinflate the prevalence and effectiveness of prescription stimulants while underreporting the risks of such use. This enthusiastic media coverage could potentially normalize the practice of enhancement use of prescription stimulants, contributing to the indirect encouragement of such use by misleading analogies between using prescription stimulants and caffeine.[7] Such coverage persists in the Australian media despite guidelines from the Australian Press Council to avoid publishing information about drug-related practices that enable drug use (e.g., by identifying sources, specifying effective or dangerous doses, and commenting on the cost of substances).[27]

We also examined the history of stimulant drug use for cognitive enhancement. We demonstrated that cognitive enhancement is not a new phenomenon, and there have been cycles of enthusiasm for the nonmedical use of prescribed drugs, such as cocaine and amphetamines, over the past century or more.[28] Cocaine and amphetamines were introduced in the 19th and 20th centuries, respectively, as medicinal agents in Europe and the United States. Their widespread medical use acquainted users with their positive acute effects on cognitive performance and mood. Within a few decades, the nonmedical use of these drugs, recognition of side effects from chronic use, and changes in user characteristics diminished enthusiasm for their medical use. Thus, increased regulations were introduced to reduce the prevalence of abuse of these drugs.

Diverse policy strategies are being debated regarding the most appropriate policy approaches to cognitive enhancement use of stimulant drugs.[29] We have argued that cognitive enhancement use of stimulants can be addressed through existing regulations that deal with illicit drugs or through those that regulate prescription medicines.[30,31]

LEGAL AND REGULATORY FRAMEWORKS RELATING TO THE USE OF PRESCRIPTION MEDICINES IN AUSTRALIA

In Australia, the 1989 Therapeutic Goods Act (TGA) established a Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).[31] These schedules are based on the 1971 United Nations Convention of Psychotropic Substances, which takes account of toxicity, purpose of use, potential for abuse, safety, and need in regulating drugs with psychotropic effects.[32] The nine schedules are ranked in ascending order by the degree of control required, with Schedule 9 being the most restricted class. According to this standard, prescription stimulants are classed as Schedule 8 (S8). These substances are controlled drugs that require restriction of manufacture, supply, distribution, possession, and use in order to reduce the abuse, misuse, and the development of physical or psychological dependence.

Currently, medical doctors with the required permits to prescribe S8 drugs are the gatekeepers for stimulant medications.[31] Australian state and territory legislations enforce the SUSMP guidelines by making it illegal to obtain or consume S8 medication that is not prescribed to the individual in possession. In addition, terminology in the SUSMP does not clearly address the nontherapeutic use of medications. The guidelines allow doctors to prescribe stimulants for "off-label" use; that is, medication prescribed for a purpose other than that for which it has been approved by the TGA. The restrictive regulation of prescription stimulants reflects concerns related to the safety of their nonmedical use. Violations of these regulations are difficult to enforce where (1) permitted medical doctors make subjective decisions regarding off-label prescribing, (2) patients can feign symptoms to obtain a prescription, and (3) diversion of prescription medication is obscured. Ideally, an understanding of the potential health risks of drugs used for enhancement purposes should inform future policy on cognitive enhancement, but the safety and efficacy of these drugs when used for cognition enhancement is yet to be determined.[33,34]

STIMULANT PRESCRIBING IN AUSTRALIA

Over the course of the past decade, there has been a considerable increase in the prescribing rates of stimulant medications in Australia. Between 2000 and 2011, there was a 79.2% increase in outpatient prescriptions for stimulant medications and an average annual growth rate of 4.7%.[35] Hollingworth et al.[36] identified a similar increase in stimulant prescribing of 87% in Australia from 2002 to 2009. Dexamphetamine, formerly the most commonly prescribed stimulant, decreased throughout this period

whereas prescription of sustained-release methylphenidate increased. This switch is most likely due to the government subsidizing methylphenidate's controlled-release form as a safer alternative to shorter acting forms of dexamphetamine. There are several suggested explanations for the increased dispensing of stimulant drugs, such as better awareness and identification of ADHD.[35]

The increase in stimulant prescribing has caused some concern over the diversion and nonmedical use of these drugs.[3] It is plausible that any diversion may result in increasing rates of nonmedical use as a study aid for student's wishing to enhance their cognitive performance, but there is no evidence to support this hypothesis at present. Diversion and misuse varies across populations, as we noted earlier, although adolescents and young adults are considered to be the most likely populations to engage in such behaviors. Despite prescribing rates being lower than the prevalence of ADHD in the community, there is concern over the difficulty in identifying the proportion of stimulant drugs diverted nonmedically for cognitive enhancement, recreation, and self-medication.[3]

PREVALENCE OF COGNITIVE ENHANCEMENT AMONG THE AUSTRALIAN GENERAL PUBLIC

Cognitive enhancement has been characterized in the academic literature and in the media as most common among college students. There have been some attempts made to assess the prevalence of cognitive enhancement in the general public.[3] In the first empirical examination of public attitudes in Australia, Partridge, Lucke, and Hall[19] surveyed a random sample of 1,265 Australian adults in the state of Queensland. In this study, 2.4% of participants said they had taken prescription medication at some time in the past (typically on fewer than 10 occasions) to enhance their concentration or alertness in the absence of a diagnosed disorder. There was a notable gender difference in exposure, in which males were 1.5 times more familiar with this practice. Most people surveyed viewed it as unacceptable for prescription drugs to be used by healthy people to enhance their normal level of concentration or alertness. Only 7% thought it was acceptable to do so. Participants who were familiar with the practice (i.e., they or someone they know personally had taken prescription drugs to enhance concentration or alertness) were nearly twice as likely to find the practice acceptable. Young adults were more likely to have used prescription stimulants, with 6.2% of that age group reporting having ever used prescription stimulants. This study found low rates of cognitive enhancement use of prescription medicines in the general Australian community, with low levels of acceptability.

COGNITIVE ENHANCEMENT AND UNIVERSITY STUDENTS

Surveys of nonmedical use of prescription stimulants by college students in the United States have found past-year prevalence rates of between 5%[37] and 35%.[38] The variation in prevalence across studies has raised questions about the methodological[16,39] and environmental factors influencing these findings.[40] Methodological differences range from size and composition of samples, geographical location, and the ways in which cognitive enhancement use was defined. Most prevalence studies have been online self-report surveys. This method offers anonymity for participants in reporting a clandestine and illegal activity such as the nonmedical use of stimulants. However, there is also a risk that this sampling method will overrepresent populations that have either engaged in cognitive enhancement or feel comfortable declaring it.

Despite these limitations, the apparent popularity of prescription stimulant use among US college students suggested by these surveys has been assumed to represent a global pattern of use.[40] Data on the prevalence of cognitive enhancement from countries outside of the United States suggest that this is a risky assumption. This may facilitate the normalization of such use, implying drug efficacy and safety on a broader scale despite possible methodological and environmental limitations or inaccuracies. Prevalence rates have been estimated at 3% in Germany,[41] 5% in Switzerland,[42] and 16% in Italy.[43] There are undoubtedly methodological factors that contribute to these variations (e.g., a small sample size in the case of the Italian study).

There are limited estimates of prevalence among Australian university students. We interviewed 19 Australian university students about their perceptions regarding the prevalence, motivations, efficacy, and safety of cognitive enhancing drug use.[17] Prevalence was not perceived as high, and many students had never encountered such drug use before or only in media reports. Students speculated about a number of possible motivations for use, including to (1) "get ahead," (2) perform at a high academic level, (3) "keep up" as a coping strategy, and (4) maintain an active social life as well as meet academic demands. The majority of the sample believed that such use was analogous to cheating. We also asked students about their attitudes regarding the efficacy of prescription stimulants as study aids. Most students were skeptical, expressing "psychological dependence" as a possible negative outcome.

The only direct prevalence study of drug use for cognitive enhancement among Australian students was recently published by Mazanov, Dunn, Connor, and Fielding.[44] They conducted an online "study drugs" survey of more than 2,000 students at four Australian universities and reported a lifetime rate of prescription stimulant use of 10% for "study purposes." The findings of this study should be interpreted with caution for several reasons. First, the sample exhibited higher rates of alcohol and drug consumption, which have been

correlated with the nonmedical use of stimulant medications in US samples. Second, it is not clear whether students may have reported their recreational use of stimulants as cognitive enhancement because it is less stigmatized. Third, this study also reported lifetime nonmedical use of stimulants rather than regular or recent use. Lifetime use captures instances in which individuals may have experimented only once with a substance several years ago. Past-year use would provide a more realistic and current estimate of the prevalence of cognitive enhancement on Australian campuses. Nonetheless, Mazanov et al.'s study documents the existence of cognitive enhancement use of stimulants on some Australian university campuses. These findings need to be followed-up with more specific and long-term studies of prevalence, motivations for use, and outcomes of use.

"She'll Be Right, Mate": Australian Cultural Values and Cognitive Enhancement

Culture, economics, and social context may explain the apparent difference in prevalence estimates between the United States and the few other countries that have estimated the prevalence of enhancement use of prescription stimulants. The desire for cognitive enhancement may be partly fueled by intense competition for university places and even more intense competition for well-paid jobs—these reflect economic, academic, cultural, and social issues.

Australia is a wealthy country that has not experienced an economic recession for more than two decades. Long-term economic growth has ensured a relatively high level of employment throughout the recent global financial crisis.[45] Australia consistently ranks near the top on measures of well-being,[46] and, despite its small size, Australia has a number of Top-100 ranked universities.[47] Although Australian citizens are charged tuition fees for undergraduate courses, these are subsidized by the Commonwealth government via an interest-free loans scheme.[48] Australian undergraduate students are not typically required to pay tuition fees up front, instead repaying the Commonwealth government after graduation when their annual income reaches a certain level. These interest-free loans are indexed to the annual inflation rate. This means that the ability to pay student loans is rarely a limiting factor for entering university in Australia. It could be argued that these conditions may reduce competitive pressure for university entry and obtaining employment. This could mitigate a strong desire among students to "get ahead of the competition" by using stimulant drugs for cognitive enhancement.

In addition, Australians are generally considered to be easy-going (encapsulated by the phrase "she'll be right, mate"). Australians who achieve higher

levels than their peers (at anything except sports) are criticized (or parodied) for their ambition—a phenomenon called the "tall poppy syndrome."[49] Australian society is often viewed as antihierarchical, with an egalitarian social system and irreverence for established authority. To be described as a "tall poppy" is to be seen as lacking in humility and asserting superiority to others.

These values could reduce social approval for trying to better oneself using pharmacological forms of cognitive enhancement in Australia. It may also increase the likelihood that the use of drugs for cognitive enhancement in Australia would be regarded as a form of cheating. We have found some evidence to support this view from our qualitative studies of the attitudes of students and the general public to the acceptability of cognitive enhancement use of stimulant medications. In one study, 85% of our sample of the general population believed that the use of medications for cognitive enhancement was unacceptable.[19] Our interviews with university students revealed that the use of drugs for cognitive enhancement was typically regarded as unfair.[18]

WHERE TO NEXT FOR AUSTRALIA?

Cognitive enhancement has not featured as prominently in Australian policy debates as it has in the United States. It continues to attract media attention as a result of media reporting of high rates of use in the United States. Current evidence suggests that cognitive enhancement exists among the Australian general public and college students but not at alarmingly high rates and that such use probably occurs among those who engage in recreational drug use, whether with alcohol or illicit drugs. Australian cultural values and attitudes may not be as encouraging of cognitive enhancement practices as in the United States. This may also mean that it is less likely to be reported or openly discussed. However, it is likely that the nonmedical use of stimulants is associated with other substance use in Australia, as it is in the United States. Cognitive enhancement is therefore likely to be correlated with other types of substance use, including both licit and illicit substances. There may be differences in the prevalence of factors in the Australian and US university environments that motivate or facilitate the use of stimulants for cognitive enhancement. Thus, there is a need to do more research on the rate of nonmedical use of prescription stimulants for cognitive enhancement occurring among university students in Australia. We are currently conducting research about the attitudes, behaviors, and motivations of Australian university students on the nonmedical use of stimulants in the context of other substance use and within the broader social context of study habits and ways of coping with student life. We hope that this holistic approach to student life and the university environment will shed light on the challenges that students face, their prioritization of study and social

activities, and the solutions that they use (including drug use) to meet their commitments.

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11

Cognitive Enhancement in Germany

Prevalence, Attitudes, Moral Acceptability, Terms, Legal Status, and the Ethics Debate

SEBASTIAN SATTLER

Introduction

In recent years in Germany, scholars in disciplines as varied as philosophy, sociology, psychology, medicine, law, and the neurosciences, as well as the public, have become increasingly interested in the individual and societal potentials and pitfalls of cognitive enhancement (CE). CE is the augmentation of core capacities of the brain such as working memory, learning, concentration, or cognitive control in healthy individuals.[1,2,3] The concept of CE can include a variety of behaviors—differing in their prevalence and effectiveness as well as in how morally acceptable they are seen—such as substance use, sleep, nutrition, physical exercise, mental training, meditation, education, genetic modification, mnemonics, and brain stimulation.[2,4] Substances can be chemically synthesized (e.g., antidementives), natural phytopharmaceuticals (e.g., caffeine), or naturally produced in the body (e.g., insulin).[1,5] Pharmaceutical CE (PCE) with prescription medicine has attracted the most attention. Therefore, this chapter, focusing on Germany, portrays PCE with respect to the terms and frameworks used to describe it, the legal status of the various CE substances, prevalence rates, expectations of and moral views about CE use, scholarly discussions on ethical issues, and remaining challenges and tasks.

The Terms and Frameworks Used to Describe CE Drug Use

Various terms other than CE are used in public debates and in scholarly writings from Germany. Interestingly, English terms are often appropriated with or without partial translation into German. Prominent[i] terms are *Hirndoping* (brain doping), *Braindoping* (brain doping), *Medikamentenmissbrauch* (misuse of medication), neuroenhancement (NE), *nicht-medizinische Nutzung verschreibungspflichtiger Substanzen* (nonmedical use of prescription drugs), *schlaue Pillen* (smart drugs), and (*Pharmakologisches) kognitives Enhancement* ((P)CE) or "cognitive enhancement."

The terms put greater or lesser emphasis on different aspects such as targeted brain functions, enhancement means, the legal status of the means, or motivations for use; some are more generic and others are narrower. For example, the general term NE includes cognitive, emotional, and motivational enhancement. Although NE and CE include different enhancement means such as brain stimulation, substances, sleep, and the like, brain doping is seen as limited to chemical substances only.[6] Similarly, Franke and Lieb define pharmacological NE as all substances used for enhancing brain performance and brain doping as one subgroup of prescription and illegal psychoactive substances misused by healthy people.[7] However, for Wulf et al. brain doping is a synonym for NE.[8] When referring to the nonmedical use and misuse of drugs, enhancement is only one motive for using such drugs; others include partying, getting high, and other recreational uses.[9]

Different terms frame the phenomenon differently; for example, some put more emphasis on risks, others on benefits.[10] The *doping* framework draws a parallel to doping in sports and carries a negative connotation by highlighting norm violations and risks.[10–12] The *misuse* framework also is negative. It signals the violation of legal and/or social norms.[11] The *enhancement* framework is seen as more neutral, but it otherwise carries positive connotations by highlighting potential benefits.[1,10–12] The *nonmedical use* framework seems to be least biased, but still signals a transgression of boundaries. Finally, the *smart-pill* framework enthusiastically attributes intelligence to the drug while neglecting side effects.[10]

No systematic research exists about the use frequency of terms. German journalists, who frequently report on this phenomenon, often seem to refer to the doping (e.g., Retzbach[13]), *misuse* (e.g., Hollmer[14]), and smart-pill frameworks (e.g., Moorstedt[15]), but they also use more nuanced depictions and discuss different frameworks, (e.g., Langlitz[16]). Whereas Eickenhorst, Klapp, and Groneberg[17] convey the impression that popular media in Germany do not support unrealistic expectations of enhancement effects and also write

disapprovingly of CE drug use, others[1,12] criticize exaggerations of enhancement effects and prevalence of use.

It has been argued that scientists scarcely ever use the doping framework.[7] Although several scientists refer to the enhancement framework,[7,9,18–21] to the nonmedical use framework,[9,20–23] or the misuse framework,[7,17,24] several counterexamples also exist.[6–8,24,25] It appears that the doping and the misuse frameworks often occur together, as well as the nonmedical use and enhancement frameworks.

The use of different frameworks might be consequential for the direction of the debate and for potential users.[10] For example, the doping framework might lead to stigmatization of CE drug users, whereas the smart-pill framework can signal social acceptance, result in exaggerated expectations about drug efficiency, and neglect side effects, which might promote increased consumption.[10] Using heavily charged terms such as brain doping (e.g., Dietz et al.[26]) in survey research can signal social undesirability and consequently bias responses (see the section on "Prevalence of CE Drug Use"). However, no systematic research has been conducted on such framing effects for CE.

In sum, in the debate and research on CE, all actors should think carefully about the appropriateness of the frameworks they use. A balanced view including potential dangers and realistic benefits might be reasonable.[12]

Legal Status of Potential CE Substances

Legal norms differ between countries and across time. This is also the case for substances that are described as potential means for CE (e.g., due to their actual risk assessment). Their legal status in Germany can be actually categorized as follows:

1. *Over-the-counter drugs*: Over-the-counter drugs can be purchased outside of pharmacies (e.g., in supermarkets or drugstores). Examples are vitamin pills and guarana. Advertisements for these drugs are legal. However, access to products with higher doses of certain substances (e.g., gingko) is more restricted (see next the categories).
2. *Drugs available in pharmacies only*: Drugs that are only available in pharmacies can be bought without prescription. Examples are caffeine tablets and several gingko products. Trained personnel give advice to ensure proper use. Advertisements for these drugs are legal, but the German law on the advertising of medicinal products (Heilmittelwerbegesetz; HWG) prescribes a disclaimer advising people to read the package leaflet and consult their doctor or pharmacist for information on side effects and risks.

3. *Prescription drugs*: Prescription drugs can be only purchased in pharmacies with a prescription from a physician. Examples are methylphenidate and modafinil. One of the most common substances, methylphenidate, is additionally restricted by the prescription regulations for narcotics (Betäubungsmittel-Verschreibungsordnung; BtMVV). According to the German narcotics act (Betäubungsmittelgesetz; BtMG), people who illegally trade narcotics, import, export, or sell them, give them away or bring them into circulation, can receive a prison sentence of up to 5 years or a fine. Modafinil was released from this regulation in 2008 due to its lower risk of dependency.[1] Public advertisements for these drugs are generally prohibited (HWG), which is different, for example, in the United States. In Germany advertisements for prescription drugs are only allowed to be targeted to health care professionals.
4. *Illegal drugs*: Drugs such as ecstasy, cocaine, and amphetamines (e.g., Adderall) are illegal and prohibited by the BtMG. It should be noted that some amphetamines such as Adderall (XR), which are prescription drugs in countries such as the United States,[27] are illegal in Germany.[28] Advertisements for these drugs are prohibited.

Prevalence of CE Drug Use

It is important to assess the CE drug use prevalence and its fluctuations because such data help to assess the need for (political) action regarding the regulation and prevention of drug use, but also to identify populations at risk of misusing drugs.[22,27] In 2011, Franke and colleagues stated that not much research on the prevalence of CE drug use exists outside of North America.[23] Shortly thereafter, more prevalence data became available in Germany. Most of this research has been conducted on university students. When comparing prevalence rates of existing studies, their heterogeneities have to be considered, including potential measurement problems.[3,27]

The definitions of CE in the research thus far and, consequently, the empirical measures gained, include various forms of substances (see previous discussion). Several of the measures concentrate on prescription stimulants, whereas others include illicit drugs or drugs that are only available in pharmacies. Some measures assess CE together with mood enhancement. Some include (e.g., Sattler and Wiegel[20]) and some. [e.g., Franke, Bonertz, Christmann, Engeser, and Lieb[22]) exclude people with a prescription for certain drugs. An exclusion can be misleading because people can fake symptoms to get a prescription.[17,27] Some studies present the respondents with lists of

CE substances[29], others generally ask whether substances were used for CE.[20] Moreover, broad measures of the nonmedical use of drugs do not provide a valid image for CE because motives such as getting high or losing weight are included.[3]

Surveys typically inquire into CE drug consumption during the past 30 days, over a lifetime (LTP), or something in between. Therefore, comparability of studies is restricted if their reported period of consumption differs.

The self-reporting of drug use might be uncomfortable for some respondents because CE drug use conflicts with social or even legal norms and is prone to stigmatization.[9,17,21,30,31] This may lead to underreporting, especially when surveys are not conducted anonymously (e.g., Tourangeau and Yan[32]). Perceptions of anonymity and tendencies towards social desirability bias might also vary between survey modes (e.g., Kreuter, Presser, and Tourangeau[33]), such as web surveys or classroom surveys. Furthermore, recall bias can also distort self-reports. Studies with small and/or convenience samples, with low response rates or within one institution/region, can be more prone to selection biases and consequently biased prevalence estimates than large random samples within multiple institutions/regions and high response rates.[3]

Studies in different populations (e.g., surgeons vs. pupils) can differ due to their differing risks and protective factors (e.g., stress, peer influences) regarding CE drug use but also due to different access opportunities or financial resources for purchasing CE drugs (e.g., Sattler, Forlini, Racine, and Sauer[21]; Sattler, Sauer, Mehlkop, and Graeff[34]).

Prevalence rates might also vary between countries because availability, price, and legal status of drugs, legal status of advertisement, strength of influencing factors (e.g., competition on the labor market), and other factors can differ.[29,30,34,35]

The following overview[ii] mostly presents LTP rates alongside several exceptions. Substances other than prescription drugs are also described; some rates are only displayed in Table 11.1.

PREVALENCE IN THE GENERAL PUBLIC

A representative German study reports a 12-month prevalence of approximately 1.5% for prescription drugs and illegal drugs used for CE.[28] Drugs counteracting depression account for 1% of the prevalence, chemically synthesized stimulants for 0.5%, and beta-blockers for 0.1%. No respondent reported the use of modafinil. An online survey of employed members of a health insurance fund found an LTP of prescription drug use to enhance cognition and mood of 5%.[25]

Table 11.1 **Review of studies in Germany[a] to assess the prevalence of substances used for CE.**

Study	*Year of Study*	*Population*	*Sampling*	*RR*	*N*	*Survey Mode*	*Technique*	*Results*
DAK [25]	2008	Working population from 20 to 50 years, insured by a health insurance	–[b]	–[b]	3,017	Online	DR	5.0% LTP of prescription drugs for CE and mood enhancement
Dietz et al. [26]	–[b]	University students	–[b]	90.7%	2,557	PAP	RRT	20% 12-month prevalence for pharmaceuticals (not exclusively prescription drugs, but also caffeine tablets) and illicit drugs
Dietz et al. [40]	–[b]	Recreational athletes at two triathlon events	Non-random	99.7%	2,773	PAP	RRT & DR	15.1% 12-month prevalence for legal CE (e.g., ginkgo biloba); 5.8% 12-month prevalence for prescription drugs, illicit drugs, and drugs only available in pharmacies for CE
Franke et al. [23]	2009-2010	University students, vocational and grammar-school pupils	Non-random	$99.8\%_{Students}$ $68.3\%_{Pupils}$	$512_{Students}$ $1{,}035_{Pupils}$	PAP	DR	$0.8\%_{Students}$ and $1.6\%_{Pupils}$ LTP for prescription stimulants; $2.9\%_{Students}$ and $2.4\%_{Pupils}$ LTP for illicit stimulants
Franke et al. [38]	2009-2010	University students, vocational and grammar-school pupils	Non-random	$99.8\%_{Students}$ $68.3\%_{Pupils}$	$512_{Students}$ $1{,}035_{Pupils}$	PAP	DR	$54.9\%_{Students}$ and $52.4\%_{Pupils}$ LTP for coffee; $30.5\%_{Students}$ and $43.3\%_{Pupils}$ LTP for caffeinated drinks; $10.0\%_{Students}$ and $10.7\%_{Pupils}$ LTP for caffeinated tablets

Franke et al. [39]	2011	German-speaking attendees of five surgery society conferences	Non-random	36.4%	$1{,}145_{RRT}$ $1{,}105_{DR}$	PAP	RRT & DR	$19.9\%_{RRT}$ [95%-CI: 15.9)-23.9%] and $8.9\%_{DR}$ LTP for prescription and/or illicit drugs
Hoebel et al. [28]	2010	General population from 19 to 97 years	Random	62.2%	6,142	PAP	DR	1.5% 12-month prevalence for prescription and illicit drugs; 8.3% 12-month prevalence for energy drinks
Eickenhorst et al. [17]	2010-2011	University students	Non-random	–[b]	1,324	Online	DR	7.0% during studies for CE, enhancing mood, recreational reasons, experimenting, etc.
Middendorf et al. [24]	2010-2011	University and vocational high school students	Non-random	25.0%	7,989	Online	DR	5% LTP of "braindoping" (i.e. certain prescription, non-prescription, and illegal drugs); 5% of "soft-enhancement" (i.e. vitamin products, caffeine, homeopathics to cope with study requirements); 1.8% regular use of energy-drinks to deal with university life
Sattler and Wiegel [20]	2010	University students	Random	53.5%	5,882	Online	DR	4.6% LTP for prescription drugs

(continued)

Table 11.1 **Continued**

Study	*Year of Study*	*Population*	*Sampling*	*RR*	*N*	*Survey Mode*	*Technique*	*Results*
Wiegel et al. [31]	2010	University teachers	Random	40.4%	1,131	Online	DR	0.9% LTP for prescription drugs
Wolff and Brand [37]	–[b]	Vocational school students	Non-random	61.1%	519	PAP	DR	8.0% LTP for prescription drugs; 8.8% LTP for illicit drug; 62.6% LTP for life-style drugs (e.g., functional use of coffee, caffeine pills, creatine, energy drinks)

[a] It cannot be assured that all respondents in all surveys were Germans, e.g., students might be of other nationalities.

[b] Information not provided in the paper.

Notes: N=Number of Observations; PAP=Paper and Pencil; RR=Response Rate; Randomized-Response Technique; Direct Response; LTP=lifetime prevalence; CI=Confidence interval.

PREVALENCE AMONG (UNIVERSITY) STUDENTS AND PUPILS

One large-scale survey of randomly selected university students found am LTP of prescription drugs used for CE of 4.6%.[20] Another study, based on a convenience sample, found an LTP of prescription stimulants of 0.8% in university students (pupils: 1.6%), whereas 2.9% of the university students (pupils: 2.4%) reported the use of illicit stimulants for CE.[23] Wolff and Brand found an LTP of 8.0% for prescription drugs and 8.8% for illicit drugs.[37] Another online survey among university students found that 7.0% used illicit and/or prescription drugs during their studies for different reasons such as CE, enhancing mood, recreation, and experimenting.[17] A study using the randomized-response technique (RRT), which is a special technique providing objective anonymity to the respondents, found a 12-month use prevalence of pharmaceuticals, illicit drugs, and caffeine tablets of 20% for university students. Especially caffeine tablets might account for this high prevalence[26] because Franke and associates found that 10.0% of the surveyed university students (pupils: 10.7%) report an LTP for caffeine tablets used for CE.[38] Another large-scale survey among university students and students from vocational high schools categorized 5% of the respondents as "braindopers" (i.e., users of nonprescription drugs such as certain pain relievers, soporifics, and antidepressants; prescription drugs such as modafinil or methylphenidate; and illegal drugs such as cocaine and marijuana).[24]

PREVALENCE AMONG OTHER SPECIFIC POPULATIONS

A RRT study for German-speaking attendees of five surgical conferences found a LTP of 19.9% for prescription and/or illicit drug use for CE.[39] Furthermore, a very low LTP for prescription drugs of 0.9% used for CE has been found for university teachers 31 A study among recreational athletes at two German triathlon events found a 12-month prevalence of 5.8% (resulting from 3.1% assessed with German and 2.7% with English questionnaires) for CE with legal substances such as caffeinated drinks or gingko biloba.[40] Another part of this survey employed the RRT and found a 12-month prevalence of 15.1% (no information about questionnaire language available) for "cognitive doping" with substances prescribed by a doctor, available in pharmacies, or on the black market, including caffeine tablets, stimulants, beta-blockers, and cocaine.

To sum up, comparisons of prevalence rates are difficult due to the heterogeneities described. However, studies often show higher prevalence rates for "lifestyle" or nonprescription drugs than for prescription or illicit drugs used for CE. Because the latter is not yet general practice, the media hype seems to exaggerate its popularity.[12,31] But this hype might raise awareness that such

drugs exist, thus contributing to their use.[25] They also might map the beginning of a potentially harmful trend,[41] as willingness measures show that much larger portions of individuals are willing to enhance performance via drugs under certain conditions (e.g., if drugs with better risk/benefit profiles existed; see the next section[25,31]). Restricted access might additionally limit actual prevalence, but availability through the Internet might increase. Moreover, higher prescription rates in countries such as the United States may increase the circulation of CE pills in the population. Changes in the variables influencing CE drug use (e.g., increasing pressure to perform and use in personal networks) may also increase future use.[29,31] However, Germany might have lower prevalence rates than the United States, for example, because of differences in the legal status, restrictions upon advertising prescription drugs in Germany, different views about the acceptable means to achieve success, and related factors.[27,30] And yet, the actual numbers should be treated carefully because even an assumed prevalence of 5% for prescription drug use among university students would translate to least 125,000 people who place themselves at risk of side effects. Kowalski estimates the number at 600,000 users in the working population. This implies potential individual suffering and burdens for health insurance.[41]

Moral Acceptability and Attitudes Regarding CE Drugs

Mapping attitudes toward CE and views about its moral acceptability can also inform the public and academic debates.[30] These factors can also be seen as antecedents that encourage or discourage CE drug use.[9,20,30,34]

The moral acceptability of CE drug use among the general public seems relatively low compared to views expressed in the media. A sizeable minority of one in four people within the working population describes the enhancement of memory and concentration on the job with prescription drugs as justifiable.[25] On a scale ranging from "strongly disagree" (1) to "strongly agree" (7), university teachers rated the item "It [CE] gives me a bad conscience" on average as 4.6.[31] On a scale ranging from "absolutely moral" (1) to "absolutely not moral" (7), university students rated CE drug use "generally for university studies" on average as 2.3 (SD = 1.8).[30]

Views about the moral acceptability of CE drug use might be relatively low not only due to factors influencing prevalence (see preceding section), but also because obtaining prescription drugs can violate legal norms. A vignette-based study found several factors influencing university students' views about the morality of CE drug use: acceptability was lower for prescription or illicit drugs than for over-the-counter drugs, for severe side effects than for mild or

moderate side effects, when the university had a policy forbidding the use of such drugs, and when no peers used such drugs compared to half of the peers.[21] For some people CE might conflict with fairness norms. Approximately 55% of university students and pupils who did not use CE drugs and about 33% of prior users describe CE drug use as "not all" or "probably not" fair.[22] In response to the question of whether NE is cheating, a mean score of 3.2 (*SD* = 1.6) on a scale ranging from "strongly disagree" (1) to "strongly agree" (6) was found for vocational students.[37] Likewise, the moral acceptability of CE drug use and of different types of academic misconduct was positively associated.[30]

The possibility that they created an "unmerited advantage" was almost never a declared reason for not consuming prescription CE drugs.[25] When CE drug use was seen as less morally acceptable, a reduction in willingness[9,31,34] and frequency[28,30] was observed.[iii] This can be explained by the psychological costs (e.g., shame or feelings of guilt) entailed in violating moral precepts.[9,30,31,34]

Two of these studies have further examined the conditions under which respondents consider the use of CE drugs to be (not) acceptable: Franke et al. asked pupils and university students about conditions for using prescription or illicit drugs (without distinguishing between these two types).[22] They found that more than 80% would use such drugs if they did not cause side effects, long-term damage, or addiction. About 60% would use them if they were available without prescription; 7.5% would use them if friends also did and 5.7% if employers recommended their use. Actually, about 95% of the respondents believe that such drugs cause addiction, but 19.1% would approve CE for physicians, 21.8% for pilots, 50.9% for the cognitively impaired elderly, and 26.4% for university students with lower academic performance (author's calculations based on the figures in Franke and colleagues[22]). A study among vocational students assessed attitudes towards NE (without specifying the type of substances) on a scale ranging from "strongly disagree" (1) to "strongly agree" (6).[37] Many respondents do not think that NE is necessary to be competitive (Mean: 2.3, *SD* = 1.2), that it is an unavoidable part of learning and working (2.1, *SD* = 1.2), or that legalizing NE would be beneficial (2.2, *SD* = 1.3). Agreement was slightly higher with the proposition that the quality of performance counts more than the means for its achievement (3.2, SD = 1.6) or that health problems caused by stress are as bad as those caused by NE (3.5, SD = 1.5).

Scholarly Discussion About Ethics of CE

Arguments put forth by German scholars about the ethics of prescription CE drug use and their legalization resemble those in many Western countries.[2,3,27,42,43] This might also be due to multiple processes of exchange between scholars. The number of scholarly contributions to this discussion has exploded

in recent years. Arguments capture individual and societal facets of CE drug use, and these arguments are mainly based on three different moral theories—consequentialism, deontology, and virtue ethics—that can lead to different conclusions. However, actually no systematic research exists to determine which theory is more often used or more influential in the discourse. Such a review is also beyond the scope of this chapter. Here, I describe several frequently discussed arguments.

DESIRED EFFECTS, SIDE EFFECTS, AND NEGATIVE HEALTH CONSEQUENCES

With reference to an "occidental" ideal, Metzinger argues that a general condemnation of the desire to enhance performance is unjustified.[1] CE drugs are used for their expected desired effects such as increased concentration or cognitive capacity as a means to increase educability, productivity, competitive advantage, and the like.[8] Some argue, however, that evidence supporting such expectations is vague and that some users aim at enhancing performance without boundaries.[12]

One major objection to CE is the risk of side effects and negative long-term health consequences, which are largely unexplored.[6,12,19] Also an exacerbation of existing pathological conditions, such as panic attacks and compulsion, seems possible.[19] Some scholars appear to downplay the risk of addiction by stating, for example, that love can also be an addiction and claiming that users should be able to decide whether to accept certain risks.[11] The German Ethics Council, however, argues that risk reduction and loss prevention are highly important when discussing medication without medical reason because, unlike in the treatment of disease, the risks of CE are not offset by health benefits.[44] This is even more important because no "wonder drug" exists, and substantial and sustainable enhancement via drugs is scarce,[1,11] whereas safe alternatives for CE, such as coffee, do exist.[6,7] Galert and colleagues conclude that standards for safety and efficacy should be higher for CE drugs than for their therapeutic use.[11]

Consequentially, more research has been requested[19] while concerns have also been raised about exposing healthy individuals to long-term health risks.[1,18] The latter can violate the professional ethics of physicians.[1] Conversely, obstructing such research can be unethical because the research supports evidence-based drug regulation.[1] Thus, Metzinger states that such research should be considered part of a state's obligation to provide benefits and medical welfare.[1]

CHANGING PERSONALITY AND ERODING VIRTUES

Opponents of CE argue that CE can also displace personal effort and hardship.[19] They express concerns about unacceptable changes of personal identity,

self-determination, authenticity, and more through CE drugs.[12,18,19] One objection to this argument is that it only holds if a "true" core of a person exists.[1] Some criticize CE as an intervention in human nature, as a perversity, or as artificial while neglecting to consider that many other accepted means are used for similar reasons or that other artificial means are also accepted for different goals.[11] Opponents claim that alternative "natural" enhancements require mental activity, operate more slowly, require effort, and might not have similar neurophysiological effects.[18,19] Others argue that personal traits are relatively stable entities that might not change quickly through CE drug use and that personality is influenced by multiple factors and decisions in life.[1,8] Furthermore, changes might be (subjectively perceived as) authentic or generally positive.[1,11] Therefore, studies should investigate whether CE drugs can cause changes in personality or can limit rational thinking or moral reasoning.[1,11]

FREE DECISION-MAKING

Galert et al. claim that everyone should have the autonomy to decide whether or not to use CE drugs and potentially change his or her personality and whether the expected benefits are worth the risks.[11] Restricting the right of self-determination paternalistically can conflict with democratic principles.[1,8,11] However, the question of whether people are competent in self-determination should also be considered.[1] Some users (e.g., addicts) might not be constantly aware of their motives, resulting in less reflection on and evaluation of potentially harmful effects of CE drug use.[8,12] Therefore, Wulf and colleagues[8] propose case-by-case decisions, and Schleim[12] argues that some individuals should be protected against themselves.

FAIRNESS, COERCION, AND INEQUALITY

A frequently stressed social consequence of CE drug use is their potential violation of fairness norms, as in competitive situations in which not all competitors can access CE drugs.[12,19] Therefore, some argue that CE drugs should be freely available/legal because if everyone can easily use them, no one would gain a relative advantage.[11,12,19,25] But free availability might increase indirect coercion to also use such drugs and accept their side effects in order to avoid relative disadvantages.[18,19,25,44] This might be especially problematic for people who would like to refuse CE drug use. Moreover, CE might create a norm of perfect functioning humans.[8] Whereas CE drug use might increase pressure and expectations on individuals—which is seen critically[11]—the literature also points to potential societal gains (e.g., CE-driven increases in productivity[44]). Furthermore, for some people, pressure might be so high that they reflect less about the risks of CE drugs.[11] Direct coercion has also been discussed with

respect to general welfare (e.g., in prescribing their use to surgeons, military, or rescue workers).[19] This conflicts with the "free choice" argument. Galert and colleagues state that—as long as CE drugs are not harmless—people unwilling to use them should be protected from falling behind in competition.[11] Moreover, the community at large should not pay for the cost of enhancement.[11,12]

If access to CE drugs were positively associated with social status (e.g., higher financial resources), then social inequality and injustice might increase.[11,44] Therefore, CE proponents suggest subsidies for disadvantaged groups (e.g., higher taxes for CE drugs for privileged groups); however, this would again lead to coercion for the disadvantaged.[11] Nevertheless, many accepted means such as private schools, tutoring, or special training already serve to protect the status of and provide advantages to the privileged and those using them, and this also causes coercion.

ENHANCING CHILDREN

Arguments against the use of CE are voiced even more vehemently in the case of their use by children. Even many proponents of CE agree that children should be treated differently than adults. One reason is the higher vulnerability of children's brains.[11,45] Experiments with healthy children are thus seen as illegitimate.[45] Moreover, CE might reduce the ability to develop meta-skills, which are essential for further cognitive performance and achievement.[45] As a result, children might end up not being able to perform certain tasks without CE. Moreover, CE might reduce the conflicts children have with others, thus eliminating developmental tasks such as overcoming crises and challenges by means of personal effort. These potential consequences of CE can lead to dependency, weaken self-confidence, and reduce the development of autonomy.[11,45] Legal guardians are responsible for making decisions for their children because there exists means for informed consent by children, but they may potentially have different goals.[1,11,45] Furthermore, legal guardians and society should critically scrutinize their expectations toward children.[45]

THE ROLE OF PHYSICIANS

The role of physicians has also been often debated. Physicians who provide medication to people without symptoms may not be acting as healers but as service agents of clients.[19] This can cause conflicts between their professional ethics and financial interests.[8,44] The German Ethics Council[44] states that physicians are not obliged to provide treatments beyond therapy, but if such treatments, including CE drug use, were to be administered, the council would prefer this to be done by physicians with professional qualifications and a commitment to professional ethics and rules rather than by less competent persons.[11]

The council[44] demands physicians to fully inform users about the risks and benefits of drugs and to offer the mildest treatment to achieve a certain goal, even if less profitable.[11] In this context, discussion is needed about the responsibility of potentially negative consequences of CE drug use.[8] Furthermore, the boundaries between enhancement and therapeutic treatment need to be clarified. Metzinger provides several examples in which a clear distinction between the two is complicated: some types of therapy can be enhancement and therapy at the same time; new diseases are constantly added to medical classification systems; definitions of diseases change over time; and there is uncertainty about whether enhancement refers to performance increases beyond a statistical or a socially defined "normal" state.[1]

Challenges and Tasks

This section discusses future challenges and tasks for epidemiological and lab research, for political regulations, and for the ethics of CE drug use beyond the borders of Germany and throughout the world. More and better empirical information about CE is needed for informed decision-making by potential users, for evidence-based policy-making, for the development of interventions and preventions means, for propelling and informing the neuroethics debate about CE, and for stimulating public discussions.[1,3,9,11,27,43] Answering the many open questions requires interdisciplinary research,[3] including the use of a combination of different theoretical approaches, methods, and proficiencies. For example, neuroscientists, psychologists, and sociologists can investigate differences and correlations between the real and perceived effects of enhancement, ethicists and sociologists can conduct joint empirical research on the moral acceptability of CE drug use, and psychologists and ethicists can explore potential CE-driven changes in personality and how individuals perceive such changes. This can be costly, but such work is worth the investment.

POTENTIAL TASKS FOR EPIDEMIOLOGICAL RESEARCH

Research, whether on the assessment of prevalence, the willingness to use CE in the future, causes, moral evaluations, effects, or others facets of CE, should be based on solid empirical data (e.g., on precise and generalizable outcomes).[20,21] Actually, research on the general population using random large-scale samples or investigating numerous organizations is rare.[21,23,27,29,43] But populations of special interest or those at risk should also be investigated (e.g., pilots, shift-workers, journalists).[3,17] Replications are also essential because many results are based on single studies and because of diverging effects between studies. Previous results should be replicated within multicountry studies to test for

potential cultural or contextual differences (see the section on prevalence of CE drug use and pertinent references[3,9,21,35]).

Many discovered effects have a correlational character and are based on cross-sectional rather than longitudinal[17,20] or (quasi-)experimental studies[9,46] that would allow for causal insights. Longitudinal and long-term studies are needed to monitor changes in prevalence rates[12,29] and to evaluate the impact of potential political regulations or prevention means.[9] Studies can assess prevalence changes over the course of a life[3]; whether changing demands affect CE drug use; whether effects are real or subjectively perceived; how drug experiences affect concurrent use; and whether CE pays off in terms of objectively measurable outcomes, such as better and more rapidly achieved university degrees, benefits to companies.[3,27,29,43] Furthermore, theory-driven research is needed to understand the drivers of and obstacles to CE drug use.[9,20] Investigations of the willingness to use CE substances also need to be replicated with behavioral measures.[9,21,31,34]

The obstacle of diverging CE definitions (see the section on prevalence) also needs to be overcome in order to facilitate comparisons of study results. Due to low prevalence rates and sample sizes, prevalence figures for different substances were often pooled when substance-specific analyses would be more abundant. Often studies apply binary measures of use and nonuse of drugs rather than more informative measure of use frequency, use duration, or dosage.[20,23] Such measures, as well as the measuring of drug dependency, would help to cast light on whether instrumental users lose control over their drug use and step into addiction.

Although previous studies predominantly concentrated on prescription drugs and substances, similar studies are needed for other potential CE treatments such as mental training, physical exercises, meditation, mnemonics, prenatal enhancement, or brain stimulation.[3,27,34] Whether certain enhancement strategies are gateways to others or whether enhancement strategies are used concurrently also deserves to be investigated.

Moreover, research should investigate ways of accessing different types of CE and whether systematic differences exist between groups with respect to drug sources, prices, and dealing/exchange.[17,20] Here, current investigations often suffer from small samples.

The role of potential gatekeepers also needs examination (e.g., prescription practices of physicians; self-conceptions regarding their role, perceived autonomy, expertise, and attitudes; selling/counseling by pharmacists; and the motives and administration of medicine by parents).[3,27,29,42] Because groups of journalists and scholars might potentially influence attitudes and expectations toward, as well as practices of CE, their communication behavior and the (moral) notions conveyed in their writings should also be studied, as well as their influence on users. Whereas it has often been demanded that information

disseminated about CE should consist of facts rather than sensationalism,[1,27] research should investigate whether communicators comply with this demand.

POTENTIAL TASKS FOR LAB RESEARCH

Many scholars have issued calls for more research on the immediate and long-term effects, as well as on the real and perceived enhancement and side effects of substances.[3,27,29] Previous studies vary in several dimensions and often suffer from weaknesses that undermine their comparability and conclusions. They vary, for example, in outcome measures, substances, dosage, usage of double-blind procedures, test duration, sample size, and characteristics of subjects taken into account (e.g., genetic makeup, personality, ability level, level of tiredness).[3,4,47] Analyses often do not control for this heterogeneity. Sometimes it is unclear whether substances affect cognitive performance directly or indirectly through manipulating motivation or emotions.[3,4] Consequently, systematic optimization and standardization has been recommended.

Galert and colleagues place the onus of drug research on pharmaceutical companies.[11] But this has raised concerns about potential publication bias (i.e., less publication of negative results, especially for private companies due to their financial interests).[3] Dresler et al. also mention that many studies do not report side effects even though such side effects may exist.[4] Especially in short-term and single-dose studies, no knowledge is gathered about potential problems with drug dependency or drug tolerance. However, the ethics of long-term studies with healthy subjects requires more discussion. Moreover, the positive and negative effects of potential non–substance-based enhancement treatments such as transcranial magnetic stimulation, mental training, sleep, or physical exercise should also be examined and systematically compared to substance use.[3]

CHALLENGES FOR POLITICAL REGULATION AND THE ETHICAL DEBATE

One hotly debated question is whether some existing CE drugs should remain prohibited or should be legalized; and, if legalized, for whom and under which conditions. A political or juristic answer would be important for individuals, institutions, and society in general.[42] Greely and colleagues argue that new laws or regulatory agencies are not needed but that existing laws need adjustment to social norms and information about drug safety, while efficient and safe medication can be already distributed.[43] In this context, Galert et al. propose the application of the principle of *constitutional proportionality* and that prohibition should be the *ultima ratio*.[11] Thus, users should not be criminalized.[43] Moreover, fundamental restrictions on CE drugs would be inconsistent

with our concept of democracy, even as policy should prevent an uncontrolled use of new substances.[1] Regulation or even prohibition for healthy children and in competitive settings (such as entry exams in universities) has also been suggested.[48]

Dubljevic discusses several options for regulating CE drugs and proposes, for example, a moderately liberal, permissive regulation for extended-release forms of methylphenidate among adults.[49] Codes of ethics or catalogues that categorize substances as allowed or prohibited have also been suggested for institutions.[12,42] To decide on how to best regulate CE drug use, a dialogue among scientists, physicians, ethicists, policy-makers, and the general public is needed.[12,43,48] In case of (partial) legalization, discussion is needed about who is responsible for the negative consequences of CE drug use, who monitors misuse, who pays for negative effects, how to distribute substances, how to protect people who refuse to take CE drugs, and more. Furthermore, given the risks and the violation of physicians' professional ethics,[1,12,18] the question of whether research on healthy subjects is socially desirable needs to be addressed.

For evidence-based policy-making, several scholars suggest monitoring systems, not only for evaluating changes in prevalence, but also for assessing the public costs associated with CE drug use, for collecting information from physicians about problems with CE, and for critically evaluating the development of new diagnostic criteria that may extend the medicalization of societies.[1,11,27]

Many scholars recommend health promotion and prevention initiatives, for example, in schools or universities, but also for the general public. Initiatives should provide information about potential side effects and long-term health consequences, realistic expectations, less harmful coping strategies, or alternative means to success.[9,20,29,43] It is also important to identify those who use CE drugs without supervision and who may transit to addiction.[17]

It has been suggested that when journalists or scientists talk about CE, it is important that they consider carefully what information they provide and how that information is presented.[27] Information should be factual, and it should be presented in a manner that avoids sensationalizing the prevalence and efficacy of CE drugs.[1,12] But it has also been emphasized that the public has a right to be informed about CE.[1]

Several scholars have also demanded more fundamental sociopolitical and institutional changes because CE may often represent the adaptation of overstrained individuals to external requirements.[6,12,25] Therefore, CE is condemned as an instrument for fulfilling the demands of competitive economies while neglecting the individual. Keywords characterizing the circumstances criticized are increased flexibility, constant availability, pressure to perform, high workloads, and unsteady employment. On the other hand, a strategic

pathologization driven by the financial interests of the pharmaceutical industry also has been criticized.[1]

Conclusion

This chapter discusses several dimensions of CE in Germany such as ethics, epidemiology, legal status, and policy regulations. Actually, heterogenic studies show very low to moderate prevalence rates, a relatively low moral acceptability, but a relatively high use-willingness for certain conditions such as no side effects. A non-negligible number of individuals already risk using CE drug. New substances, drug circulation on black markets, increasing pressure, contagion effects, and other factors may increase this number. As a result, researchers have called for intensified research before CE drug use becomes more widespread. The findings would be especially important for public and scholarly debates and in the development of policy regulations, interventions, and prevention. In debates about CE, neutral frameworks should be used that neither neglect dangers nor exaggerate drug efficacy. In terms of policy-making, a balance should be found between the free and informed choices of users, the protection of people who refuse to take CE drugs and children, and the potentially positive and negative effects of CE on the individual and society. In general, society should always reflect on the conditions of a satisfying work and life balance and the means for achievement. Actual CE drugs seem to be often overrated as such means.

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Notes

i. Based on a subjective evaluation by the author.
ii. Studies assessing the use of potential CE substances that do not clearly refer to CE as a motive were excluded (e.g., Lohmann, Gusy, and Drewes[36]).
iii. Research on factors influencing CE drug use is of high importance (see next section) but is beyond the scope of this chapter (for more information, see pertinent references[9,20,21,30,31,35]).

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12

Cognitive Enhancement in the Netherlands

Practices, Public Opinion, and Ethics

MAARTJE SCHERMER

Introduction

The use of cognitive enhancement drugs for the healthy has received quite a lot of attention in the international bioethics literature. It has rightly been pointed out that it is not always clear what exactly is supposed to be captured under the heading of "cognitive enhancement."[1] Does it refer to hypothetical future smart drugs? Or does it refer to actual use of drugs that allegedly improve cognitive functioning by students, scientists, and others—even though the actual effects of such drugs are doubtful? At this moment, it is questionable whether medication like methylphenidate or modafinil really has significant cognition-enhancing effects in healthy subjects.[2–3] Nevertheless, there have been reports, mainly from the United States, of people using these substances with the intention of enhancing their cognition or cognitive performance.[4] Although much of the bioethics literature has dealt with the ethical questions that would be raised by the availability of safe and effective cognitive enhancers—questions about freedom of choice, social pressures and coercion, equal access, fairness, human nature—relatively little is known about the actual use of alleged cognition enhancers or of the opinions and moral concerns about cognitive enhancement entertained by the general public. Moreover, views on cognitive enhancement may differ between various cultural and social contexts. A comprehensive debate about both the current use of alleged cognition enhancers, as well as about possible future safe and effective enhancers, should take such knowledge into account.

In this contribution, I will therefore discuss what is known about the use of and opinions on cognitive enhancement in the Dutch context. I will first

present the available evidence regarding the use of cognitive enhancement in the Netherlands. Next, I will discuss how cognitive enhancement is looked upon in the Netherlands by reviewing the available research data on opinions of lay people, students, and psychiatrists. Furthermore, a brief analysis of the public debate and media coverage of (cognitive) enhancement is given. It appears that the debate on the increasing number attention deficit hyperactivity disorder (ADHD) diagnoses and the concomitant rise of prescription use of methylphenidate is more significant than that on cognitive enhancement use by the healthy. Finally, these findings are considered in light of Dutch cultural norms and values. I conclude that, in general, the Dutch appear to have a rather conservative attitude toward enhancement and the use of drugs for enhancement purposes. This may partly be due to moralistic considerations—one should earn one's credits, work hard for achievement—but concerns regarding safety and the proper use of medication seem paramount. However, these culturally and socially determined moral norms may shift in the future, especially if effective and safe cognition enhancers become available.

Prevalence of the Use of "Cognition Enhancers" in the Netherlands

Only a very limited number of studies in the Netherlands try to capture the nonprescription use of drugs that may be considered cognitive enhancers. Most of this work has not been published in academic journals but as "gray" literature—policy report, master thesis—and so has not gone through a process of peer review.[i] Some studies have been done by students as part of their education; others have been performed by research institutes and have only been published as research reports. In the following, I present and discuss the most important findings of the available research.

In 2007, the Institute for Addiction Research (IVO) reported that 2.4% of students between 12 and 18 years have used medication for nonmedical purposes over the past year.[5] Half of them used ADHD medication, mostly methylphenidate (Ritalin)—it was not clear from this study whether this use was for enhancement purposes or for partying or the "high" effects of the drug.

In 2010, the IVO conducted a further survey and an interview study among people who use methylphenidate or other ADHD medication without prescription to investigate their reasons for using methylphenidate and their experienced side effects and addiction risk.[6] The survey was filled out by 162 users (medium age 23, 107 men and 55 women). Some had a prescription for methylphenidate but also used it in amounts or ways (intranasal) that were not prescribed. Forty-four percent scored positive on a screening test for ADHD (although they did not have an official diagnosis). The use of other substances

(tobacco, alcohol, cocaine, cannabis, MDMA, speed, LSD) was (much) higher among the respondents than in the general population.

Of the respondents, 32% indicated they used methylphenidate for better performance in study or work. Other reasons for nonprescription use of methylphenidate were recreative (getting high, experimenting, for fun; 60%) or "to feel better" (8%). The survey also looked into dependence and addiction. Although 41 people had only used methylphenidate once, of the remaining 121 who used it more often, 20% had experienced (or were still experiencing) dependence on methylphenidate use. The group who reported dependence more often used methylphenidate primarily for performance enhancement; they also reported significantly more side effects than the nondependent group (67% vs. 17%). At the same time, the dependent group also reported more positive effects than the nondependent group (e.g., feeling better, 63% vs. 32%; performing better, 58% vs. 32%). In sum, the picture that emerges from this study is not one of happy healthy people using a cognition-enhancing drug to give them a performance edge. Rather, it concerns a group that uses more drugs and substances than average, is more likely than average to have undiagnosed ADHD, and uses methylphenidate mainly to "feel better" but also to enhance performance. Although a portion of the more frequent users reports positive effects and little side effects, one-fifth experience problems with dependence and negative side effects.

UNIVERSITY STUDENTS

In 2012, a survey among Dutch students was conducted by a group of honors program students of Radboud University Nijmegen[7] to study the prevalence and determinants of cognitive enhancement use among Dutch university students.

A total of 1,503 students filled out the questionnaire; their mean age was 21.8 years, 30% were male and 70% female. In addition to questions about alcohol and tobacco use, the questionnaire asked about use of four potential cognitive enhancers: methylphenidate, modafinil, rivastigmine, and beta-blockers.[7]

Of the group of 1,503 respondents, none had ever used modafinil or rivastigmine; 3.5% had used methylphenidate at least once during their studies, and 2.4% had used a beta-blocker,[ii] However, of the respondents using methylphenidate or beta-blockers, almost 50% did so for medical reasons. Other reasons to use methylphenidate were to enhance study performance (73%), to feel good (33%), to have a good time with others (23%), or to deal with negative feelings (21%).

The authors of the report conclude that the overall percentage "of users of methylphenidate and beta-blockers, who use with the intention to enhance study results and who do not have their own prescription for these drugs is

1, 7%."[7: 38] This is comparable to results found in Germany,[8] where percentages of 1.55–0.78% (depending on age group) were found, and the above-mentioned IVO study[5] that found 1.2% (including use for recreational purposes). If the findings include users with their own prescriptions who indicate that enhancing study results is one of the reasons to use medication, the number rises to 3.2%.

Those students using methylphenidate as performance enhancers indicate that their reasons for use are improvement of concentration, to work faster, to remember better, or to stay awake longer. Beta-blockers are used either to improve concentration—which is a remarkable reason given that there are no studies indicating any effect of beta-blockers on concentration, or to reduce stress before exams.[7]

Interestingly, the study found a correlation between certain personality traits and the use of cognitive enhancers. Among students with the personality traits "extraversion" and "openness to new experiences," enhancement use was higher, whereas it was lower among student with the trait "carefulness." Users spent more time in extracurricular activities and less on study than did nonusers. They also used significantly more nicotine, cannabis, and stimulating substances than did nonusers. There were no differences between users and nonusers with regard to study results or emotional stability.[7]

In his master thesis, an anthropological-sociological case study among students in Amsterdam, Aleksi Hüpli[9] describes the perceptions, practices, and ethics of prescription and nonprescription cognitive enhancement drugs. He conducted an online survey that was completed by 113 students between 18 and 24 years (70% female) and additionally interviewed 15 students.[iii] Of the respondents, 21% reported having tried study drugs, defined as "prescription medication (for example Ritalin, Concerta, Modafinil, Addreall) that are used to effect study results."[9: 20] A little more than half of them did so without a prescription (12% of the respondents). Ritalin was the most commonly used drug; modafinil was mentioned only once, and two respondents mentioned benzodiazepines.

Most students who had tried study drugs without prescription had not done so often and had not continued to use. Current prevalence of nonprescription use among the 113 respondents was 1.8%.

Most of the interviewed students who had used without prescription found the effects to be mild or not beneficial and did not intend to use them again in the future.

PSYCHIATRISTS

Another interesting study was performed by Timmer and Glas,[10] two psychiatrists who transmitted an online questionnaire based on the survey conducted

by *Nature*,[11] to psychiatrists, trainees, and other medical doctors working in psychiatry in the Netherlands. Their aim was to investigate the extent to which psychiatrists and other doctors working within psychiatry actually use neuroenhancing drugs themselves and to record their views on such use. In their group of 422 respondents, 11% reported they had occasionally taken some drug without medical indication in order to improve their mental functioning: 40% did so no more than once a year, 23% a couple of times a year, and only 4–6% on a weekly or daily basis.[10]

Methylphenidate was used by only 2% of the respondents. The other reported substances were benzodiazepines (5%) and beta-blockers (4%). It is remarkable that benzodiazepines are included here because they are not generally considered to be performance-enhancing drugs. The authors themselves question whether these fall within the definition of "enhancers." As in the survey among students, there were no reports of the use of modafinil. When asked about a hypothetical drug that would be safe and effective as a cognitive enhancer, 18% said they would use it. This is a much smaller number than the 69% found in the *Nature* poll.[11]

The authors conclude that, in the Netherlands, neuroenhancement appears to be a nonissue among physicians working in mental health care. However, they also state that in a culture where performance is so important, we may expect a rising demand for enhancements.

CONCLUSIONS

The number of users of cognitive enhancement in the Netherlands appears to be very low,[5–7,9,10] especially the number of people who use it without prescription and more than once or twice. Although methylphenidate is sometimes used by healthy people, modafinil appears to be unknown. Beta-blockers and benzodiazepines are also mentioned,[7,9,10] but it is questionable to what extent these should be called "cognition enhancers." Under certain circumstances (stress, pressure), they might be considered performance enhancers, however.

Those using methylphenidate do so for reasons of performance enhancement but also to "feel good" or for recreational purposes. Subjects using methylphenidate for performance enhancement seem more prone to using other substances as well, and a portion of this group may have undiagnosed ADHD.[6,7] To what extent users actually experience positive effects on cognition or (study) performance is not very clear because not all studies asked about this result. Although subjects who experience little or no positive effects seem likely not to use again,[9] those users who report the most positive effects also report the most dependence.[6] Thus, there may be—unsurprisingly—a correlation between experienced effects and continued use.

Views on Cognitive Enhancement in the Netherlands

Most of the studies just reported also asked about opinions of people with regard to cognitive enhancement, and there are some additional studies available that inquire into public opinion concerning human enhancement in general.

GENERAL PUBLIC

In 2012, the Rathenau Institute published a report on public perceptions and opinions regarding human enhancement.[12] The report contains the results of a focus group study among the Dutch public featuring concentration enhancers, especially methylphenidate, as one of the cases discussed. After a brief explanation, participants were asked whether they would want to use certain enhancements. Of the 38 participants in the five focus groups, 41% indicated they would use Ritalin[iv] as an enhancer, 22% said they would not, and 38% were not sure. Interestingly, after their discussion of the topic, these numbers had shifted: only 5% still said they would use Ritalin, 75% said they would not, and 22% still were not sure.

The researchers give a qualitative account of the focus group discussions on the use of Ritalin as a cognition enhancers for healthy people and state that the participants came up with a number of concerns. First, they were surprised to hear that Ritalin could be used by healthy people and questioned whether this was allowed. Next, they discussed potential side effects and the lack of knowledge about long-term side effects. There were concerns about the lack of knowledge regarding long-term side effects, and some were of the opinion that people take too many medications already and that this is not a good thing: "Medication always burdens the body and therefore caution is needed."[12: 65] Participants also expressed worries regarding risks of dependence and addiction and suggested alternatives like homeopathic drugs.

In response to the question of whether Ritalin should be available for healthy people, a number of other issues were brought up. Participants discussed possible shifting of performance norms, risks of social pressures and of coercion by employers, issues of equal access and fairness, and effects of enhancement use on personality (e.g., the development of stamina or the pride one could take in performances that were not really "one's own").

The researchers conclude that a majority of the respondents found it undesirable for Ritalin to be available for healthy people without prescription—in general, they were of the opinion that one should not take medication in the

absence of disease, although some believed that limited use for special occasions, like taking an exam, would not be problematic.[12] The researchers write:

> Most respondents think that the use of Ritalin by healthy people should be limited. A frequently heard argument is "*if we pose no limits to the use of Ritalin then it will be taken more and more*." And "*this could be the thin end of the wedge*." Exactly which doomsday scenario's respondents see before them here, does not become clear" (translation MS).[12:69]

Some respondents stressed the potential benefits of availability of cognition enhancers for healthy people: they could improve work or study or be used in certain professional circumstances, like sustaining concentration in lengthy surgery, they suggest. A minority of the respondents believe that Ritalin should be freely available, just like coffee or energy drinks. Their main arguments are freedom of choice and an aversion to paternalism, and the more pragmatic thought that a prohibition would be counterproductive.

These results are in certain respects similar to results of a study we did on lay people's perceptions and opinions regarding various examples of wish-fulfilling medicine.[13]

One of the examples we discussed in our five focus groups (consisting of 37 lay people) was the use of beta-blockers against exam anxiety for a driving test. Such use of medication to enhance performance on a test can be understood as a form of neuroenhancement, although it does not figure in the debate on (cognitive) enhancement so far. This use of beta-blockers is an accepted practice in the Netherlands, in the sense that occasional use of a beta-blocker for exam anxiety or stage fright is advised by general practitioners' professional guidelines.[14] Most participants in our focus groups, however, were not aware of this and were very surprised that it was possible to use medication for such purposes, and they questioned whether it was allowed, just as the participants in the Rathenau study did regarding Ritalin use by healthy people.[12, 13] Many participants in our focus groups were of the opinion that medication should not be taken in the absence of disease, and, moreover, they were convinced that medication would somehow be "bad for you." A participant said: "Yeah, paracetamol, if you take too much, it is not safe either. But I believe that with prescription medication, that there is a reason . . . that you cannot go to a pharmacy and just say 'I want this.'"[13: 3] They also raised worries about habituation or even addiction.

Even after the harmlessness of a single dose of a beta-blocker was explained, many remained convinced that it would be risky or simply wrong to take it: "it is still medication, isn't it?"

In our study, as in the Rathenau study, participants suggested alternatives such as psychological consultation, herbal extracts, or homeopathy apparently because, in their view, such "natural" remedies were more harmless or otherwise "better." This is in line with a Swedish study that found that the general public had more favorable attitudes toward the use of "natural remedies" for enhancement than toward medication.[15]

Two groups in our study also brought up the question of whether it was better to just accept one's limitations instead of trying to enhance oneself with medication; according to some participants, acceptance was the morally right thing to do. For instance, in response to an example of a violinist who used beta-blockers for stage fright, one of the participants suggested that this person should choose a different profession rather than use medication.[13]

STUDENTS

In their questionnaire study, Bundt et al.[7] asked for the opinions of students about cognitive enhancement drugs. A very large majority, 84.6%, believed that "smart pills" should not be freely available; 39% believed they should be prohibited in universities, 39% were neutral on this topic, and 22% thought they should not be prohibited. This seems to indicate that a minority would agree with some form of regulated prescription of cognitive enhancement drugs; unfortunately, the researchers did not ask any further questions about the conditions students would deem necessary for regulated use. A remarkable result was that only 21% of students thought that students who used "smart pills" would have an unfair advantage over others, whereas 52% thought they would not.[7] It is not clear whether this result reflects skepticism regarding the effectiveness of smart drugs or whether Dutch students do not believe it inherently unfair to get better results with the help of cognitive enhancement. The first interpretation seems more likely, since Dutch culture does stress the value of working hard to earn one's success. Moreover, Hüpli[9] also found that most of his informants did not think the use of study drugs unfair, and they thought so "because they did not see the effects to be big enough to give people an unfair advantage."[9: 45] However, they also mentioned that pharmaceuticals are not the only thing that creates an unfair playing field or that cognitive enhancements should just be considered as tools or equipment and not like "doping." Interestingly, one student did not think cognitive enhancement was unfair because, in her opinion, study performance was not a matter of competition but of personal achievement: "You're not competing against other people; you are just competing against yourself. I mean, if I get a grade 7 and somebody else gets an 8 it doesn't affect me."[9: 45]

Although one quote, of course, cannot count as solid evidence, I believe this does reflect the less competitive atmosphere within the Dutch higher education

system as compared to that in the United States. None of Hüpli's respondents reported that he or she felt social pressure to use study drugs.[16]

Hüpli also asked his respondents about their opinions regarding desirability and ethics of cognitive enhancement in general. Equal numbers of students (27%) believed the use of study drugs to be "ethical" and "unethical," respectively, whereas 47% said it depended on the situation. Male students were much more likely to think the use was ethical than were female students.

Most of the informants did not think cognitive enhancement drugs should be available to the general public without regulation. The main reasons for this were worries about short- and long-term safety and side effects and about possible addictive effects and abuse.

Students in both studies[7,9] expressed a need for more accurate information on the effects, side effects, and risks of pharmaceuticals that might be used for cognitive enhancement.

PHYSICIANS

The findings among psychiatrists and other physicians working within the field of psychiatry show a somewhat similar picture. Two-thirds of those who responded to the questionnaire of Timmer and Glas[10] were opposed to the use of psychopharmaceuticals for nonmedical purposes and believed this should not be allowed; 19% believed it should be allowed for certain groups. Only 15% thought cognitive enhancement drugs should be available for everyone who wanted to use them—in contrast, in the *Nature* poll, 79% were of this opinion.[11] Timmer and Glas conclude that there is a strong public opinion in the Netherlands holding that medication should only be used if it is really necessary. They point out that the Netherlands has one of the lowest rates of medication use in Europe, and they confirm a statement in a previous paper[17] that "pharmacological Calvinism" is part of our national culture. The term pharmacological Calvinism—a phrase originally coined by Klerman[18] to refer to the value orientation involving a "distrust of drugs used for nontherapeutic purposes, and a conviction that if a drug 'makes you feel good must be morally bad' "(3)—is used here in a somewhat broader sense. It refers to a general reticence to prescribing and using pharmaceuticals and a cautious and somewhat reserved attitude toward medication, even for therapeutic purposes. This has also been called "pill prudishness" and has been shown to be more prevalent in the Netherlands than in most other West-European countries.[19]

CONCLUSIONS

Their appears to be a rather strong reluctance among the Dutch public—lay people, students, and psychiatrists—to the use of medication for enhancement

purposes. A large majority believes that "smart drugs" should not be freely available for healthy people.[7,9,10,12,13] The most important reason for this seems to be the risks and side effects of medication and the possible addictive effects. Moreover, other concerns are also mentioned, such as unfairness, possible coercion or social pressure, and effects on character. A minority, it seems, would be in favor of allowing regulated use for certain groups or for certain occasions.[7,10] Perhaps most remarkable is the opinion Dutch respondents express with regard to "medication" as opposed to what they consider "natural remedies." The very fact that something is a registered medicine for many people implies that it should not be used otherwise, and even as medication it should be used with caution and only if really necessary.

Public Discussion on Enhancement, "Malleability," and Rising Use of Ritalin

MEDIA

It is safe to say that there is no large-scale public debate on the use of cognitive enhancement drugs or devices in the Netherlands. In Dutch national newspapers and opinion magazines, the topic comes up very rarely. and. if it does, it is mostly mentioned only briefly and not discussed in depth. A search in the major Dutch national newspapers (through LexisNexis database) using the search terms "smart drugs" or "brain doping" generates only 19 hits over the past 10 years, whereas "cognition enhancement" generates none. Apart from newspapers and magazines, the topic of cognitive enhancement has raised some interest in the programming of science cafés, philosophical cafés (more or less informal meetings with a mix of educational and entertainment value), in Studium Generale programs (series of public semi-academic lectures on current topics in science and society), and "science-at-the-movies" programs.

There is a little more debate about human enhancement in general. Dutch newspapers and opinion magazine have reported on the appearance of research or policy reports and edited volumes on the topic—both a number of national Dutch works and some international ones—and have featured interviews with philosophers such as Anders Sandberg, Nick Bostrom, or John Harris. The Rathenau Institute appears to be an important instigator of the discussion—it has published a number of reports on the subject, and researchers of the Institute have written opinions in Dutch newspapers calling for more debate and discussion, but the discussion has not really caught on beyond a small group of researchers, scientists, and philosophers. The topic of human enhancement, let alone that of cognitive enhancement, is not very prominent in Dutch national debates, and the general public is not very

involved. Interestingly, the Protestant segment of the Dutch public appears most involved or interested: compared to other newspapers, two Protestant papers (the *Reformatorisch Dagblad* and the *Nederlands Dagblad*) have featured more articles on human enhancement, mainly expressing concern and rejecting the idea altogether.

A much more prominent debate in the Netherlands is that about the expanding use of methylphenidate and other medication for ADHD and attention deficit disorder (ADD) and about the increased numbers of these diagnoses. This is not a debate about cognitive enhancement in the strict sense of "improving cognition beyond normal levels," but it is a debate about the boundaries between normality and disorder, about the acceptability of the use of psychopharmaceuticals, about performance enhancement and performance pressures. This debate also links in with a specific undercurrent in various Dutch debates, namely the concern about the boundaries of malleability, or, in Dutch, *maakbaarheid*. *Maakbaarheid* literally means "makeability" and refers to the idea that we, as people, can make things—either society, nature, life, or human beings—to fit our wishes and desires and can direct and control them. The notion has a slightly negative connotation because it is mainly used to express concern about the (moral) boundaries to our interference with nature or human life and to the illusionary character of the idea of total control. In a sense, *maakbaarheid* is the opposite of naturalness, spontaneity, luck, fate, or even God.[v]

The debate about the diagnosis ADHD and the rising use of medication for this condition in the Netherlands figures quite prominently in national newspapers, on national television, and in opinion journals, books, and websites.[20–22] It is even a topic in health care policy. Whereas, on the one side, experts claim that ADHD has been underdiagnosed for a long time and that diagnosing and treating children is beneficial to them, critics claim that overdiagnosis, that the boundaries of the concept are being stretched, and that we are medicalizing a societal problem. Moreover, there is concern about the risks and side effects of the medication on children, especially the unknown long-term effects.

This debate shows, I believe, at least two things regarding the cultural context in the Netherlands and the Dutch view on the use of medication for performance enhancement. First, it again shows Dutch pharmacological Calvinism or pill prudishness: the reluctance to use medication—especially psychopharmaceuticals and especially for children—because of a fear of risks and known and unknown side effects and because of the view that medication should only be used if *really* necessary. Also, in this debate, the role of the pharmaceutical industry has been criticized for pushing diagnosis and medication use,[vi] increasing suspicion with regard to the necessity of medication. Second, the debate shows a resistance against the idea that people should be adapted to societal expectations, high-performance pressures, and social institutional arrangement through the use of medication. Frequently, social factors such as

decreasing space and time to play outside, decreasing social acceptance of "typical boy behavior," increasing pace of society and amount of distractions (e.g., the Internet and social media), increasing performance expectations and pressures, increasingly big and diverse school classes, and the like are mentioned as explanations for the increase in ADHD diagnoses and medication use. The underlying claim is that these social problems ought to be addressed through social means rather than through medicating children. The reserve regarding *maakbaarheid* shines through here: we should take people as they are, accommodate their shortcomings, accept or even celebrate diversity, and not make people fit into one single mold.

Although there are also many proponents—doctors, parents, teachers—who feel that diagnosing ADHD and treating it with medication such as methylphenidate is beneficial for children and helps them to function and perform better, no-one in the debate has suggested that medication could or should be used for enhancing performance in healthy people. In the Dutch view, a diagnosis—the recognition of a medical condition—must be present to legitimize the use of medication.

Discussion and Conclusion

The actual use of cognitive enhancers—medication taken by healthy people with the intention of enhancing cognitive performance and functioning—appears to be very low in the Netherlands. The numbers of students who use cognitive enhancers without prescription for enhancement purposes appears to be 1–2%, and most of them probably have not used them very often. Methylphenidate is the most commonly used and most often mentioned drug, whereas modafinil appears to be unknown in the Netherlands. Interestingly, beta-blockers and benzodiazepines are also used and mentioned in the context of enhancement. These drugs do not figure in the international bioethics debate on cognitive enhancement. Although it may indeed not be warranted to call beta-blockers and benzodiazepines cognition enhancers—they do not enhance functions such as memory or concentration—they may still enhance performance by taking away stress, anxiety, or other inhibiting factors. It would be worthwhile to include this type of performance enhancers in the bioethics debate because they may raise some different ethical issues.

In general, the Dutch appear to have a rather conservative attitude toward enhancement and the use of drugs for enhancement purposes. This may partly be due to moralistic considerations: the conviction that one should earn one's credits and work hard for achievement fits the traditional Dutch work ethic. Moreover, moral concerns about possible social pressures and coercion, cheating, or equal access are voiced in some focus group studies. However, concerns

regarding safety and the proper use of medication seem paramount. There tends to be a critical attitude toward medication use in general in the Netherlands, a stance known as pharmacological Calvinism. This seems to be based on a fear of risks and side effects of medication and on the idea that natural remedies are somehow better than medication, and it results in the opinion that medication should only be used if it is really medically necessary. Small numbers of people may think differently and may want to use cognition enhancers if they are effective and relatively safe. A minority of respondents in the available studies is in favor of some form of regulated use. An interesting comparison could be made here with the rather liberal Dutch policies on use of so-called "soft drugs" like marijuana and hashish. These policies are based on pragmatic rather than moralistic considerations and effectively allow people the freedom to choose to use such drugs within a regulatory system aimed at enhancing safety, preventing health risks, and containing drug-related criminality. This also explains how pharmacological Calvinism among the general public can go together with a rather permissive regulatory stance on "soft drugs." Whereas many people may disapprove of using such drugs, and only a minority actually does use them, policy refrains from taking a moralistic stance, but instead is based on pragmatic considerations of public health and safety. A similar direction might be taken with regard to cognition enhancers if effective enhancers become available.

Cognitive enhancement, or even human enhancement in general, are not very prominent subjects in Dutch public debate. However, discussions about *maakbaarheid*, Ritalin use, and increasing performance pressures are relevant for a better understanding of the topic as well.

Although performance pressures and competition in academic achievement appear to be less fierce in the Netherlands than they are in the United States, they are rising. Also, a more competitive and maximizing ethos seems to be gaining ground in the Netherlands, especially among younger generations. Instead of the traditional "Don't stand out from the crowd," the appeal to "Maximize your potential" seems to be becoming more popular. At the same time, the debate about the increasing numbers of ADHD diagnoses and the rise in Ritalin use reflects some of the societal worries about these developments, especially the worry that we may start to biomedically adapt people to our social systems and expectations instead of the other way around.

How these different views and moral considerations will develop in the future is, of course, difficult to predict. Effectiveness and safety will be the most prominent factors that will affect public opinion regarding cognitive enhancement, but culturally and socially determined moral norms are also in play. These may already be changing with respect to performance and competition, and if effective cognitive enhancers become available this would undoubtedly have an impact on public morality as well. In that case, it would seem

possible that current rather conservative attitudes toward use of medication for enhancement purposes might shift. However, as the saying has it, it is hard to make predictions, especially about the future.

Notes

i. The studies discussed here are all freely available through the Internet, so readers can form their own opinion of the quality of the work. It is partly due to lack of time and resources that the outcomes of these studies have not been reported in international journals (personal communication).
ii. As a comparison, 84.3% had used alcohol, 19.1% indicated having used cannabis or marijuana, and 4.9% had used stimulating substances like MDMA, amphetamines (speed), or cocaine.[7]
iii. Of these, eight were students without a diagnosis of ADHD/ADD but with experience of cognition-enhancing drugs and six were students with ADHD or ADD who had distributed their prescription medication to undiagnosed fellow-students. Most of the undiagnosed informants reported they only had used cognition-enhancing drugs rarely and without much effect.
iv. The brand name Ritalin is better known among the Dutch public than the generic methylphenidate, although both are prescribed for ADHD. In reporting the study results, I here follow the terminology used by the researchers.
v. Netherlands is one of the most secular countries in the world, with only 39% being religiously affiliated (31% for those aged under 35) and fewer than 5.6% visiting church regularly; thus, religion and God do not figure very prominently in debates about enhancement, bioethics, and the like.
vi. For example, in the TV news program *Een Vandaag*, "Commotion About New Psychiatry Handbook" (from May 26, 2012) or an article entitled "ADHD: A Dream-Diagnosis for the Pharmaceutical Industry" in one of the national newspapers (*Volkskrant*, July 7, 2012).

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13

Cognitive Enhancement in Canada

An Overview of Conceptual and Contextual Aspects, Policy Discussions, and Academic Research

ERIC RACINE

As evident from international drug usage data, Canada is among the heavier prescription drug-using nations on a per capita basis. The 2011 Canadian Alcohol and Drug Use Monitoring Survey reports that 22.9% of Canadians aged 15 and older have used a psychoactive prescription drug in the last 12 months.[1] Not surprisingly, based on the commonality of prescription drugs, health authorities have signaled the nonmedical use of prescription drugs (or "prescription drug abuse") as an important public health issue. Some have even called it "Canada's Prescription Drug Crisis."[1-3] Both public interest and the limited evidence we have about the prevalence of such use in Canada shape these concerns. Unfortunately, there have been few attempts made by health authorities to better understand the current Canadian situation and to respond to the challenges it raises, even though Canadian scholars have participated in international discussions on this topic (as described in detail later). This fragmented landscape is one of the features of this review of conceptual and contextual aspects, policy discussions, and academic research on the nonmedical use of prescription drugs for cognitive enhancement (CE) purposes.

In this chapter, I review the development of discussions on the nonmedical use of prescription drugs with a focus on prescription stimulants in the Canadian context. First, I describe the conceptual and contextual aspects of the nonmedical use of prescription stimulants in Canada. Second, the limited policy discussions and policy responses to the nonmedical use of prescription drugs for enhancement are reviewed and discussed. Finally, more attention is dedicated to reviewing and discussing both empirical and conceptual academic work either conducted in Canada or about the Canadian context. Readers should

take note that an inclusive definition of "Canadian scholarship" is retained for this chapter comprising (1) the work of scholars active in Canadian institutions and (2) work about the Canadian context. Both are considered relevant, although space constraints preclude any pretension to providing an exhaustive depiction.[i]

Conceptual and Contextual Aspects of Nonmedical Use of Prescription Drugs for CE in Canada

CONCEPTUAL ASPECTS

When referring to "medical uses" of prescription drugs, I designate uses for which the drugs are approved according to their labels and for which they are typically prescribed and medically supervised. The term "off-label" designates uses that depart from the original indication but that are nevertheless under medical supervision with the intent of treating a disorder or an identified psychiatric or neurological condition. I reserve the term "cognitive enhancement" for uses that do not intend to treat an identified disorder but rather to augment performance and that are not typically under medical supervision (nonmedical uses). (To my knowledge, no drug has been approved for CE per se in Canada). I readily acknowledge that these terms are broad nets that capture fluctuating and evolving realities related to prescription drugs. For example, the American Academy of Neurology (AAN) has called for greater medical oversight and supervision of enhancement uses,[4] therefore blurring the medical/nonmedical dichotomy captured in the presented definition of CE. Also, some uses captured under "enhancement uses" may in fact be disguised self-treatment (i.e., individuals using drugs for purposes described by some as CE could in fact be self-medicating, for example, for attention deficit hyperactivity disorder [ADHD]). Accordingly, the phenomenon of CE can be captured by different, even diverging, frameworks.[5–6]

Defining CE as a form of nonmedical use of pharmaceuticals is not benign from a regulatory standpoint but could be consistent with Canadian discussions and governance. It signals that pharmaceuticals such as stimulants used for CE, many of which actually require prescriptions in Canada, fall under a regime of health products that are regulated by complex federal law and clinical practices. In Canada, stimulants are typically schedule III substances, meaning that their possession is controlled and their illegitimate possession punishable.[1] (I recognize that some authors have suggested that CE technology [e.g., pharmaceuticals, neurostimulation] be considered as a separate category).[7–8] However, irrespective of the virtues of the

proposal of considering cognitive enhancers as a distinct category, this would require rather substantial changes to legislation and clinical practices at this time. Otherwise said, it is more likely—unless important changes occur—that, in Canada, CE with pharmaceuticals will be dealt with under the current regime even if it represents a patchwork of legislations and regulation of clinical practices.

CONTEXTUAL ASPECTS

Obviously, the use of neuropharmaceuticals for enhancement evokes several questions related to the level of evidence supporting some current claims, views about cognitive enhancers, and risks related to the nonmedical use of drugs (including drugs available only under prescription). Despite significant ethical questions, the nonmedical use of prescription drugs for CE is a poorly documented phenomenon in Canada.

From a prevalence standpoint, few studies have established the existence of the nonmedical use of prescription drugs as a public health concern. One, now dated study suggested a low but nonetheless very real rate of nonmedical stimulant use in high school students located in Canada's Atlantic provinces (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador; located on the East coast of Canada).[9] It found that the "prevalence of medical and nonmedical methylphenidate (Ritalin) use and medical and nonmedical amphetamine use was 2.0%, 6.6%, 1.2% and 8.7%, respectively." Another study carried out in a small sample of 100 students at McGill University (50 of whom had reported misusing methylphenidate and 50 matched controls) suggested that among those who had misused methylphenidate, 30% of them had done so for the purpose of enhancing cognitive performance.[10] This study was not designed to establish the actual prevalence of this phenomenon on this university's campus. However, a recent study on the actual and hypothetical use of cognitive enhancers in medical students from one Canadian medical program found that 49 out of 326 students "admitted to nonmedical and/or off-label use of one or more pharmaceutical stimulants."[11] The study also found that "[c]lass seniority and male gender were both associated with positive attitudes towards use of these agents; favorable attitudes were associated with recent use of pharmaceutical stimulant and high-caffeine products." In spite of being conducted on a single site, the study concluded that a "substantial proportion" of "Canadian medical students" (at large) have used stimulants for CE purposes.[11]

A recent report by the Canadian Centre for Substance Abuse on the nonmedical use ("abuse") of prescription drugs examined the nonmedical use of

stimulants (irrespective of purpose or goal) and other prescription drugs such as opioids.[1] The report recommended "[developing] a coordinated national surveillance system related to prescription drugs, leveraging existing opportunities, including linkages to prescription monitoring programs, and monitoring overall key outcomes related to misuse, abuse and harms."[1,ii] In 2009, Quebec's Committee on Ethics, Science and Technology (CEST; Commission de l'éthique de la science et de la technologie) called for the need to establish a better prevalence rate of the nonmedical use of neuropharmaceuticals and for funding agencies to support this initiative.[13] This call has gone unheeded, with no official response either from the ministries concerned or from the funding agencies.

In sum, the phenomenon of nonmedical use of prescription drugs for CE remains poorly understood in the Canadian context from a societal and public health standpoint. Although a possibly emerging trend, the current lack of evidence obviously calls for a greater exploration of this issue because we are unable to assess the extent to which this phenomenon exists or presents a genuine problem for public health. Now and then, media reports have questioned whether the usage trends reported in the United States[6] exist in Canada.[14] Canadian media coverage, studies on the ethical aspects of this phenomenon (such as those carried out by the author of this chapter), and anecdotal reports have also promoted public discussions and media coverage of this issue.[14–29]

Policy Discussions and Responses to the Nonmedical Use of Prescription Drugs for Enhancement

Although there have been limited policy discussions surrounding the nonmedical use of prescription drugs in Canada, the CEST has led a substantive and relevant public policy initiative on CE.[iii] The CEST undertook a mandate to examine the broadening uses of neuropharmaceuticals (or "psychotropic drugs," as stated in the report) from both a medical and nonmedical standpoint. In this case, "nonmedical" essentially stands for CE uses. The full 2009 report (*Position Statement—Psychotropic Drugs and Expanded Uses: an Ethical Perspective*) offers extensively researched guidance on CE.[13] A summary of the key recommendations of the report and information about targeted stakeholders can be found in Table 13.1. The CEST's recommendations have, to my knowledge, not brought substantive public responses from concerned bodies such as governmental departments, professional societies, and university departments charged with the training of health care professionals.

Table 13.1 **Key recommendations from the Commission de l'éthique, de la science et de la technologie, extracted from the summary report**[13*]

Recommendation No. 1: That the main stakeholders deepen the knowledge of psychotropic medications, namely:

a) that the Minister of Health and Social Services give the Conseil du medicament (the Medication Council) the mandate of establishing a profile of current uses of psychotropic medications in the Quebec population and of monitoring their evolution over time;
b) that Quebec granting agencies incorporate into their programming the funding of qualitative and quantitative studies on the uses of psychotropic medications and on the different types of impacts induced by them;
c) that the relevant associations and professional orders document the practices of their members where the use of psychotropic medications is concerned.

Recommendation No. 2: That main stakeholders ensure the reliability of information transmitted to the population on the Internet, namely:

a) that the Minister of Health and Social Services, together with the Conseil du médicament and the relevant associations and professional orders, direct the general public to sources and Internet sites containing reliable popularized information;
b) that the Ordre des pharmaciens du Québec (Quebec College of Pharmacists) raise awareness in the general public of the risks of relying solely on information found on the Internet and of the importance of validating this information by consulting health professionals.

Recommendation No. 3: That stakeholders in the field of information ensure the dissemination of critical, balanced, and complete information on knowledge and uncertainties relating to mental health disorders, the use of psychotropic medications and the nonpharmacological treatments used in the treatment of mental and neurological disorders.

Recommendation No. 4: That the Minister of Health and Social Services, together with the Conseil du médicament and the relevant associations and professional orders:

a) establish an accessible mechanism to disseminate information on psychotropic medications and on the state of knowledge relating to non-pharmacological treatments;
b) develop best clinical practice guidelines for mental health;
c) develop decision support tools.

Recommendation No. 5

a) That the relevant associations and professional orders sensitize their members about the phenomena of medicalization and medicamentation, as well as the reality and potential consequences of expanded uses of psychotropic medications.

Table 13.1 **Continued**

b) That the universities, associations, and professional orders concerned provide integrated mental health programs in the core curriculum and in continuing education programs.
c) That the universities, associations and professional orders involved include nonpharmacological treatments in the core curriculum and in continuing education programs.

Recommendation No. 6: That the Minister of Health and Social Services intervene with the Minister responsible for Health Canada, in order

a) to keep in effect the ban on direct-to-consumer advertising (DTCA) of prescription drugs in Canada as long as the pharmaceutical industry or the advertisers have not demonstrated its benefits for the health of the population and for the health system;
b) that regulations continue to preserve the unique character of the Canadian health care system, which is based on solidarity;
c) that existing regulations concerning the prohibition of the third kind of DTCA (which mentions the medication by name, the pathologies which it addresses, and the benefits associated with its use) are applied to advertisements coming from the United States.

Recommendation No. 7: That the Minister of Health and Social Services intervene with the Minister responsible for Health Canada so that Health Canada makes disclosure of clinical trials and of all results compulsory, in an accessible registry, and that this registry is regularly updated.

Commission Cautionary Note on External Pressures: The Commission is concerned that the pressures exerted in many social spheres and activities that aim to homogenize behaviors will lead to the regular use of psychotropic drugs.

Commission Cautionary Note on the Accessibility of Medications: Given the likely increase in the use of psychotropic drugs caused by expanded "Medical" and "Lifestyle" uses, the Commission is concerned about the impact of this increase on access to medications. It is concerned about the impact this increase may have on the list of medications eligible for reimbursement, the affordability of drug insurance plans, and the possibility that persons suffering from pathologies could be faced with unmanageable financial obligations.

Recommendation No. 8: That the Minister of Health and Social Services continue to implement integrated mental health practices to ensure better continuity of care and services and to help reduce expanded uses.

Recommendation No. 9: That the Minister of Health and Social Services:

a) establish the conditions for improving service delivery within the public system of services offered by professionals for nonpharmacological therapies used in the treatment of mental and neurological disorders;
b) study the conditions for reimbursement by the Régime d'assurance maladie du Québec† of professional services provided for private nonpharmacological therapies used in the treatment of mental and neurological disorders.

(continued)

Table 13.1 **Continued**

Recommendation No. 10: That the Quebec granting agencies include in their programming the funding of qualitative and quantitative studies on the impacts of increased use of nonpharmacological therapies on the public health and social service system.
Recommendation No. 11: a) That the Minister of Health and Social Services and the Minister of Education, Recreation, and Sport promote the participation of civil society in discussions and decisions related to the place of medications and particularly to the expanded use of psychotropic medications. b) That the Commissaire à la santé et au bien-être (the Commissioner of Health and Welfare) lead a public debate on the expanded uses of psychotropic medications.

* This report tackles jointly expanded use of neuropharmaceuticals as well as uses for cognitive enhancement purposes, hence the broad nature of the recommendations.

† Quebec's provincial health insurance system

Although some national and regional media coverage has occurred, it is largely in response to academic publications on the ethical aspects of CE as stated earlier.

Other responses of health authorities and stakeholders have remained minimal in comparison to the significant public debate that has occurred on this topic in the United Kingdom[30–32] and in the United States.[33] In all fairness, Canada does not have a national advisory body on bioethical matters. This is not the case in other developed countries such as the UK, the United States, and France, which do have dedicated advisory boards (Nuffield Council on Bioethics, Presidential Commission for the Study of Bioethical Issues, and Comité Consultatif National d'Ethique Pour les sciences de la vie et de la santé, respectively). Instead, in Canada, a set of governing bodies—none of which has publicly tackled issues related to CE—provide some coverage of bioethical issues without clear leadership at the federal level (see Table 13.2). Quebec, with the CEST, is the sole province to have its own such committee. However, the CEST acts only at the provincial level. The recently revised Canadian document on research ethics guidance, the Tri-Council Policy Statement 2, does not allude to the ethical issues associated with research surrounding CE in any specific way.[34] Although a modest policy response from a 2011 editorial in the *Canadian Medical Association Journal* has called for a restrictive approach to CE, it was mostly focused on the use of stimulants on university campuses and tasked university authorities to monitor and respond to this situation.[35] The Canadian Centre for Substance Abuse, an independent but government-funded

Table 13.2 **Example of bodies that handle ethical aspects of biomedical science in Canada**

Interagency Advisory Panel on Research Ethics: The Panel is responsible for the development, interpretation and implementation of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* (TCPS). It advises the three Canadian funding agencies (Canadian Institutes of Health Research, CIHR; Social Sciences and Humanities Research Council of Canada, SSHRC; Natural Sciences and Engineering Research Council of Canada, NSERC); the TCPS is applicable for research directly funded by the three agencies as well as all research that is accomplished at institutions eligible to apply for funding.[36] Link: http://pre.ethics.gc.ca/eng/index/
CIHR's Ethics Office: Now defunct, this used to be a separate ethics office. It has been subsumed under one of CIHR's three business portfolios: Research and Knowledge Translation. This evolution has been criticized for failing to respect CIHR's mandate in ethics, as stipulated by the law.[37] Previous research funded by CIHR has, however, delved into the issue of CE. Link: http://laws-lois.justice.gc.ca/eng/acts/C-18.1/index.html
Health Canada's Science Policy Directorate (Bioethics, Innovation, and Policy Integration Division [BIPID]): This is a subgroup of analysts at Health Canada who are responsible for policy development and advice on matters related to ethics. Health Canada also has a research ethics board approving research conducted by or involving Health Canada (as well as the Public Health Agency of Canada). Link: http://www.hc-sc.gc.ca/ahc-asc/branch-dirgen/spb-dgps/spd-dgps/index-eng.php
Canadian Bioethics Society: This is a leading academic and professional society for Canadian bioethics. Since it is a society, it does not typically offer guidance to other professional societies or health institutions. Previous annual conferences have featured content on the issue of CE. Link: http://www.bioethics.ca/ethics/conference/past.html
Office of Ethics, Professionalism, and International Affairs, Canadian Medical Association (CMA): This office was established in 2008 and "is responsible for developing, maintaining and revising policies and guidelines on ethical and professional issues, as well as serving as secretariat for the Committee on Ethics" but to date has not published guidance on CE.[38] Link: http://www.cma.ca/advocacy/ethicsprofessionalism

agency, tackles broad issues related to illicit and, increasingly, prescription drug abuse. However, the focus of the Centre has been largely on the abuse of opioids, which have been identified for several years as a major public health concern in Canada.[1] Therefore, in sum, the policy response and public discussion on CE remains minimal in Canada.

Academic Work on the Nonmedical Use of Prescription Drugs for CE Conducted in Canada or About the Canadian Context

In contrast to the limited policy responses and public discussions, academic research on CE has been an active area in Canada. This potentially reflects the country's significant role in the development in the field of neuroethics (see Table 13.3), which cannot be fully explained here.[39–40] Academic research and contributions have included (1) empirical studies, mostly focused on stakeholder perspectives (e.g., physicians, students); (2) conceptual work that has discussed normative aspects of CE, and (3) recommendations on CE. Because of the diversity of terms used to describe CE, contemporary discussions might have occurred separately from the work reviewed in this chapter. For example, in Canada, as elsewhere, the term "cognitive enhancer" has been used to refer to medical treatments for conditions like schizophrenia and Alzheimer's disease.[41] Also, it is clear that Canadian authors have discussed other forms of enhancement before this time and separately, notably regarding genetics.[42–44]

EMPIRICAL STUDIES

Canadian scholarship in the empirical investigation of ethical issues surrounding the nonmedical use of stimulants and cognitive enhancers has examined stakeholder perspectives (e.g., physicians, students) in some detail. Peter Reiner[iv] and colleagues from the National Core for Neuroethics surveyed Canadian (N = 64/212) and American (N = 148/212) primary care physicians to understand their attitudes toward pharmacological CE. Physicians were asked to answer several questions about a hypothetical scenario involving a drug that was approved by regulatory bodies for healthy adults and found to be "safe, effective, and without significant adverse side effects."[50] Reiner and colleagues found that, in this scenario, physicians were more comfortable prescribing this cognitive enhancer as the age of the hypothetical patient increased. Although the scenario was designed to explicitly assert that the drug was safe to use, the authors reported that many physicians were skeptical about these claims of safety and that this was the most prominent concern expressed by physicians. In a vignette-based study, Reiner and colleagues examined general public attitudes.[51] The sample consisted of 4,011 participants but only 261 (6.5%) were from Canada (3,750 [93%] were from the United States), and therefore this study could be more appropriately considered a North American rather than a Canadian study (i.e., focused on the Canadian context). The authors found moderate support for CE as well as the existence of concerns about the pressures to enhance and the authenticity of achievements resulting from CE.[51]

Table 13.3 **Historical landmarks in Canadian neuroethics and cognitive enhancement**

Early discussions in Canadian neuroethics: Although not widely known, contemporary Canadian discussions on neuroethics were initiated at about the same time as in the United States. For example, a landmark meeting hosted by the Dana Foundation in 2002 marked the history of the field and served as an impetus and a historical reference in the United States.[45–46] However, at the same time, a distinct neuroethics meeting was also held the same year under the auspices of one of Canada's health research institutes (the Canadian Institutes of Health Research [CIHR]), notably the Institute of Neurosciences, Mental Health, and Addiction (INMHA), to foster discussion on questions related to neuroethics.[47]

Neuroethics as a CIHR priority initiative: Because Canadian discussions were held and sponsored by CIHR's INMHA under the impetus of Dr. Rémi Quirion, a distinguished Canadian neuroscientist and director of INMHA, Canadian leadership took the form of several pioneering, large-scale initiatives led by INMHA to fund and support the development of neuroethics internationally. These included the International Neuroethics Network.[39] The year 2004 marked the beginning of one of the first large-scale research initiatives, led by Canadian legal scholar Jocelyn Downie of Dalhousie University, and focused on issues related to the use of neuroimaging in pediatric populations. In 2006, another large-scale initiative named "States of Mind: Emerging Issues in Neuroethics" was led by the philosopher and bioethicist Françoise Baylis, also from Dalhousie University. This second network covered a broader range of ethical issues related to identity, free will, and harms and benefits.[48] Subsequently, in 2006, the first Canadian center for neuroethics was founded in Montreal at the Institut de recherches cliniques de Montréal (IRCM). In 2007, a CIHR-INMHA chair in neuroethics was awarded to Judy Illes, based at the University of British Columbia (UBC) and formerly director of the Stanford Center for Biomedical Ethics' Neuroethics Program at Stanford University in California. Finally, a trilateral initiative beginning in 2008 and involving Germany, Canada, and Finland was funded and supported different international collaborations involving multiple researchers and universities (including one funded project on enhancement). Also, three major international conferences have been hosted in Canada (in Halifax in 2009, in Montreal in 2011; in Vancouver in 2014).

Subsequent funding and developments: Through personal knowledge, I am aware of dedicated grants funded by the SSHRC* as well as by CIHR† that have focused on the issue of CE. Several other national and international events have marked the young history of neuroethics in Canada, which is, of course, still unfolding.

* Eric Racine. Examining stakeholder perspectives and public understanding of the ethical and social issues of cognitive enhancement using methylphenidate, Social Sciences and Humanities Research Council of Canada, Standard Research Grant, 2008–2011.

† Peter Reiner. Public attitudes toward pharmacological cognitive enhancement, Operating grant, 2011–2014; and also Jennifer Chandler and Eric Racine. The neuroethics of detecting, suppressing, and enhancing memory, CIHR Catalyst Grant, Canadian Institutes of Health Research, 2011–2013.

Research conducted by my own group, the Neuroethics Research Unit based at the Institut de recherches cliniques de Montréal (IRCM), has examined public and academic discourse (in an international sample) about CE. We identified three distinct paradigms under which nonmedical use of prescription drugs for enhancement was captured: (1) "the prescription drug abuse paradigm," (2) "the CE paradigm," and (3) "the lifestyle use of pharmaceuticals paradigm."[6] The first paradigm "expresses concerns for the health of individuals engaging in those practices and highlights the health risks and potential for dependence associated with the nonmedical use of drugs like methylphenidate." Nonetheless, drawbacks of the prescription drug abuse paradigm include applying the harsh language of illicit drug abuse to pharmaceuticals that may not capture the ambivalence noted in stakeholders such as clinicians and members of the public.[52] The CE paradigm is most often encountered in the ethics literature and stresses the potential benefits of augmenting cognitive function beyond ordinary or average capacities. From an ethics standpoint, this paradigm underscores the potential impact of enhancement on identity or autonomous decision-making. However, the term "enhancement" is incongruent with unknowns risks and benefits of the practice and may bias the discussion toward an "enhance or not enhance" dichotomy without due attention to circumstances in which substances would be used. The third paradigm, the lifestyle use of pharmaceuticals paradigm, is encountered in the media (and some academic discourse) and describes the nonmedical use of prescription drugs as a "lifestyle choice," equating it with "better living through chemistry."[53] Observing these divergent portrayals of CE in different realms of academic discourse led us to criticize academic discourses that fail to critically examine their initial portrayal of this as-of-yet scientifically established phenomenon of CE. Regarding conceptual and methodological aspects of discussions on CE, our work has identified that "cognitive enhancement" itself is a heavily charged term that propels the discussion on CE in specific directions. Previous discussions have focused on the benefits of potential enhancements and have lacked an appreciation of the contextual factors involved in the repurposing of drugs for the goals of enhancement.[6] Overall, we found that the media disseminates highly problematic portrayals of CE and that academic discourses have sometimes failed to distance themselves from this enthusiasm. Academic literature has replicated some problematic assumptions that can be found in media coverage (for an example, see the findings of our study on donepezil).[54] Similarly, a series of collaborative papers led by Outram and involving the author of this chapter analyzed the content of major public policy responses (made by AAN, CEST, British Medical Association)[4,13,30] and found debatable assumptions about the efficacy and prevalence of CE use as well as potentially premature calls for public health responses. For example,

we identified that problematic assumptions associated with the claimed efficacy or high prevalence of CE shaped the work and responses of bodies such as the CEST and the AAN.[55,56]

From these results, we chose to investigate stakeholder perspectives on CE.[57] In a follow-up study using focus groups, we investigated reactions and attitudes of students, parents, and health care professionals toward ethical questions associated with the nonmedical use of stimulants. This study focused on methylphenidate because of its salience in the public domain. One of the key challenges was the social pressures described as an inescapable trend leading to the acceptance of CE.[58] We also found considerable ambivalence regarding the proper ethical response to CE, both at the descriptive level (e.g., how this phenomenon can be described as lifestyle choice, enhancement, or abuse) and at the normative level (e.g., the proper ethical response to CE).[52] We also reported that the debate occurring within the focus groups showed that the values associated with ethical concerns surrounding the use of cognitive enhancers have deep roots that are not easily captured or handled by current normative approaches. Current approaches often focus only on a single set of considerations related to moral acceptability or to moral praiseworthiness but rarely both (see later comments).[59]

Other empirical work carried out in Canada has explored how claims about cognitive enhancers for memory enhancement have surfaced in online marketing for dietary supplements.[60] Collaborative work involving Canadian scholars has also examined attitudes toward the moral acceptability of CE drugs (e.g., how different contextual factors shape attitudes),[61] as well the relationship between CE and academic misconduct[62] (these studies are based on German respondent samples).

CONCEPTUAL WORK ABOUT CE

From a conceptual standpoint, Canadian scholars have put forward a variety of perspectives on the nonmedical use of prescription drugs. Overall, few Canadian scholars have sided with either the rather restrictive or conservative perspectives encountered in some American scholarship or with enthusiastic libertarian viewpoints such as those found in the UK.[63–64] In the United States, the President's Council on Bioethics and leading authors have voiced deep concerns about the threat of CE to identity and authenticity.[33] Sandel, for example, criticizes how CE propagates an ill-founded quest for perfection.[65] In the UK, some governmental commissions have, in contrast, proposed that CE could be a strategy to ensure that the aging UK population remains a thriving economic force. The Foresight Mental Capital and Wellbeing Project subtitled "Making the Most of Ourselves in the 21st Century" has put forward CE as a response to the threat of age-related cognitive decline and Alzheimer's disease to the

UK's economy and thus argued for a notion of "mental capital" to ensure the competitiveness of its economy in an a ferociously competitive international knowledge-based economic context.[32] Likewise, a series of UK-based authors have adamantly argued in favor of the use of CE.[66–68] Canadian scholarship—if there *is* any trend uniting it—has perhaps been less about providing an overall normative perspective and more about exploring how the ethical questions associated with CE can be answered in different cases and contexts.

The earliest discussion surrounding CE published by Canadian scholars might date back to a 2002 paper published in French in *Ethica*.[69] This publication was followed soon after by a special session on neuroethics at the Canadian Bioethics Society Meeting in 2003 (jointly held with the American Society for Bioethics and Humanities in Montreal), which included presentations by Walter Glannon, Annette Mondola, and myself.[70]

Walter Glannon, one of the leading Canadian bioethicists and experts in neuroethics, has published extensively on the topic of enhancement. For example, his seminal 2006 paper in *Bioethics* captures the ethical issues surrounding the use of neuropharmaceuticals for enhancement alongside those of neuroimaging, psychosurgery, and deep brain stimulation.[71] He cautions about the impact of such drugs (especially modafinil, which is also known in Canada as Alertec) on sleep–wake cycles and the impact of sleep on memory consolidation. Glannon also alludes to drugs that target memory storage per se by acting on what we know of the biochemistry of memory consolidation and warns about the potential disruption of neurocognitive systems that may have evolved to work optimally.[71] Glannon responds to scholars who are optimistic that universal access to cognitive enhancers would reduce social inequality by expressing doubts that equal access would necessarily translate into "equal outcomes," and he calls for public debate on these advances.[71]

In a separate paper published in 2007 in the *Journal of Medical Ethics*, Glannon concentrates on questions associated with enhancement and memory.[72] He describes the crucial role that memory plays in survival and personal identity and focuses on the scientific and clinical contexts of post-traumatic stress disorder (PTSD) and a class of drugs called the beta-adrenergic antagonists, which include propranolol. Glannon describes some of the key experiments that have made these drugs promising candidates in the treatment of PTSD and other mental illnesses that involve perturbed recall of traumatic memories. He explains in detail the use of propranolol to counter combat-related PTSD in soldiers and its potential use as a memory dampener or memory eraser. Acknowledging the potential therapeutic benefits of the drug, Glannon criticizes the US President's Council on Bioethics[33] cautionary message about such interventions and their impact on our identity. Glannon argues that the Council mostly targets conscious episodic memories that differ from the nonconscious negative emotional memories that become pathological in PTSD or

depression. The other section of the paper expands the discussion on memory enhancement found in the *Bioethics* paper and cautions, with respect to refinements in memory enhancers (e.g., enhancing only retrieval of memory rather than acting on forgetting), that this could be very difficult to achieve because of the distributed nature of neural networks. The fourth chapter of Glannon's *Bioethics and the Brain* (Oxford University Press)—one of the first monographs on neuroethics—"Pharmacological and Psychological Interventions," expands his previous publications.

In a subsequent publication in *Neuroethics*, "Psychopharmacological Enhancement," Glannon puts forward a more clearly normative standpoint based on the precautionary principle as well as the need to inform individuals about the risks entailed in the use of cognitive enhancers.[73] In this paper, Glannon cautions against work-induced pressures and also indicates that side effects could lead to health compensation claims against employers. In terms of implications for the doctor–patient relationship, Glannon argues that, leaving aside issues of risks, the physician would have no obligation to prescribe an enhancer (provided it is safe but only available through a physician) because he or she "would have no duty of beneficence and no obligation to prescribe the drug simply because the individual wanted it."[73] However, there are cases where the occupation of the patient could warrant the prescription of cognitive enhancers and "[w]hether the use of a drug is described as a form of therapy or enhancement depends not on the drug itself but the purpose of its use."[73] In cases where the occupational tasks call for heightened attention or wakefulness (such as in the case of night-shift workers or airplane pilots on transcontinental flights), doctors could prescribe cognitive enhancers even though "they are not obligated to make people more competitive or happy."[73] Following this opening to clinical practice, Glannon acknowledges variable responses between physicians. Subsequent work by Glannon has examined, in collaboration with some Canadian neurosurgeons, the impact of neurosurgery and neurostimulation on the enhancement of cognitive function.[74]

Work of my own group, developed with Cynthia Forlini, has delved into nonempirical and normative discussions as well as into stakeholder perspectives.[69,75] This conceptual work has concerned (1) conceptual and methodological aspects of the discussion on CE, (2) assumptions about public and clinical responses to the issue, and (3) philosophical stances embedded in the debate on CE. The Neuroethics Research Unit has also been active in organizing panels and in participating in public discussions on this topic locally as well as at different national and international meetings.

We have recently published in collaboration with colleagues in Ottawa and Brisbane a discussion paper on some foundation conceptual and methodological issues associated with CE.[76] The paper acknowledges that speculation (from the Latin *speculare* meaning "looking out") involves an attempt to predict and

draw conclusions based on incomplete evidence and that this effort, although potentially highly valuable, involves constraints based on the fact that looking *out* is always an act of looking *from* somewhere and thus from a particular point of view. The paper identifies and describes in detail common assumptions in the cognitive debate concerning (1) terminology (as discussed earlier), (2) scientific aspects (e.g., efficacy), (3) sociological aspects (e.g., trends of acceptance and increasing prevalence), and (4) normative aspects (e.g., unquestioned need for bioethics to tackle this issue).[76] These aspects of the debate on CE and how one is positioned toward them shape the vantage point for guidepost, and can create blind spots. We propose different methodological suggestions to remediate these blind spots. First, assumptions about CE should be acknowledged more explicitly. Second, interdisciplinary literature should be consulted to validate these assumptions. Third, a broad perspective should be adopted to support more comprehensive reflection, notably by (1) comparing disciplinary frameworks, (2) considering historical knowledge, and (3) reflecting on the development of normative approaches.[76]

Our work has also stressed that American debates have, to a large extent, polarized the ethical analysis of CE by following staunch liberal and conservative perspectives. I have proposed a moderate liberal position in an effort to recognize that the criterion of moral acceptability, found at the heart of liberal positions, and the criterion of moral praiseworthiness, central to conservative positions, need to be integrated rather than either being solely dismissed, as a way to provide a comprehensive perspective. (Moral acceptability describes minimal ethical obligations and relies on the principle of not causing harm to others, which can be sanctioned by law and other extrinsic motivators; moral praiseworthiness captures positive obligations to pursue actively the good and relies on intrinsic motivators such as moral ideals.)[46] This approach is consistent with the empirical data we have gathered suggesting that liberal positions[77] unduly dismiss concerns articulated by nonexperts and constrain ethical discussion to the criterion of moral acceptability without addressing moral praiseworthiness.[78] Traditional sources of morality cannot bring ready-made responses to fulfill the criterion of moral praiseworthiness. Such an effort must, in contemporary liberal democracies, rely on public debate and efforts to reconstruct what is considered to be shared goals and values.[46]

In response to a commentary published in *Nature* by Greely and colleagues (authors from the United States and UK), who advocate for a liberal position based on moral acceptability,[7] we have stressed that issues surrounding worker's rights (as well as assumptions made by the authors of this proposal) call for an international perspective.[79] We underscored concerns about the authors' assumptions regarding efficacy and their silence on the impact CE would have on health care resources given their position that "a proper societal response will involve making enhancements available while managing their risks."[7]

A similar reflection has also been proposed to Canadian psychiatrists in a separate publication in the professional magazine *Canadian Psychiatry Aujourd'hui*.[80] Consistent with the call for further dialogue, an argument in favor of broadening ethical analyses and re-enacting the deliberative role of bioethics beyond the boundaries of entrenched advocacy positions has recently been published.[81]

A second strand of our work has identified assumptions in policy responses and clinical guidance. With regard to clinical guidance, for example, we have criticized the AAN, which has proposed that "[t]he prescription of medications for neuroenhancement is 1) not ethically obligatory, 2) not ethically prohibited, and therefore, 3) is ethically permissible."[4] We criticized this guidance because it overlooks the impact of social stressors and similar factors that could prompt individuals to request neuroenhancers in competitive environments and, therefore, allows the complicity of neurologists to produce potentially problematic social contexts. Instead, the AAN could have provided guidance that approaches individual well-being in a broader social context and emphasizes solidarity. We also found that the AAN relied on an implicit belief favoring the safety and efficacy of cognitive enhancers that was not supported by evidence for CE in heterogeneous populations.[82]

Realizing the potential challenges of applying the AAN guidance to the Canadian context, such as threats to solidarity and the sustainability of a public health care system, we developed guidance for Canadian practitioners.[83] This discussion is structured around three concerns and uses the AAN guidance as a backdrop to examine its applicability to the Canadian context. This paper first makes the point that "'can' is not enough" and that moral acceptability should not be handled lightly, whereas other considerations related to moral praiseworthiness should be given full attention. We also highlight that the clinical and social benefits of cognitive enhancers given to healthy individuals are not well supported by scientific literature. Since Canadian physicians are expected to promote equitable access to health care resources and to use these resources prudently,[84] we argued that physicians should prioritize treatments for patients based on the Canadian Medical Association (CMA) Code of Ethics, which puts forward fiduciary obligations of physicians in matters of resource use. Finally, we noted that the conflicting perspectives on how CE aligns with medical professional integrity indicate that CE is not yet an accepted medical practice. We advised that physicians should seriously consider refusing to prescribe medications for CE to healthy individuals. We concluded that, at this time, prescription by Canadian physicians is ethically unjustified, and we invited clinical societies to address this topic.[83] We have put forward a similar position in a paper, led by Canadian physicians and ethicists Nathalie Gaucher and Antoine Payot, on pediatric CE. We stress that the best-interest standard, an important international guiding principle for children's health and well-being, as well as pediatric decision-making, pre-empts the prescription of

drugs for the sole purpose of CE.[85] Our position here is much closer to the AAN which, in the case of pediatrics, has voiced a very different and much more cautious perspective than in the adult guidance referenced earlier.[86]

Finally, other work, including some of my earliest, has examined how different stances on CE intersect with philosophies of neuroscience.[69,87] This work has proposed that from a strong reductionist (boiling down the mind to biological activities of the brain) or strong holistic perspective (refusing to acknowledge the contribution of brain activities to the mind), some of the concerns about the impact of enhancement on identity and personhood are not apparent. On the one hand, for holism and its counterpart of dualism in philosophy of mind, firm beliefs in the separation of the mind from the body mean that interventions on the brain do not bring significant concerns regarding their effects on the mind. On the other hand, reductionism can lead to the call to eliminate any belief in mind (as a substance) or as a set of properties based on the defense of forms of eliminative reductionism. The theory of emergentism, inspired largely by the work of the philosopher of science Mario Bunge, is argued to be most consistent with neuroscientific observations and also is most able to capture the potentially profound impact of neurotechnologies on personhood.[87]

This chapter can only provide a general overview of Canadian scholarship into CE, and several others have made contributions that have not been described in this chapter. It is very clear that Canadian scholarship will continue to bring new perspectives based on ongoing recent research. For instance, Jennifer Chandler has led research into the legal aspects of memory dampening with a particular focus on the case of the use of beta-blockers in situations of sexual assault. In this unfortunately common situation, victims have to offer convincing testimonials in spite of the stress of potentially reviving the trauma associated with the crime that victimized them. Chandler and colleagues criticize the often abstract discussions based on an in-depth contextual analysis that identifies more concrete issues at stake as well as the benefits and risks of using such treatments.[88] Simon Outram, based at Dalhousie University (Halifax) at the time, published strong critiques of mainstream bioethics discourse on enhancement. He stressed the lack of evidence about, for example, stimulants like methylphenidate for CE.[5,89] Collaborative work involving Australian (Lucke and Partridge) and Canadian authors (Forlini and Racine) has also examined different policy options for CE as well as issues related to the public discussion of CE.[90–91] Andrew Fenton, then based at Dalhousie University, has proposed an analysis of CE from a Buddhist perspective and Buddhist values. Fenton has argued that Buddhism from at least certain traditions "should advocate the development or use of pharmaceutical enhancements if a consequence of their use is further insight into our self-nature or the reduction or alleviation of duhkha (dissatisfaction)."[92]

DELIBERATION AND WORKSHOP RECOMMENDATIONS

Being active in the field of neuroethics, Canada has hosted several events where discussions about CE have taken place. This is the case of the three editions of the Brain Matters series of international neuroethics conferences (see Table 13.3).[93–94] One international working group convened prior the Montreal Brain Matters conference hosted at the IRCM led to a publication on the ethical considerations involved in the funding of research on CE.[95] This group involved participants from Canada, Sweden, Australia, and the UK and proposed an analysis of three stances regarding funding of research in this area. These stances include (1) promoting research on the efficacy of cognitive enhancers, (2) neither promoting nor restricting research on cognitive enhancers, (3) preventing research on the efficacy of cognitive enhancers. The latter option was judged hard to defend given academic freedom but, nevertheless, the concerns it captures about the social impact of research are genuine. The first option could lead to unattended promotion of CE without due reflection on its impact. The second option, which could likely describe the current Canadian context, has the drawback of not bringing attention to any specific issues associated with CE research and fails to give impetus to research that would help describe the Canadian (and other) context of usage (e.g., epidemiological data). The working group concluded that a prudential position favored research into the public health aspects such as prevalence and safety.[95]

Conclusion

Like in many other countries, the debate on CE has surfaced in Canada. However, this debate includes some features that stand out in comparison to other geographically and culturally neighboring countries, such as the United States and the UK. In Canada, the prevalence of the nonmedical use of cognitive enhancers remains elusive, with little data published by scholars and health agencies. Policy responses have been timid in contrast to the policy work occurring in the UK, a country from which Canada has traditionally found inspiration for the governance of its public institutions. Apart from a national Quebec ethics commission, no extensive policy discussion has taken place. The reasons for this are many and could range from a simple lack of awareness to the potential vested interests of authorities not to stir debate on a complex issue. From a scholarly standpoint, Canadian researchers have generated empirical data and analyses that often focus on the contextual aspects of CE and its impact on publicly funded health care systems and stakeholders. After this first review focused on the Canadian context, one observation is that most scholarship and

responses have taken the middle-ground with respect to enthusiastic libertarian perspectives and highly critical conservative standpoints. Further research should assess the actual prevalence of CE and relevant clinical and ethical aspects of CE in Canada.

Notes

i. Generic PubMed searches on CE and nonmedical use of prescription drugs were conducted (January 2014), but this strategy does not warrant any claim to exhaustive capture and coverage of Canadian scholarship as defined earlier. Another caveat is that much of Canadian work can only artificially be constructed as Canadian because some of the scholarship is internationally focused.
ii. The exact purpose for misuse is usually not spelled out in such surveys.[12] In other words, uses for CE are amalgamated with recreational use or nonconforming medical use (e.g., self-medication).
iii. In the past, this committee has advised Quebec's provincial government on a wide range of ethical questions associated with developments in technology and science (e.g., surveillance and monitoring technologies, cyber bullying, organ transplantation, genetic databases) (more details at: http://www.ethique.gouv.qc.ca/en/). Overall, it serves a broad mandate of instilling reflection on ethical questions, public dialogue, and guidance.
iv. Reiner has also argued separately for the value of bringing evidence to the debate on cognitive enhancement.[49]

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14

Cognitive Enhancement and the Leveling of the Playing Field

The Case of Latin America

DANIEL LOEWE

> We might conjecture that in the long run, if there is an upper bound on ability, we would eventually reach a society with the greatest equal liberty the members of which enjoy the greatest equal talent.[1: 92–93]

Introduction

This chapter discusses the mechanisms of allocation for the pharmacological cognitive enhancement (CE) of healthy adults in the context of Latin America, considered from the perspective of a liberal egalitarian theory of justice. According to a common definition, CE is an intervention that aims to improve mental functioning beyond what is necessary to sustain or restore good health.[2]

In today's enhancement discussions, CE remains a heavily debated issue.[3–5,i] Currently available pharmacological agents (like amphetamine, methylphenidate, and modafinil) could potentially offer improvement of cognitive faculties in healthy people, such as memory, focus, problem-solving, increased energy levels, and a diminished need for rest. Certainly, the evidence of the extent of improvement is still a matter of contention. For example, some types of cognition can perhaps only be enhanced at the expense of impairing other cognitive functions.[6] But even if the extent of improvement is modest to date, research is under way on substances that might be even more effective and could offer new opportunities to improve cognitive faculties during the next few decades.[7] Additionally, according to international empirical research on the prevalence of CE, currently available pharmacological agents are used by academics, as well as college and university students, for the improvement of cognitive function.

After addressing the available evidence on prevalence of CE use in Latin America, I will focus on the normative implications of such use in developing countries. My normative thesis is that a policy of open and, in some specific cases, facilitated access to CE may offer an effective way of remedying some social and natural inequalities, as well as advancing overall equality of opportunity. This is especially relevant for public policies on CE in societies that are marked by deep social inequalities, such as those in Latin America. The most serious counterarguments that can be leveled against this policy proposal pertain to the probability of health risks and the seriousness of potential harms.

To elaborate the normative argument, I accept the perhaps unrealistic premise that CE is safe and effective.[ii]

I will proceed in several steps: in the next section, I will review the available empirical evidence about the use of CE in Latin America, which seems to suggest that it is used quite regularly. Because the normative status of such enhancement use is contested, and the normative problems might be exacerbated in societies that are marked by deep social inequalities, I will examine what follows from Rawls's egalitarian theory of justice in the general case of enhancement in the section "Egalitarian Principles of Justice and Enhancement." Following that, in the section "CE and Equality of Opportunity," I will focus on CE and propose a policy of open market access to available pharmacological agents for CE, a policy grounded in egalitarian principles of justice, and I will respond to immediate objections. In the final section, I will consider if CE implies coercion and cheating and how the potential negative side effects of CE may qualify the normative thesis and policy proposal for Latin America.

CE in Latin America

In Latin America, there exist only a few larger empirical studies about the prevalence of nonmedical use of psychotropic drugs for CE. As such, the evidence is lacking. For example, according to Barros and Ortega, there are no scientific publications regarding the use of methylphenidate in Brazil (as reported by the SciELO index) in the years 1997–2008. Most of the available research focuses on illicit amphetamine use by college and university students, but does not usually survey the prevalence of modafinil and methylphenidate use.[8,9] The few available studies that do take methylphenidate and modafinil prevalence into account focus on students in the health sector.[iii] The sector of health-related education has some special features: these programs are linked with high stress levels and demanding requirements. The students also seem to be informed about the consequences of CE use and have easier access to the drugs.

It is common to link the use of CE to demanding academic requirements and the associated high levels of stress. Bearing in mind the available information,

students in the health sector may be the most common users of CE in Latin America. However, we cannot plausibly conclude that the same levels of use pertain to students in other disciplines or to the general population.[iv]

The available data from Argentina is particularly telling. According to a recent empirical study of 122 medical students at the Universidad Nacional de Buenos Aires, 41% consumed substances to be able to study longer: 72.5% used coffee, 58.8% energy drinks, and 45% used psychotropic drugs, principally modafinil (31.7%) and methylphenidate (13.72%).[10]

Similar prevalence rates have been found in Colombia. An empirical study at different departments at the University of Manizales, with a population of 3,616 students and a representative sample of 309 participants, surveyed the use of amphetamines and related substances.[11] The relevant results for this discussion are the following: 12.1% stated that they used substances for academic reasons, naming consumption of methylphenidate as the most common (38.6%). Seventy-one percent of the students who used methylphenidate also reported positive academic results.

In Chile, the official position is that the use of psychotropic substances is growing but has not reached a worrisome level.[12] There are a few studies focusing on the use of modafinil by students in the health sector. According to a statistically nonrepresentative study of medical students at the Universidad de Chile,[13] the vast majority (110 of 121) study at night until later than 10 or 11 p.m. Most of them (56%) use coffee. Only a minority (16 of 121) reported using drugs such as modafinil or amphetamine-like substances (e.g., pseudoephedrine).

However, the actual prevalence of use may be higher: Campos et al.[14] completed a study in the Universidad Austral de Chile with a population of 346 medical undergraduate students and 272 nursery undergraduate students, with a sample of 57 medical students and 45 nursing students. As much as 37% reported having consumed modafinil at some stage of their studies. Medicine is leading the list of the most demanding syllabus requirements, but it is not perceived as the most stressful area of study.[15] Nursing is perceived as more stressful, perhaps because of the cognitive abilities of the medical students, who usually get the best results in the university selection tests.[14] Regarding the positional effects of such use, 25% of the medical students reported an improvement in their academic achievements, 10% reported a worsening, and 65% did not note any change. In contrast, 64% of the nursing students reported an improvement of academic results, none reported worsening, and 35.3% did not note any change.

According to another study conducted at the same university but focused on a sample of 208 medical students, 49% reported consuming psychotropic substances at least one time during their studies.[16] A majority (77.6%) used prescription stimulants (68% of them without prescription) such as modafinil (68.5%). Modafinil seems to be the stimulant of choice in this population, which overwhelmingly (89.6%) declares to be aware of the associated risks.

Although the available data are limited, such data indicate that the use of CE among students in Latin America is quite common, which is to an extent comparable with available evidence in other countries.[17,18,v]. This is in sharp contrast to the legally restrictive access to CE in these countries.[vi] In Chile, for example, methylphenidate and heroin are controlled substances belonging to the same schedule.[19] Access to methylphenidate is by retained medical prescription and to modafinil by simple medical prescription. But there is a huge informal black market operating in the digital space on the Internet and in physical space on the grounds of universities. Whether high prevalence rates are a social problem and whether current legislation is justified is a normative issue pertaining to justice, to which I turn now.

Egalitarian Principles of Justice and Enhancement

Egalitarian principles of justice aim to reduce the effects of undeserved circumstances on citizens. [vii] The prospect of citizens realizing a rational life plan should not depend on the natural or social lottery. What follows from an egalitarian perspective is that differences in distribution—either undeserved or based on luck—should be mitigated by justice, whereas differences grounded in choice are legitimate.[viii] But which are the mechanisms for mitigation? This is a contentious point.

On the one hand, "lotteries of life" are both social and natural. Economic and social status, as well as genetic cognitive and physical fortitudes, affect the life prospects of citizens. These factors are "arbitrary from a moral point of view."[1: 72] On the other hand, Rawls stipulates that justice is the first virtue of social institutions. Rawls asserts that the natural facts as such are neither just not unjust. Just or unjust is "the way the basic structure of society makes use of the natural differences and permits them to affect the social fortune of citizens, their opportunities in life, and the actual terms of cooperation between them."[20: 337] What follows from this sociostructural view of justice is not that the given natural assets have to be directly changed. Instead, the social and political institutions that create an advantage or a disadvantage out of natural assets have to be directly changed.

To achieve this aim, Rawls proposes a principle requiring that individuals of equal talent and motivation have equal prospects of obtaining social offices and positions (the *principle of fair equality of opportunity*).[1: 73] However, because talent and motivation are partly genetically and socially conditioned, the principle of fair equality of opportunity is not enough. A principle is required that compensates those who suffer disadvantages related to unchosen circumstances. This is the *difference principle*, which ensures that social and economic

inequalities have to be arranged in a way so that they benefit the life prospects of the worst-off. Both principles aim to mitigate the effects of undeserved circumstances, improving the life prospects of citizens through social and political institutions and not through interventions on their natural endowment.

Rawls's theory assumes the relative equality of the contract members. Accordingly, their cognitive and physical powers are always beyond a minimal necessary benchmark to be cooperative members of society. This step makes sense in the "ideal" architecture of the theory.[ix] But it is evident that this doesn't correspond to reality. Not every individual is a normally functioning, fully participating member of society. There are individuals below the benchmark who are not equal in this sense.

Natural assets and social opportunities work in tandem most of the time. That's why a natural capacity bestows a (dis-)advantage in the context of a social structure.[x] This is not to say that there are no differing natural abilities that correlate to an increased probability of failure or success in modern societies in terms of achieving rational life plans. In every society that rewards effort, there are such (dis-)abilities. For example, there are debilitating mental and physical diseases (e.g., Huntington's chorea, Tay-Sachs, Alzheimer's, cystic fibrosis) that affect and prevent individuals from being normal cooperative members of society, as well as competitors for advantages. All other things being equal, if we admit this point, and if there are available mechanisms to directly improve the bad luck of a natural lottery, it is hard to see the reasonableness of opposing this direct improvement. From an egalitarian perspective, it is not persuasive to argue that even if we could avoid several diseases by, say, genetic intervention we should instead restrict ourselves to compensating individuals with such diseases by means of material goods.

Interestingly, Rawls himself opens the door for extended intervention and modification of genetic natural assets: he asserts that "over time a society is to take steps at least to preserve the general level of natural abilities and to prevent the diffusion of serious defects."[1: 92] This lends justification to policies aiming to improve genetic endowment.

A conservative reading suggests that the aim is to preserve human abilities and to prevent the diffusion of serious defects by taking the present situation to determine the "general level of natural abilities," which then allows us to judge any departure and to determine what would be an acceptable level of diffusion of serious defects. In my view, it is obvious that, from an egalitarian perspective, the argument in favor of genetic intervention to treat or impede serious diseases is appealing.[xi]

If we consider Buchanan's limited normal function model of equality of opportunities, this treatment would be an intervention aiming to prevent, cure, or reduce the effects of a disease, understood as an adverse deviation from species-typical functioning. In contrast, enhancement aims to affect

factors like talent, intelligence, or strength, even if they are not related to disease. According to this understanding, the aim of medicine is to keep individuals close to normal functioning. Disease is morally relevant because it "limits opportunity in the most serious cases, at least by preventing persons from developing the threshold of abilities necessary for being a 'normal competitor' in social cooperation."[21: 74] In his view, the difference is important because, for justice that requires compensation, the treatment of diseases is more important than enhancement. This is a weak normative distinction, according to which the first (treatment) but not the second (enhancement) would be obligatory.

This conception goes beyond the social view of equality of opportunities. We have seen that there are good reasons (partly recognized by Rawls) to take this step: if intervention in natural assets aims to establish something close to normal human functioning and so to transform the individual to be the "normal competitor for advantages" that Rawls stipulates in his contractual theory, then this step makes sense because it tends to establish the equality he presupposes. But this conception is implausible in practical cases.

Consider the following well-known and discussed case: a child with growth hormone deficiency caused by a tumor will grow to be 160 cm as an adult. Another child with normal growth hormone secretion will also grow to 160 cm but because of normal genetic variation. According to Buchanan, the normal function model requires that the first child be treated because the cause of his shortness is disease. In contrast, treatment of the second child would be a form of enhancement not implicated by the normal function model of equal opportunity, and therefore the second child would not be treated. It is difficult to make good sense of the different considerations in the two cases. According to the model, disease was morally relevant in the first case because it limits opportunity because it prevents persons "from developing the threshold of abilities for being a normal competitor." According to moral relevance, both children are exactly in the same situation. Both children require the growth hormone to achieve a threshold of human functioning, and both children require it for reasons beyond their choices. Treating differently these cases that are identical in the morally relevant sense is not only counterintuitive but arbitrary.[22]

According to Buchanan, the dilemma arises from the luck egalitarian concern with the unchosen circumstances. But for him the luck egalitarian perspective goes too far because not every unchosen disadvantage would be unfair. From the luck egalitarian perspective, Buchanan's answer is arbitrary. But even if we weaken the luck egalitarian concern, it is difficult to see why unchosen circumstances causing serious disadvantages can hold the distinction between required treatment and not required enhancement if the rationality of his argument is grounded in some model of equality of opportunity.

However, the limited normal function model of equality of opportunity is not the only offshoot of the Rawlsian argument. If the rationale of his argument

is correct, then its scope goes further and includes forms of enhancement. Rawls's qualification "at least" suggests going beyond the conservative reading, and there are good reasons for it. In Rawls's "original position," which models a form of social contract, everyone would be interested in having improved natural assets because of the higher order interest in the realization of rational life plans. The parties to this hypothetical social contract don't know many details about their position, but "whoever" they turn out to be, it is evident that (if they are rational) they would accept a policy of improving genetic endowment.

CE and Equality of Opportunity

The improvement of genetic assets seems to be opposed to a common assumption in theorizing about justice: the assumption of the moral relevance of the difference between (1) persons as subjects to whom assets or goods are distributed and (2) the assets as objects that are distributed to people.[23: 126] From this perspective, justice aims to distribute same sets of external goods to individuals, and individuals are considered not modifiable, even if there would be modifications that would mitigate the effects of the natural lottery.

However, from a Rawlsian perspective, this assumption can be weakened in the case of genetic improvements through treatment or through enhancement. In the original position, parties don't have an interest in becoming a particular individual to which some goods are distributed but to becoming an individual with such properties that increase the probability of realization of rational life plans, whatever these might be.[24] An extension of this idea is that, in the original position, everyone would be interested in having access to available enhancement technologies in general—and CE in particular—in order to develop the properties that increase the probability of realization of rational life plans. Each society with market mechanisms probably rewards effort and some marketable cognitive abilities. If this is the case, there is an important link between CE and the social opportunity of every individual.

The cases of genetic improvement and of CE are different. Unlike the former, every decision about CE can and must take into account the choice of its potential user. In Rawlsian terms, the principle of equal liberty has priority of over the principle of fair equality of opportunity. Even if CE would provide positional advantage, individuals must have a protected right to decide whether to use CE or not. Individuals have different conceptions of the good and, accordingly, different rational life plans. Just as an individual can legitimately decide not to use her best cognitive capacities because its use is in opposition to her conception of a good life (e.g., a life of obedience to religion), an individual may legitimately decide not to make any use of available CE.[xii] However, from an egalitarian perspective we have *prima facie* good reasons to make CE

accessible.[xiii] Following Farah: "there is no reason that neurocognitive enhancement could not help to equalize opportunity in our society."[25: 423] In what follows, I will consider different policies that are increasingly more in line with egalitarian aims.[xiv]

Open market access (Laissez faire): One option for accounting for the interests of all would be to provide open access to CE through market mechanisms. However, without qualification, this option is open to one common criticism: that the more advantaged members of society would then become even better off. Because the rich have more economic means to gain access to CE, and because enhanced cognitive abilities offer positional advantages, this policy would be in opposition to the egalitarian aim.

Open access only for the cognitively disadvantaged people: A more restrictive policy could avoid this risk. This policy is based in the interest of all to be offered positional advantages in cases belonging to the group most disadvantaged by natural lottery, and it restricts the CE to the cognitively disadvantaged on a voluntary basis. But assuming that social background and cognitive abilities are mutually reinforcing and that, accordingly, the cognitively disadvantaged members of society may be extremely poor, some of them will actually not have access to CE if the economic barriers are significant.

Open access and subsidies for cognitively disadvantaged people: It would be reasonable to support a third policy consisting of economically facilitated access to CE for cognitively disadvantaged people. This policy can achieve a maximal extension according to the limits imposed by the liberty principle. The logic of this option is consistent with the distinction between treatment and enhancement: individuals below some cognitive benchmark should have economically facilitated open access to CE akin to treatment of disease. The only point to discuss is the benchmark itself.

Open access and subsidies for the worst-off only (i.e., poor people): But, if the normative ground is egalitarian, there is no reason to restrict CE access to cognitively disadvantaged individuals. What follows from the aim to neutralize effects of undeserved conditions is that we should improve the capacity of every person disadvantaged by both the natural and social lotteries so that they can make use of the available opportunities. According to the Rawlsian fair equality of opportunity principle, two persons with the same natural talents and the same ambition should have the same prospect of success in the competition for positions of advantage. If CE can improve some cognitive abilities (focus, memory, etc.), then a policy restricting and facilitating its use for the worst-off would probably help, even if modestly, to close the gap in social and natural inequalities.[xv]

Open access and economic incentives for everyone: According to the preceding analysis, everyone (under rational constraints in the hypothetical social contract) would be interested in having access to the available CE technologies to

develop their abilities and so could increase the probability of realizing their rational life plans. Any restriction in access would override this interest, at least for some. An extreme policy would be to economically facilitate access to CE for everyone. But there are convincing arguments against this option: (1) it doesn't consider any budget restrictions, thus rendering it unsuitable in contexts where there are limited resources; and (2) it doesn't take the egalitarian aim of improving achievement opportunities for the worst-off seriously.

Open access for everyone, coupled with subsidies for the worst off: From an egalitarian point of view, it would be better to implement a policy of open access to CE that includes economically facilitated access for the worst-off as a form of compensation.[xvi] These economic incentives for the worst-off break the improvement spiral for the advantaged, helping, even if modestly, to close the gap of achievement opportunity while taking seriously budget restrictions. I will now consider some criticism of the idea that such a policy could effectively make progress regarding the equality of opportunity.

A first criticism could be that there is no difference between this policy and a complete prohibition of CE. If the advantaged have economic means to access CE, their position would be exactly the same as the position of the subsidized worst-off. Comparatively, this policy will not implicate any change in equality of opportunity.

This argument supposes that the position of the advantaged and disadvantaged regarding access to CE is the same, which is not the case. The disadvantaged would have guaranteed access to CE, if they wanted it, whereas the advantaged would have to make a tradeoff among their different aims. In most cases, even in the case of the most advantaged, budgets are limited. Therefore, it is reasonable to suppose that this policy improves the achievement opportunities of the disadvantaged more than those of advantaged members of society.

Furthermore, there is some evidence that available CE drugs are more effective in individuals with lower performance.[26–28] Therefore, even assuming that everyone would use CE, the effects would be more pronounced in the cognitively less advantaged, which means that this policy could promote equality of opportunity.

A second criticism could be that this policy raises a society's average level of cognitive ability but does not raise social prospects for anyone. Cognitive faculties could be seen as positional goods, and the value of a positional good lies in the fact that not everyone has it. Talented people are admired specifically because not everyone has talent—if everyone could write *Don Quixote*, Cervantes would no longer be admired.

In a market economy, our cognitive abilities are a comparative advantage in relation to the abilities of others. If everyone uses CE to improve their cognitive abilities, a cognitive "arms race" will ensue, and the pursuit of enhancement

will be a waste of time, effort, and money[29: 328] because, comparatively, cognitive abilities will stay at the same level. Therefore, this would not necessarily be a good outcome for anyone—but it would be even worse for the nonenhanced. As a response to this critique, I offer four arguments:

1. If people use CE, the average cognitive ability will rise, but this doesn't mean that everyone will achieve the same or even similar levels of cognitive ability. CE does not constitute magic pills raising everyone to the same level of cognitive ability. CE is effective over a given (natural) substrate. If this is the case, the average will rise, but there will remain some (probably still strong) dispersion of cognitive capacities—competition will not disappear.
2. If the curve of effectiveness of CE is more pronounced for people with less cognitive abilities, the distribution of market outcomes will especially favor the disadvantaged choosing to enhance.
3. Cognitive abilities (and other factors, like preferences) have an outcome worth in the marketplace. But the worth of cognitive faculties cannot be reduced to their market price: they are not only positional goods.[30] Even if enhanced people would not achieve better market outcomes, it is evident that they would have access to more opportunities of enrichment in their lives, which can be productive in the process of developing, revising, and pursuing a rational life plan.
4. The idea that improving the average of cognitive abilities doesn't implicate better market outcomes is based on the supposition that the overall market return is fixed and that the market interactions of individuals are a zero-sum game. But this is not the case: a knowledge economy with more people with enhanced cognitive abilities has better prospects for growth, and economic growth improves the outcomes of individuals. Furthermore, a better pool of cognitive capacities has positive social externalities beyond the economy (e.g., smarter solutions to social problems, new technologies, etc.).

Unfairness, Coercion, and Health Risks

However, a common position is that CE is unfair: it is a kind of cheating, as per the analogy with doping in sports. This is a serious criticism that has to be examined carefully.[31]

The usual definition of cheating refers to the unilateral breaking of explicit play rules to get an advantage. If the marathon runner takes the subway to move forward or she takes illegal anabolic substances to improve her record, she is breaking explicit rules to gain an advantage over other athletes, and, accordingly, she is cheating. By analogy, the use of CE by healthy people to gain

an advantage over the nonenhanced would be a sort of cheating. Thus, there is a perfect analogy between doping in sports and CE: under the assumption that both doping and CE are not allowed, both would be a kind of cheating. The converse of this argument is that if the explicit rules did not ban the subway ride, the use of steroids, or CE, there would be no cheating at all because everyone could do the same.

But there is a deeper level of unfairness. Not every rule is explicit: social practices and activities include implicit rules as well. Sometimes, those rules are hard to determine, and, in some cases, there would be no agreement about their content. Breaking these rules to gain an advantage could be considered unfair or even a kind of cheating, at least under some conditions. An implicit rule in sports, for example, is that the play rules should be defined referring to the intrinsic good of the activity to facilitate the expression of the athletes' excellence in play.[xvii] Excellence in sports is the result of a hard-to-determine mix of natural abilities and training, the latter being an approximation of effort. If an athlete improves by doping her natural abilities or her effort disposition, she may achieve more. But her achievement—this is what many of us intuitively think—would not be the expression of her excellence. This intuition grounds the common rejection of doping. After all, an athlete doesn't need to win to gain our admiration (e.g., when her performance expresses a lot of effort), and not every winner gains our admiration (e.g., if the other competitors are out of shape). Surely, athletes want to win: that is one of the reasons for the common use of dangerous doping in sports. But our interest in sports is not restricted to winners—we admire the excellence of athletes. An athlete improving her performance by doping would be cheating others (and maybe herself) because her achievement is not a true expression of her excellence.

But suppose that a doped superhero can rescue a family from their collapsing house because of her super speed.[32] Would we still say that this achievement is not worthy of praise because it is not an expression of her excellence? Probably not. In contrast to the marathon runner, in this case, we are not interested in excellence but in the achievement as such.

Arguably, this is the background of most real-life situations.[32] Think of a surgeon capable of successfully carrying out an extremely long and difficult operation while on modafinil. Would we say that this achievement is not worthy of praise because it doesn't express her excellence? Obviously, it expresses excellence (with CE alone, without natural ability and training, the surgeon would have achieved nothing), but the point here is different: in this case, as in the case of a scientist capable of developing a ground-breaking or even modest theory, we are interested in the achievement and not, in contrast to sports, in the pure expression of excellence. Maybe it seems elegant to mentally calculate the structure of a building or to draw it by hand, but if the use of a

calculator or a design computer program can avoid the occurrence of mistakes, it would be better to use the calculator or the program, even if it doesn't express mathematical or imaginative spatial excellence.

As long as the use of CE refers to activities in which we appreciate the achievement as such and not to activities whose worth is in the excellence they express, CE would not be a kind of cheating, provided that access is open and the disadvantaged are subsidized.

Obviously, there are borderline cases. For example: what is an examination measurement? Is it the achievement (what the student knows and can do), or is it the excellence the student shows in her achieving? What we measure depends on the context. A music student's performance doesn't exclusively show us what she can do, but her excellence as well. In this case, enhancement (e.g., beta-blocker) would perhaps be a kind of cheating (in the second interpretation). But if the examination aims to measure achievement, there should be no problem with CE provided the proposed policy of open access and subsidies for the disadvantaged is at work. Obviously, there is a thin and not always clear line between some cases.[xviii]

Another way of conceiving of CE as unfair could be that it implies coercion. This is again an important critique that needs to be taken seriously.[33] Some people don't want to use CE because they have conceptions of the good or preferences that oppose its use. A policy of open access to CE, subsidized for disadvantaged people, indirectly coerces them because they have to compete with cognitively enhanced people who obviously can achieve more. Namely, people with better cognitive abilities are prone to achieve more: to get a better education, better jobs, to be promoted, to obtain more economic rewards, to be praised, and so on. There is empirical evidence of correlations between high levels of talent, high levels of education, and income and other advantages (e.g., life expectancy, better health, etc.).[34: ch. 5;36–38] Even if the disadvantaged don't want to use CE, there would be a huge pressure on them to use it. For example, economic competition might force people to use enhancement because of the risk of becoming ineligible in the competition for jobs.[39] An employer or an insurer could impose (explicitly or implicitly) the disposition to be enhanced as a condition to get the job or to obtain insurance, which means that the unenhanced shouldn't apply because they are ineligible.

On the other hand, outlawing or restricting the use of CE in the workplace or in school is also itself coercive to people with a preference to use it.[25: 423] If CE is harmless, the last criticism loses a lot of its persuasive force.[32] An analogy with education[40] is useful to illustrate this point: like CE, education helps improve achievement opportunities. Education (at least some) is in opposition to some people`s preferences or conceptions of the good. Does this imply that people who are not willing to be educated are coerced by educational policies? In practice, most societies consider education, at least at elementary levels,

a relevant good, so much so that access to it is mandatory. If an employer imposes—as a reasonable requirement for a job—the willingness to use CE, there is no more or less coercion than in the case of an employer imposing a reasonable requirement of education for the job. Technically, those opposing enhancement and education have a "constrained preference": they have a preference to do things (to become enhanced and educated) that in other circumstances they would rather avoid, but they fear that others will gain advantage over them if they don't.[41: 798] But having a "constrained preference" is not necessarily a bad thing. Both market functioning and the success in competition could refer to "constrained preferences," and many public policies aim to constrain preferences by offering incentives. But, in any case, a "constrained preference" is not the same as "coercion." Assuming the innocuous character of CE implies the weakening of any reasonable claim about coercion.

But is CE safe? There is evidence that the use of methylphenidate might pose a moderate risk of addiction.[42] For now, modafinil seems to be safe, but we don't have conclusive long-term studies regarding its health risks. Obviously, the uncertainty about the health consequences of CE should be considered: if there is no danger, there is no reason to restrict access. As a general rule, the more dangerous CE is, or the more uncertainty about its health risks exists, the better the case for restricted and controlled access. This rule doesn't focus on the protection of would-be users of CE but on the protection of those who are wary because of health risks, those who are under pressure to use it because of the competition.

This doesn't imply that any and all health risks trump access to CE, but it does mean that we have to weigh the health risks against the egalitarian aim of the proposed policy and people's liberty to use CE. The egalitarian aim is more relevant the less egalitarian the society is, and, correspondingly, the wider the gap between the achievement opportunities of the worst-off and the most advantaged. If the drugs are not dangerous or the risk of moderate harm is slim, there are strong egalitarian reasons to support the proposed policy of open access with subsidies for the disadvantaged and thus close the gap on opportunity. That is why Latin American countries, as discussed in earlier, should not punish students using CE and should seriously consider more liberal policies toward CE that promote egalitarian justice.

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Notes

i. For an overview see Merkel et al.,[3] Schöen-Seifert, Talbot, Opolka, and Ach,[4] and Schöen-Seifert and Talbot.[5]

ii. The fact that currently available CE drugs have been approved as safe and effective for medical uses even in pediatric populations gives credence to this assumption.

iii. According to a recent review of articles in English, Portuguese, and Spanish from four database (LILACS, PubMed, ScienceDirect, and SciELO), from between 1990 and 2012, on the use of methylphenidate among medical students, the prevalence reaches 16% with no gender difference.[43]

iv. However, anecdotal evidence and my informal (obviously statistically nonrepresentative) survey of university students of other disciplines points to the conclusion that the use of modafinil and methylphenidate is fairly common, at least during exam periods.

v. However, the fact that modafinil is the drug of choice for CE in Latin America, at least in the population of medical students, is somewhat surprising. The reasons for this could be normative (e.g., lower legal penalties) or pragmatic (e.g., fewer side effects) and should be investigated in future studies.

vi. The dominant position in the academic community is critical toward the use of CE among students.[44,45,10, 13,14,44,45]

vii. There are different egalitarian theories of justice,[46–55] and the distinction between choices and unchosen circumstances plays a central role in many of them. However, perhaps the most important contemporary theory of justice is the one offered by John Rawls. According to Rawls, society is a system based on cooperation, and the principles of justice govern the distributions of its benefits and burdens.[1,56] For reasons of space, I will focus on Rawls's principles of justice and their normative implications for enhancement in general and legitimate policy on CE in the Latin American context in particular. This is because the theory of justice formulated by John Rawls[1,20] is perhaps one of the most influential positions in contemporary political theory. Rawls's principles of justice (in its final formulation) state that (1) each person has the same indefeasible claim to a fully adequate scheme of equal basic rights and liberties, which scheme is compatible with the same scheme of liberties for all (the equal liberty principle); and (2) social and economic inequalities are to satisfy two conditions: first, they are to be attached to positions and offices open to all under conditions of fair equality of opportunity (the principle of fair equality of opportunity), and, second, they are to be of the greatest benefit to the least advantaged members of society (the difference principle).[56: 42–43]

viii. There are many different ways of understanding the contrast between luck and agency, such as the contrast between plain and option luck, circumstance and choice, and so on. Accordingly, there are many different ways to draw the line between them.[46,57–59] These are relevant discussions related to the question about what a just distribution would be, but, for reasons of space, I will not discuss this. For my normative thesis, it suffices to note that the difference between choices and unchosen circumstances is morally relevant, whatever the line between them would be, and that the circumstances that matter are social and natural ones.

ix. Rawls's theory of justice is a hybrid theory.[60] On the one hand, because of the characterization of society as a common venture for social advantages, justification of the principles of justice is based on the self-interest of individuals as society members. On the other hand, because individuals are considered free and equal with moral powers, justification is based on impartiality as a moral motivation to offer conditions of association that we can reasonably expect that others can accept. Because of the first pillar (and in line with the contractarian tradition grounded in self-interest) Rawls stipulates that, during their lives, contract members are comparatively equal.

x. Consider the example of dyslexia: a person with dyslexia would not be at a disadvantage in a hunter-gatherer community or a preindustrial agrarian society. However, in modern industrialized societies based on a knowledge economy, this person is disadvantaged.

xi. An issue at the core of the enhancement debate is the distinction between therapy and enhancement. The distinction can be made in different ways but is always expressed within a normative claim. Therefore, there are two associated issues: the conceptual issue and (if a reasonable distinction can be worked out) the normative claim related to it. The general idea seems to be that therapeutic technologies are a means to restore impaired human capacities to a normal level, whereas enhancement technologies are a means to raise human capacities above the normal level. A common normative claim is that the restorative aim is politically and morally valuable, but that the aim of enhancement is not. Think of the use of cognitive pharmaceuticals like methylphenidate or modafinil: if the individual using it is suffering from attention deficit hyperactivity disorder or narcolepsy, the aim is considered restorative and acceptable, all other things being equal. In contrast, when people use these drugs without the associated syndromes, "just" to improve cognitive abilities, it is considered enhancement and is therefore questionable. However, any appeal to standards of normality is debatable. These standards are always historically, socially, and technologically bounded, so it is reasonable to assert that the distinction as such is not meaningful.[61] A first problem is to determine which capacities or abilities are considered properly human and to determinate the criteria of necessity or sufficiency. Even then, if a class of capacities is delineated, the level of normality still has to be established. Is this the average, the best 1%, or any other arbitrary level? The only case avoiding the problem of arbitrariness would be the creation of totally new capacities of humans by enhancement mechanisms. But this is, at least at the moment, a marginal case. The distinction rests on some questionable (often naturalistic) premises about what is naturally appropriate (or normal) to a human being. A common bypass strategy is to link the distinction between restoration and enhancement to the distinction between disease and health. But because of the difficulty to provide an exact definition of "disease" and "health,"[62] this strategy reproduces similar problems as the distinction between enhancement and restoration. In his influential definition, Boorse[63–65] links "health" to statistical normal functioning for a given species. There are similar distinctions in ethical debates.[66,67,21,23] Not without reason, the claimed non-normativity of Boorse's conceptual distinction is questioned.[68] It is grounded in normative decisions about what normal human functions are. Despite these difficulties, the distinction between disease and health is productive. Everyone has some intuitive, if vague idea about this distinction, and, more importantly, about its centrality related to the allocation of scarce (medical) resources.[32]

xii. The opposite is not necessarily true: individual liberty doesn't extend necessarily to the use of these technologies. This asymmetry is based on the possible consequences of the extended use of these technologies on the liberty of other individuals. I'll examine this point in the next section.

xiii. Probably we have good reasons in the case of some nonpharmacological enhancement strategies as well, like nutrition, physical exercise, sleep, meditation, mnemonic strategies, and so on. There is some evidence that these strategies could be even more effective than pharmacological enhancement.[69]

xiv. For a similar, yet distinct, discussion about policy options in case of amphetamine, methylphenidate, and CE drugs see Dubljević.[42,70]

xv. Obviously, the social components of the "ambition" that luck-egalitarianism considers as part of an egalitarian theory[58] are outside the scope of this policy.

xvi. For an argument in favor of moderate enhancement grounded on compensation, see Gesang.[71: ch. 2]

xvii. For this line of argument against enhancement, see Sandel.[72]

xviii. These could perhaps be dealt with at lower level of regulation (e.g., university rules).

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Part 3

LAW AND POLICY OPTIONS

15

Regulating Cognitive Enhancement Technologies

Policy Options and Problems

ROBERT H. BLANK

Introduction

Rapid advances in cognitive neuroscience and converging technologies have begun to create a vigorous debate over cognitive enhancement (CE). Although there are strong opposing views over the ethics of enhancement, there is little doubt that such endeavors will proliferate in the coming decade. In a highly competitive society where the difference between winning and losing is measured in miniscule degrees, demand for any enhancement edge is inherently strong, driven by the high economic stakes of a thriving enhancement industry. Already, there is evidence of the attractiveness of such techniques by athletes, symphony orchestra members, parents, and students.[1] Moreover, we live in an era dominated by forces that create "needs" through captivating marketing of products promising a better life. Marketing of these products through the media and the Internet is already active and, absent regulation, will escalate. Despite the controversy over CE, therefore, it will be alluring to many individuals and democratic governments will be hard pressed to limit its use.

This chapter focuses on the legal/policy dimensions of CE and places enhancement techniques in a social context. Since CE is likely to become more commonplace in the near future, it will increasingly generate a range of policy issues. Importantly, since different interventions involve more or less risk to the user and vary in effectiveness, it is counterproductive to lump all potential new enhancement methods into one category.[2] The more intrusive and risky the procedure or drug, the closer the policy attention should be. There is also a need to balance the individual right to self-improvement with the numerous social costs that could arise.

Whereas enhancement technologies are in various stages of research and development and some are likely to have no real enhancement capacity, many observers stress the potential benefits of the research.[3] Meanwhile, the media tends to exaggerate the positive effects of CEs and downplay or ignore the negative effects.[4] Moreover, active marketing and publicity often promote their use long before potential deleterious effects are apparent. Because the broader policy implications are extensive and touch many areas of human existence, these techniques must be scrutinized as to their impact on the individual and society as a whole. Any such dialogue is likely to increase demands for some government involvement in enhancement techniques.[5,6]

The move of the CE issue to the policy domain alters the context by bringing to the forefront political considerations and divisions and placing the resolution of these issues in the milieu of interest group politics. With the high potential economic, social, and personal stakes involved, this is unavoidable. Intervention in the brain, including CE, is a particularly controversial policy area because of the rapid succession of advances in knowledge and the shortened lag time between basic research and application.

Although many of specific issues raised by CE are distinctive, fundamentally, the policy dimensions are similar to other areas of biomedical research. At their base, there are three relevant policy dimensions.[7] First, decisions must be made concerning the research and development of the techniques. Because a considerable proportion of this research has been funded either directly or indirectly with public funds, civilian and military, it is important that public input be included at this early stage. The growing prominence of forecasting and assessing the social as well as technical consequences of technologies early in the process represents one means of incorporating broader public interests. However, it remains problematic as to how best design assessment processes to evaluate efficacy, short- and long-term safety, and the social impact of brain interventions, especially when there is a ready market and demand for them.

The second policy dimension relates to the individual use of technologies. Although direct governmental intrusion into individual decision-making in the medical arena has been limited, governments have at their disposal an array of more or less explicit devices to encourage or discourage individual use, including tax incentives or disincentives, the provision of services, licensing, and education programs. Although conventional regulatory mechanisms might be utilized to protect potential users or targets of CE applications, it is critical that their efficacy and applicability first be determined. Despite much debate on the potential or actual ethical and social impacts of human enhancement, however, the origin of motivations leading to the desire of individuals to be enhanced or not have been poorly investigated.[8]

The third dimension of enhancement policy centers on the aggregate consequences of widespread usage. What impact might widespread CE have on

Ban or Prohibit Technology	Regulate Technology	Discourage Individual Use	Take No Action	Encourage Individual Use	Mandate Use of Technology

Figure 15.1 Types of governmental involvement in cognitive enhancement.

society? Will it aggrandize social inequalities or break down barriers? Should it be a high priority for public funding? Policy-making here requires a clear conception of goals, extensive data to predict the consequences of each possible course of action, an accurate means of monitoring these consequences, and mechanisms to cope with consequences deemed undesirable. At a minimum, the government has a responsibility of ensuring safety and quality control standards as well as consumer protection and fair market practices.

Figure 15.1 illustrates the many forms that a governmental response to CE could take from the earliest stages of research to the use of specific techniques. Enhancement policy can be permissive, affirmative, regulatory, or prohibitive. Also, a government could opt to take no action, thus allowing unfettered activity by the private sector. It can make affirmative policies that promote or encourage certain activities, for example, public funding of research or provision of services to facilitate wider use of a particular technique. The question of whether the government ought to be providing such encouragement, and, if so by what means, is debatable. Should public funds be used to pay for enhancement interventions when patients cannot afford them? Should private insurers be required to cover these expenses? Should we even distinguish among therapeutic and enhancement uses of a drug? Moreover, affirmative policies are often redistributive and thus introduce potential conflict between the negative rights of individuals to use their resources as they see fit and the positive rights of recipients of government support. Also, in some instances, the line between encouragement and coercion or mandate is easily breached.

The most obvious examples of regulation are psychoactive drugs including those used for CE.[9] Although the research and development phase of all pharmaceuticals is highly regulated by the Food and Drug Administration (FDA) in the United States, control of individual use is problematic, as is potential overuse in the aggregate. A broader regulatory approach would require assessment of the social and ethical ramifications by focusing attention on the various social processes involved in moving a technology along the different axes of regulation. Although regulatory policy might apply only to government-supported activities, it normally consists of sweeping rules governing activities in both the public and private sectors. Regulation can be used to ensure that standards of safety, efficacy, and liability are adhered to, and, unlike professional association guidelines, which can set minimum standards, regulations have the force of law and usually include legal sanctions for violations.[5] Moreover, as discussed later,

an important regulatory device is price, which can be modified through taxation or license fees. Regulation of enhancement drugs could follow an approach similar to policies on tobacco products based on a combination of taxation, bans on marketing and display, plain packaging with graphic pictures, and limits on where the products can be sold and used. Dubljevic,[10] however, doubts such an approach is well-suited to medical drugs like Ritalin (methylphenidate) and Adderall (a combination of amphetamine and dextroamphetamine) that have serious known side effects and that it would be too permissive to sell them over the counter even with sufficient warning.

Another option would be to require enhancement licenses to ensure informed consent and enable better monitoring. Dubljevic[10] suggests that a government agency such as the FDA could offer a licensing procedure to pharmaceutical companies to market enhancement drugs for healthy adults. Moreover, in order to use them, citizens would have to pay for and pass a course about known effects and side effects. Furthermore, additional medical insurance and obligatory annual medical tests would be required in order to obtain and renew a license to use them. In addition, the prices could be regulated and an additional tax imposed. According to Dubljevic,[10] such a policy could ensure that all citizens have legal access to the drugs, but the imposition of taxes, fees, and requirements of additional insurance would offset any positional advantage gained from their use. A downside with enhancement licenses is that people with low cognitive capacity who might have the most to gain from enhancements might find it difficult to get access if the license requirements were too demanding.[11]

Last, although far less common than regulation, prohibitive policies could be implemented that reduce the options available for CE. The most straightforward form is to create laws that impose criminal sanctions on a particular research activity or application. A softer type of prohibitive policy is to preclude public funding of specific areas of research and development (e.g., certain types of fetal or human embryo research) or specific enhancement services. It remains to be seen what, if any, areas of cognitive neuroscience are candidates for prohibition, but governments do have that option, as evidenced by bans on electroconvulsive therapy in some jurisdictions. These policies often reflect political motives or a response to the demands of particular interest groups.

Figure 15.2 illustrates a range of possible policy responses to CE. Many of these options have been used by various countries with regards to stem cell research, reproductive and genetic technologies, or past brain interventions. They clearly demonstrate the diversity of policy options as well as the often diametrically opposed positions on the role of the government. Given the history of policy in these related fields, there appears very little likelihood of anything approaching a consensus emerging either on the role of government in enhancement or the preferred policies regarding specific uses. Also, it should be

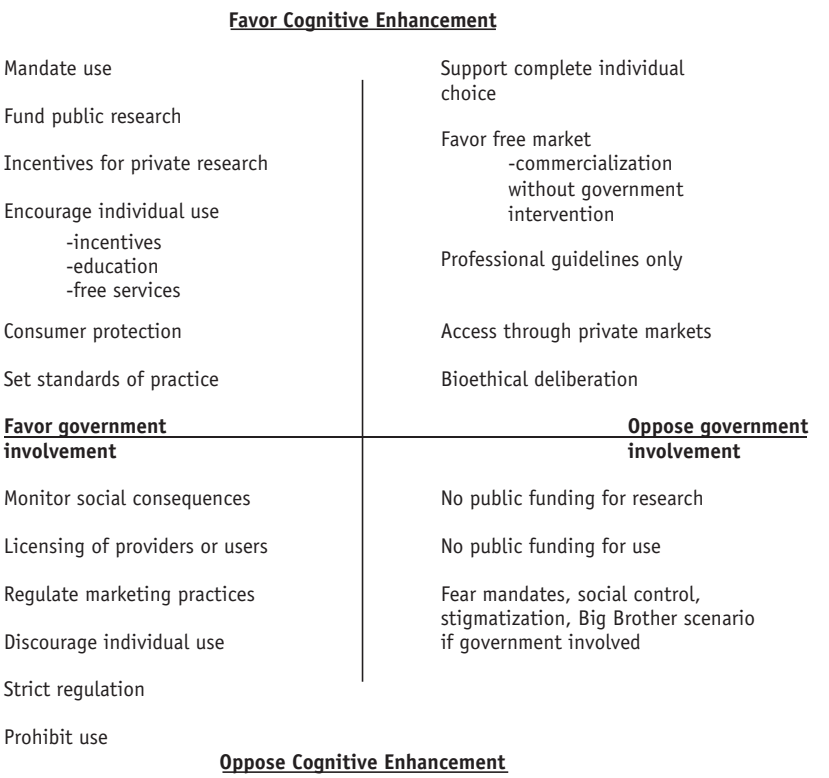

Figure 15.2 The role of government in cognitive enhancement. Source: Adapted from Blank.[7]

emphasized that policy-making, particularly in the United States, is a gradual process, not manifested in quick, decisive action, and policy on CE, like genetic and reproductive policy, is likely to come in fits and starts in a fragmented, unsystematic manner.

Throughout the policy process, governments have many mechanisms for facilitating expert input. Permanent mechanisms include the use of internal bureaucratic expertise, science advisors, offices of science and technology, and science advisory councils, whereas temporary mechanisms comprise task forces, ad hoc committees, commissions, consultants, conferences, hearings, and issues papers. Their remit can be specific to a particular application, broader in scope across the range of brain interventions, or cover a wider swathe of issues. The United Kingdom's Academy of Medical Sciences, for instance, has recommended the establishment of regulatory authorities for cognitive enhancers,[12] whereas the British Medical Association proposed a permissive system of regulation in which techniques are permitted under license from a regulatory body—the Regulatory Authority for Cognitive Enhancements.[13]

Ethical Perspectives

The Advanced Concepts Group at Sandia National Laboratory identified four perspectives on CE technologies that are useful here.[3] The *laissez-faire view* stresses the freedom of individuals to seek and use enhancement technologies based on their own judgment of potential benefit. Although the government might have a limited role in regulating the use of these technologies by funding research and ensuring the safety of new applications, the economic marketplace is the central mechanism for developing and distributing them. Regulation of particular technologies is not out of the question, but only with unequivocal evidence of harm. *Managed technological optimism* agrees that CE technologies promise great benefits to individuals and society but holds that active government participation is necessary to promote innovation, ensure efficacy and fairness, and manage risk. Because of the rapid pace of technological change, however, regulation can be an ineffective instrument of governance. Moreover, the governance of CE does not lie strictly in the domain of formal government policy-making but through interactions among government, business, and nongovernmental organizations.

Whereas the first two perspectives stress the benefits of technological enhancement, *managed technological skepticism* presumes that quality of life arises more out of a society's institutions than its technologies. Because markets are viewed as profit-driven, not quality-of-life maximizing, the government has a crucial role to play. Moreover, the potential for enhancement technologies to affect society negatively merits consideration of a range of policies such as the creation of an independent body to provide expert social impacts assessments of enhancement technologies, strong regulation and oversight of human subjects research on enhancement, and close oversight of FDA phase II and III clinical trials.[3] The last perspective, *human essentialism*, starts with the notion of a human essence (God-given or evolutionary in origin) that should not be modified because this could destabilize individual quality of life and social relations in unforeseeable ways. The role of government is to restrict enhancement research and its use when it threatens these essential human qualities. Part of the essentialist policy agenda would be to develop a process that drew lines between appropriate and unacceptable enhancement technologies. At the extreme, the government could prohibit specific, or potentially all, enhancement techniques.

Each of these perspectives encompasses a distinctive combination of values and preferred policy decisions. Furthermore, they are all subject to ethical uncertainty created by the unknown future directions, pace, and outcomes of CE itself. Therefore, although highly exploratory at this time, a vigorous dialogue among these competing perspectives offers an opportunity for a

prospective and adaptive governance of enhancement technologies instead of a retrospective crisis response after they are widely diffused. However, the gap between the rapid rate of advance of enhancement technologies and slow development of the legal, social, and economic frameworks poses significant challenges for policy makers.[14]

A rational, evidence-based policy informed by a wide array of relevant experts and stakeholders is needed. Greely et al.[15] propose four types of policy mechanisms. They include (1) an accelerated program of research to build a knowledge base concerning the usage, benefits, and associated risks of CE by healthy individuals; (2) professional guidelines for those who have a role in dispensing, using, or working with people who use cognitive enhancers; (3) public education provided by physicians, teachers, and others to increase understanding of CE; and (4) new or amended laws and regulations to take account of emerging social norms and information about safety and risk. The remainder of this chapter focuses on the last of these areas—laws and regulations—and contends that how the issues are framed depends on which of these listed perspectives one brings to the table.

Policy Issues in Cognitive Enhancement

Although the line between enhancement and therapy is often indistinct, many applications are clearly aimed to enhance human traits or performance rather than treat disease or promote health.[16] According to Singh,[17] enhancement interventions are those that improve human performance, appearance, and/or behavior where such improvement is not medically warranted. They also have been termed *cosmetic neurology*, "the practice of intervening to improve cognition and affect in healthy individuals."[18] De Jongh et al.[19] distinguish among (1) cognition-enhancing drugs used to improve short- and long-term memory or executive functioning that manages other cognitive processes, (2) drugs that enhance mood and pro-social behavior, and (3) drugs that prevent the consolidation or reconsolidation of unwanted (traumatic) memories. The focus here is on the first dimension.

Most attention in CE today is directed at nootropics, or "smart pills," that act on the central nervous system to enhance the cognitive performance by improving memory, concentration, perception, attention, judgment, motivation, and/or orientation. Despite considerable variation in chemical composition and in the mechanisms by which they act, a common characteristic of nootropic drugs is their activity on higher integrative brain functions.[19] They are thought to work by altering the availability of the brain's supply of neurotransmitters, enzymes, and hormones, improving the brain's oxygen supply

or stimulating nerve growth. Although the initial research on these drugs was designed to treat patients with dementias or other diseases, increasingly, they are being touted as means of boosting the cognitive abilities of healthy persons.[18] Despite the lack of clear scientific evidence that they enhance normal persons, a "smart drug" industry is flourishing, and the appeal of a technological short-cut to learning is prevalent.[19]

Recently, an editorial in *Nature* sparked a heated debate by asserting that the use of smart drugs was not cheating, as claimed by the opponents, and arguing that their use represented a "pursuit of personal liberty" to reach one's full potential.[20] Following this theme, a group of scientists and ethicists concluded that healthy people should have the right to use nootropics and that society should welcome, not discourage, new methods of improving brain function.[15] Although they suggested a number of cautions and called for more research about the unknown risks of the drugs, they declared that enhancing with pills is no more objectionable than eating right or getting a good sleep. Similarly, the popular media has displayed often unabashed support for cognitive-enhancing drugs, whereas the Internet offers thousands of sites that promise significant benefits and immediate shipment, often without prescription.

Bostrom and Sandberg[11] contend that "conventional" means of CE such as education and mental training, improved general health and sleep, herbal extracts, caffeine, and energy drinks are largely accepted by society, whereas "unconventional" methods such as drugs and brain stimulation tend to evoke moral outrage, even though the line between them is problematic. They argue that whereas these interventions have immense potential benefits for enhancing memory and other intellectual faculties, they currently face regulatory roadblocks. From their standpoint, the problem is that the current regulatory and policy framework treats these different modes of enhancement differently with little justification for doing so. Similarly, some argue for a "radical revision" of drug policies that currently prohibit off-label use beyond their prescription-only status to make cognition-enhancing drugs widely available.[21] Among the most extreme proponents of enhancement are transhumanists who favor fundamentally improving the human condition by developing and making widely available technologies to produce better memory, greater intellectual capacities, and improved decision-making.[22]

In contrast to these proponents, a number of worries about CE have been raised that include potential safety problems with the long-term use of drugs in healthy individuals; the possibility of direct or indirect coercion to take enhancement drugs; the social justice concern that access will not be distributed equally, thereby excluding some social groups from the benefits they offer; and that the use of enhancement poses a threat to social values by undermining the worth and dignity of hard work.[23] Often, opposition is framed in terms

of a slippery slope argument.[24] In general, the concerns of the opponents can be classified into two broad categories: concerns about the harms that may be experienced by those who use the enhancement technologies and concerns about the adverse social impacts of the widespread use and societal embrace of enhancement technologies.[25]

According to Sahakian and Morein-Zamir,[26] we should not be complacent about the harms that may result, particularly with long-term use of enhancements. Although there are potential adverse reactions to many therapeutic drugs, these harms are usually balanced by the relief afforded from the symptoms of the disease. However, when given to healthy individuals, the tradeoff of the adverse effects with the uncertain benefits of enhancement are confused. "Our brain is of such complexity and its neurotransmitter systems are so strongly interlaced that turning a small screw in one system generates unpredictable effects in all other systems with corresponding consequences for behavior."[27] Critics also warn that the drugs have not been tested for off-label uses and that some could be addictive.[28]

Concerns also are raised about the societal implications of widespread use of enhancement technologies. The first is that inequities in access to CE technologies will exacerbate social inequality by adding to the advantages of elites. According to Chatterjee,[18] in modern competitive societies, the social and cultural pressures to secure all the latest enhancements for one's children and oneself will benefit the already best off. For Bostrom and Sandberg,[11] however, this would depend on whether CEs are expensive or cheap. Moreover, if it turns out to be easier to enhance individuals at the low end of the performance spectrum than those at the high end whose brains are already functioning close to their biological limit, the talent gap could even decrease.[27] In the end, public policy and regulations can either contribute to inequality by driving up prices, limiting access and creating black markets, or reduce inequality by supporting broad development, competition, and subsidized access for disadvantaged groups.

Especially troublesome issues when enhancement is used on children include the fiduciary responsibility of physicians to children, the special integrity of the doctor–child–parent relationship, the vulnerability of children to various forms of coercion, distributive justice in school settings, and the moral obligation of physicians to prevent misuse of medication. Given these concerns, an Ethics, Law, and Humanities Committee position paper concluded that prescribing stimulants for enhancement without a diagnosis of a neurologic disorder is unjustified in legally and developmentally nonautonomous children and inadvisable for near-autonomous adolescents.[29] Not surprisingly, pediatric enhancement appears to be increasing in parallel to the rising rates of attention deficit disorder (ADD) diagnoses and stimulant medication prescriptions and the opportunities for medication diversion.

A related concern about the social impacts of enhancement technologies is that their widespread use will raise the standards for what counts as normalcy and force an arms race in the use of enhancement technologies, one in which individuals are pressured into using enhancement technologies as a way of "keeping up with the Joneses." Furthermore, it could increase discrimination against the disabled and people with medical conditions who decline to be enhanced.[30] It is also possible that children are compelled to take drugs either by their parents or through peer pressure.[9] Carrying this concern further, Martin and Ashcroft[31] argue that we should move with caution in enhancement because it could imply that some people have less intrinsic human worth than others. Eliminating certain characteristics or increasing specific capacities could imply that some people—the smarter, stronger, more competitive ones—are of greater intrinsic worth than others.

Another issue surrounding enhancement is that it is a form of cheating against others who do not use it or cheating against oneself because it does not represent natural achievement.[9] Moreover, one's perception of one's self could change as we become mechanistic beings no longer able to take credit for our achievements, and virtues such as motivation and working hard could become outdated.[26] Capps sees unrestricted choice as leading to societal problems: "The exclusivity of choice, and an uncritical deployment of enhancement as an unequivocal good, underplay the role of a social and political community, and leave one unable to discriminate between, and solve, conflicting ideas of 'good.'"[21]

A final issue involves the efficacy of enhancement techniques. In their meta-analysis, Repantis et al.[12] show that current expectations exceed the enhancement capacity of these drugs. Moreover, as de Jongh et al.[19] note, there are a number of caveats in the development and use of neuroenhancers. First, according to the inverse U-function principle, enhancement is only possible as long as we do not have an optimal level of arousal, vigilance, or neurotransmitter concentration. Thus, an already optimally tuned brain can hardly be enhanced, and, given that usually our brains already perform to the best of their ability, general enhancement for most people is limited.[27] Second, doses most effective in facilitating one behavior could simultaneously exert null or even detrimental effects on other cognitive domains.

Because of the complexity of the brain, it is unlikely that we will be able to overcome tradeoffs between enhancement and concurrent impairment by drugs. In addition to the collateral adverse effects on cognitive functions, the available substances have many psychiatric and somatic side effects that make them unsuitable for use in healthy humans. Coors and Hunter[32] contend that the desire for enhancement by a public ill-equipped to understand the detail of any proposed intervention, coupled with the vast financial incentives of its promoters, have the potential to lead to grievous and potentially irremediable

harms. Trachtman,[33] however, dismisses the argument that there will be a huge demand for CE: "There will always be people in search for the quick fix to treat obesity, prevent dementia, or win an Olympic medal but it is contrary to experience to think that everyone will line up for each new enhancement opportunity."

Assessing Enhancement Techniques

Although all potential enhancement techniques elicit similar broad policy concerns, they differ widely in efficacy, potential usage, and risk. Not all conceivable CE methods are equal, particularly the more risky direct interventions such as deep brain stimulation. Different kinds of enhancements pose different social challenges. Although logic would suggest that the more intrusive and potentially dangerous and costly medical interventions require more intense scrutiny and regulation than widely vetted drugs, for example, in the United States at least, the mechanisms for controlling medical procedures are less demanding than for pharmaceuticals. After briefly describing selected CE methods and evidence of their efficacy and risks, suggested regulatory approaches are presented.

Modafinil was first approved for the treatment of narcolepsy and is also prescribed off-label for neuropsychiatric and medical conditions involving fatigue as well as for healthy people who need to stay alert and awake when sleep deprived. In aggregated studies, modafinil was found to improve attention for well-rested individuals while maintaining wakefulness, memory, and executive functions. Repeated doses were unable to prevent deterioration of cognitive performance over longer periods of sleep deprivation although they did maintain wakefulness and perhaps induced overconfidence in cognitive performance.[12] Given the heightened work pressures in a modern society to disregard biological rhythms, it is not surprising that modafinil has gained popularity as a cognitive enhancer. Moreover, there is no significant evidence of risk for its use, and it is not addictive.

As noted earlier methylphenidate (Ritalin) is already used on college campuses and elsewhere as a cognitive enhancer. However, in their meta-analysis of the literature on methylphenidate, Repantis et al.[12] were unable to find sufficient evidence of positive effects in healthy individuals from objective tests. Because it is the subjective effects that motivate people to take a drug like Ritalin, not the objective results of neuropsychological assessments, those who use it for enhancement may not be influenced by the fact that there is scant evidence that it works. Although Ritalin appears less risky than other candidates, it does carry the risk of heart problems and dependency that need to be addressed if it is to be safely used for enhancement. Moreover, safety of long-term use is unclear.

Amphetamines are a distinct class of drugs that increase activity related to dopamine and norepinephrine in the brain, thus increasing alertness, wakefulness, and awareness. They have been shown to increase executive functions in most healthy normal people, improving their ability to focus, manipulate information in working memory, and control their responses. Although amphetamines are used medically to treat attention deficit hyperactivity disorder (ADHD), as well as obesity and narcolepsy, they are particularly liable to abuse and addiction and can cause serious cardiovascular adverse events. The most immediate adverse effect is an increase in blood pressure, which could be dangerous to individuals who suffer from high blood pressure and may even cause sudden death.[10] Despite these considerable risks, Adderall (which contains a combination of amphetamine and dextroamphetamine) is one of the most commonly used drugs for CE.

Another application involves *beta-blocking* drugs, such as propranolol, that were designed to treat cardiac arrhythmias and hypertension and to prevent sudden death after myocardial infarction. Beta-blocking drugs compete with adrenaline-like chemicals produced by the sympathetic nervous system that attach to beta-adrenergic receptor sites when the body is under stress. By occupying the receptor sites, they block these physiological responses, thus reducing the symptoms of anxiety. They also appear to alleviate post-traumatic symptoms by curtailing disturbing memories.[24] Beta-blockers are prescribed to relieve clinically diagnosed anxiety, but are also reported to be widely used by musicians and competition shooters to dampen physiological tremors in order to improve or enable performance. Other users of propranolol could include surgeons, students, and soldiers.[18] Although not addictive, beta-blockers can significantly worsen some medical conditions and, thus, some psychiatrists feel that beta-blockers ought only to be used only as a temporary measure in the context of psychological intervention.

Whereas most attention to date has focused on nootropics, some have suggested that direct physical interventions such as *deep brain stimulation* (DBS) be used to enhance cognitive abilities.[34,35] A highly optimistic article titled "Brain Electrodes Can Improve Learning,"[36] led to an "enthusiastic media shock wave . . . replicated on an international scale," promoting public acceptance of DBS for enhancement without addressing ethical issues.[37] Although Synofzik and Schlaepfer[38] contend that the widespread use of DBS for enhancement purposes is highly premature, they envision a potential future use. However, in their study of the attitudes of neurosurgical staffs toward its uses, Mendelsohn et al.[39] found little support for using DBS for CE, with most respondents finding physical alteration of nonpathological traits objectionable. This is crucial since, unlike drugs, professionals must directly do the enhancing.[40] A main concern is that while DBS is a relatively safe surgical procedure, complications may include bleeding in the brain, stroke, infections, and heart problems.

Moreover, side effects associated with DBS are seizures, headaches, insomnia, memory problems, and mood changes such as mania and depression.[41]

In research originally funded by the US Defense Advanced Research Projects Agency, scientists found that *transcranial direct current stimulation* (tDCS), a stimulation technique utilizing electrodes placed outside the head to direct tiny painless currents across the brain, could heighten learning.[42] It is assumed that the currents increase neuroplasticity, making it easier for neurons to fire and form the connections that enable learning. Reis et al.[43] found that tDCS can improve the ability to learn a simple coordination exercise, with the improvement still apparent 3 months later. With this yet sparse evidence, one entrepreneur plans to develop and market the "thinking cap," a tDCS device to improve creativity.[44] Advantages of tDCS are ease of use, low cost, portability, and safe, potent effects.[45] Not surprisingly, there remains skepticism, with some calling it a fad, the latest in a long series of "neuro-myths" that arise when scientists distort or embellish research findings.[46] Although all current evidence suggests that tDCS is extremely safe and that adverse effects are mild and transient, not much is known about the chronic effects of either magnetic or electrical brain stimulation.[47]

Similarly, *transcranial magnetic stimulation* (TMS) can increase or decrease the excitability of the cortex, thereby changing its level of plasticity. Although TMS appears to be quite versatile and minimally invasive, there are risks of triggering epileptic seizures, and, as noted earlier, the effects of long-term use are unknown. Thus, it remains doubtful whether TMS will ever be a practically useful enhancement method, although this does not mean it won't be tried unless regulations are in place to prevent it.

The most dramatic proposed CEs are *brain–computer interfaces* (BCIs). Development is rapid, both on the hardware side, where multielectrode recordings from more than 300 electrodes permanently implanted in the brain have been used, and on the software side, with computers programmed to interpret the signals and commands.[11] Hildt[48] points out that the use of brain implants or brain–computer interfaces challenge our notions of human nature and of how far human functions can be substituted for or enhanced by technical devices. Similarly, Robert[49] argues that whereas self-improvement is a noble aim, there is a "dramatic and morally important difference between self-improvement through drugs and neural implants and other forms of enhancement." Moreover, at this early stage, any enhancement applications are highly conjectural at best.

Framing Cognitive Enhancement Policy

Obviously, one's stand on the four ethical frameworks just discussed will impact directly on their acceptance or rejection of various enhancement policies and

on the type of government activities, if any, they support from Figure 15.2. For those with a laissez faire approach, the trump card is held by each user, and permissive/encouraging social policies, if any, are favored. Managed technological optimism and skepticism advocates accept varying degrees of intervention to protect individual users and the broader society, with the former oriented toward "encouraging" policies and the latter toward "discouraging" and regulatory policies. In contrast, human essentialists of assorted persuasions are likely to back constraints on CE, including prohibitive policies. Whatever one's perspective, however, there is little controversy that, at a minimum, safety, efficacy, and curtailing risk are critical.

According to the Nuffield Council on Bioethics, requiring evidence of the benefits of any new technology, particularly in the clinical domain, is common to assessment of its overall permissibility. However, whereas the risks and side effects of enhancement techniques can be assessed similarly to their clinical applications, it is less clear how their benefits should be measured. Unlike clinical interventions, the benefits of enhancement technologies are idiosyncratic and dependent on the goals, values, and circumstances of the person. Although still vital that potential consumers are thoroughly informed about the risks and efficacy of enhancement products, the valuation of benefits and the weight they are given are best made by the consumer.[50] Therefore, the current medical risk system that compares treatment risk with the expected benefit of reduced morbidity risk from successful treatment is risk-averse for enhancement. Bostrom and Sandberg[11] note that cosmetic surgery offers a precedent for a risk model in which patient autonomy overrides at least minor medical risks even when the procedure does not reduce or prevent morbidity.

Similarly, Bostrom and Sandberg[11] contend that the current system of licensing drugs is an obstacle for enhancement because drug companies are unlikely to get regulatory approval for a drug designed solely to improve cognitive functioning in the healthy population. To date, every drug offering a CE effect was developed to treat a specific medical condition, with the enhancing effects of these drugs emerging as serendipitous benefits. If drug companies could develop nootropics directly rather than having to proceed indirectly by demonstrating that the drugs are efficacious in treating some recognized disease, progress would accelerate. Moreover, the disease-focused medical model medicalizes many conditions that were previously regarded as part of the normal human spectrum, often meaning that in order to legally obtain a drug the person must be first labeled with a disease. One result of this apparent inconsistency is that while Major League Baseball infielder Miguel Tejada received a 105-game suspension for testing positive for Adderall under its amphetamine policy, 116 players received "therapeutic-use exemptions" granted by the League's medical staff for players diagnosed

with ADHD, thereby allowing them to use the identical substance without repercussions.[51] For Singh et al.[52] globalization of ADHD and the rise of CE have raised fresh concerns about the validity of ADHD diagnosis and the ethics of stimulant drug treatment.

As noted earlier, the role of professional medical associations and medical practitioners is pivotal to all types of CE, especially physical interventions. Miller and Brody[53] argue that the distinction between treatment and enhancement is relevant to the ethical consideration of professional integrity. They suggest two principles for justifying or prohibiting clinical involvement from this perspective. First, the more clearly an enhancement can be understood as serving a legitimate medical goal, the more easily it can be justified. Second, the greater the risks involved in the enhancement intervention, the more difficult it is to justify it in the absence of a clear health rationale (also, Forlini et al.[54]). On these grounds, the risk of permitting drugs like methylphenidates and amphetamines as legally available commodities for the healthy population are questionable. Given their effects on the dopaminergic pathways in the human central nervous system, they have considerable side effects ranging from drowsiness and insomnia to addiction, increased blood pressure, serious cardiovascular problems, and even sudden death. Although methylphenidates appear safer than amphetamines, Ritalin has been linked to both physiological and social harms. On these grounds, LaBuzetta[55] suggests we must look for other forms of enhancement drugs.

Table 15.1 illustrates an approach to examining each conceivable CE technique as to safety, risk, and efficacy for the individual. Although it is highly provisional and open to dispute over the details, it illustrates that each proposed enhancement method requires unique policy analysis. Importantly, it does not address the broader social concerns that were raised earlier, which must be dealt with through mechanisms such as national committees or commissions or through studies like that conducted by the Office of Technology Assessment at the German Bundestag.[2] Also, the table assumes a managed technological skepticism perspective that errs on the side of caution before countenancing the use of these drugs/procedures for enhancement purposes. As suggested by Table 15.1, most techniques require substantially more focused research to assess the safety, efficacy, and advisability of allowing individuals access to these techniques for CE.

Therefore, although drugs such as Ritalin, Adderall, and modafinil are legal, there are issues surrounding their use, supplier authorization, and possession that must be addressed before they are widely available for enhancement. For instance, if allowed, should cognitive-enhancing drugs be purchased by prescription only or with over-the-counter availability? If not by prescription, are there any controls over how much of each substance an individual is allowed to have in his possession? It should be noted, however, that whatever policies are

Table 15.1 **Comparison of Cognitive Enhancement Techniques**

	Efficacy	*Risk/Safety*	*Provisional Policy*
Modafinil	Evidence of effectiveness	Low risk with responsible use	Allow prescribed enhancement use with controls
Methylphenidate	Mixed evidence	Risk of abuse and dependency, long-term effects unclear	Discourage use. Regulate closely, more research
Amphetamines	Mixed evidence	Commonly used but high risk of dependency, heart issues and abuse	Prohibit enhancement use at this time, more research
Beta-Blockers	Evidence of effectiveness	Low risk with responsible use	Allow prescribed enhancement use with controls
tDCS	Mixed evidence	Relatively safe procedure but long-term consequences unclear	Licensed use, more research on long-term safety
TMS	Possible effectiveness	Some risk of seizures and long-term consequences unclear	Regulate closely, more research on long-term safety
DBS	Mixed evidence	Possible major side effects and risk of complications	Prohibit based on risk grounds, more research on safety and long-term effects
BCI	Unknown	Very early stage of development but relatively invasive procedure with risks similar to DBS	Prohibit use but allow research on potential enhancement uses

BCI, brain–computer interface; DBS, deep brain stimulation; tDCS, transcranial direct current stimulation; TMS, transcranial magnetic stimulation.

adopted regarding enhancement uses of these drugs, their pervasive availability, along with potentially unsafe black-market versions, is bound to expand with a growing user demand. Therefore, regulating the marketing and distribution of both drugs and procedures is critical in protecting the public's health. Although public funds should not be allocated for enhancement purposes at this time, in the litigious United States, it is only a matter of time before lawsuits are filed for access to public-funded enhancement services.

Conclusion

All governments have a broad range of powers that could be applied to specific emerging techniques and drugs that have potential CE uses. Although, to date, most attention has focused on the scientific and ethical dimensions of enhancement, not public policy, this is likely to change as the policy implications for individuals and societies are crystalized. Moreover, as the issue of enhancement becomes more salient, various groups are likely push for government involvement to further their own interests and perspectives. As discussed earlier, the form of government response potentially could range from mandating to prohibiting particular research or applications, although it is more apt to take more nuanced regulatory forms. Although it is too early to speculate how divisive the issues surrounding CE ultimately will become and how they will reach the policy agenda, this chapter demonstrates that it is crucial that the safety, efficacy, and risk components of the various techniques be clarified *before* widespread use. Moreover, it is essential that an expanded dialogue include assessments of longer term ramifications for society that address the broader ethical concerns discussed herein.

As the policy issues surrounding CE unfold, one must look toward smaller more homogenous countries such as Denmark or New Zealand or highly centralized political systems such as Britain for workable regulatory frameworks. Given the fragmented US system wherein constitutional rights could likely negate controls over individual use, it is doubtful that any anticipatory policy initiatives in CE will be forthcoming. Moreover, countries with strong egalitarian roots might decide that the ethical challenges raised by CE warrant strict regulation, whereas others may be more permissive or encouraging.[3] It is also possible that, just as individuals might feel pressured into participating in enhancement to avoid discrimination, so might some countries decide that they need to aggressively pursue enhancement technologies to gain competitive advantages in the global economy.

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16

Enhancing with Modafinil

Benefiting or Harming Society?

VELJKO DUBLJEVIĆ

Modafinil (e.g., Provigil), has generated a lot of attention in the academia and the media because empirical evidence indicates that it can offer enhancement of cognitive function to healthy adults.[1] This drug is especially interesting because it is dissimilar to other stimulants in several important respects. First, modafinil might offer "performance enhancement" as well as "performance maintenance." Performance enhancement means that healthy adults could use this drug to achieve significantly better results, whereas performance maintenance means that normal levels of functioning could be maintained while effects of fatigue and sleep deprivation could be reduced. Second, unlike the cases of older stimulants—methylphenidate and amphetamine[2]—modafinil is not mentioned in relevant international treaties, and so an international framework for regulation is not in place. The regulation of modafinil seems to be arbitrary and haphazard, differing significantly from country to country. The third important difference is that modafinil was designated as an "orphan drug" because the prevalence of narcolepsy—the condition for which it was first approved—is very low.[3] Thus, the producers of modafinil have benefited from government incentives.[i] However, its off-label use has been on the rise, along with the profits—the global market share of modafinil is more than US$700 million per year.[4] This increase could be due to increased public perception of enhancement effects, which the manufacturer has been allegedly advertising illegally.[5] Finally, there is not enough reliable data on its exact mechanisms of action.[6] The potential for abuse seems to be low;[7] however,[8–9] long term consequences of use by healthy adults are unknown.

Even though there are articles discussing the promises and perils of modafinil,[10–11] there is no sustained discussion of physiological, social, and regulatory aspects from a comparative neuroethical perspective. This chapter tries to address these issues in the hope of facilitating an informed discussion

toward legitimate public policy that would avoid falling into the trap of common extremes—hype and hope, and gloom and doom.

What Is Modafinil?

Modafinil, which is mostly known under the brand name Provigil, is used around the world as a medical treatment for narcolepsy, disorders of breathing during sleep (sleep apnea), and in the treatment of sleep disorders resulting from shift work.[12] A recent review of available studies has shown that non–sleep deprived volunteers may also benefit in the domains of working memory, visual recognition, planning performance, and executive inhibitory control.[1] The benefits of modafinil, along with its apparent lack of obvious toxic effects or abuse liability, seem to have led to considerable "off-label" and enhancement use in the educational context,[13–14] in addition to its use in military settings, most notably in the United States.[15–16] Furthermore, there appears to be mounting anecdotal evidence about increased use in the work context, especially in cognitively demanding jobs.[17]

Modafinil first became controversial when the pharmaceutical corporation Cephalon (the holder of orphan drug monopoly on modafinil at the time) started promoting its use for conditions that the drug was not approved for under the US Food and Drug Administration (FDA) regulations, such as general "excessive sleepiness."[10] At first, Provigil was approved to treat narcolepsy, but the label was then expanded to include treatment of sleep apnea and shift work sleep disorder. From 2001 through 2006, Cephalon allegedly promoted Provigil as a nonstimulant drug for the treatment of sleepiness, tiredness, decreased activity, lack of energy, and fatigue. In 2002, the FDA sent Cephalon a letter, warning the company to cease and desist promoting Provigil off-label. Cephalon apparently ignored this warning and continued to undertake its promotional practices via a variety of techniques, such as training its sales force to disregard or downplay restrictions of the FDA-approved label. The effectiveness of these promotional strategies can be seen in the steady rise in the number of patients filling prescriptions for on- and off-label uses of Provigil—not only has the percentage of off-label prescriptions reached 90%,[10] but the trend of increase is mounting yearly in absolute numbers.[3] Be that as it may, the activities of Cephalon resulted in a lawsuit that was settled in 2008 for US$425 million.[5]

The potential for biased conclusions in the issue of modafinil regulation for healthy adults needs to be taken into account. Because the pharma-industry obviously has a vested interest in loosening the regulation, the dangers of enhancement use by healthy adults should be carefully analyzed and studies confirmed by independent research teams before permissive public policies

are officially adopted. However, by most accounts, the short-term benefits and cost-effectiveness of modafinil for treatment of narcolepsy is well established. Unlike older stimulants like amphetamine, modafinil poses only modest short-term risks. Indeed, the empirical studies, conducted on healthy adults for the military, recommend replacement of amphetamine with modafinil and its use in combat missions.[15–16] Furthermore, the toxicity of modafinil is very low. This is evidenced by the fact that doses of up to 1,400 mg/d have not produced significant detrimental effects in patients, and although blood pressure was found to be elevated in elderly persons receiving 1,000 mg/d, these effects were not clinically significant.[16] Moreover, the risk of mortality associated with modafinil overdose seems to be close to nil as suggested by the report by Bastuji and Jouvet in 1988.[18] Namely, a female hypersomniac who attempted suicide via the acute ingestion of 4,500 mg modafinil (45 times the usual single dose) suffered only tachycardia and 24 hours of nervousness, nausea, and insomnia prior to a full recovery.

But what exactly does modafinil do? How does it relate to other stimulants?

It is useful to compare modafinil to methylphenidate and amphetamine in various respects—physiological, social, and legal—in order to gain an insight into an appropriate public policy regarding its use by the healthy.

Physiological Aspects of Modafinil Use

Older stimulants like amphetamine (e.g., Adderall) and methylphenidate (e.g., Ritalin) have a clear mechanism of action. It is well known that they affect the dopamine (DA) and noradrenalin (NA) receptors in the central nervous system. Methylphenidate inhibits reuptake of DA and NA, whereas amphetamine also inhibits monoamine oxidase (MAO) enzymes, which are vital to inactivation and breakdown of monoaminergic neurotransmitters (such as DA and NA, but also serotonin and a whole range of trace amines) and also *reverses* the DA transporter action. Consequently, amphetamine is much more effective as a stimulant because, apart from the prolonged presence of already available DA and NA in the synaptic cleft, it causes additional release (in high quantity) of these neurotransmitters.[2] This additional release can create rapid effects (the so-called rush), euphoric effects (so-called high), and psychiatric adverse events and a decrease in mood and energy (the so-called crash) after the initial effects wear off.[2]

Contrary to the relatively clear neurobiological picture of older stimulants, the exact molecular mechanism of modafinil's action is unclear, and there are several possible explanations for its effects.[13] Modafinil is thought to alter the balance of major inhibitory (gamma-aminobutyric acid; GABA) and excitatory (glutamate) neurotransmitters, leading to a cascade of neurophysiological

events, including the release of both histamine and orexin.[12] Also, stimulation effects of modafinil may be related to its weak DA reuptake inhibition properties, which means that it also amplifies spontaneously released DA and NA in the brain, and this makes its danger profile similar to that of methylphenidate. Although modafinil is a weak DA reuptake inhibitor, concentrations of the drug achieved after oral dosing are quite high and sufficient to have a substantial action on DA reuptake, which might explain the rare occasions of psychosis and mania connected with its use.[19–20] Enhancement of extracellular serotonin levels and serotonin neurotransmission is another possible molecular mechanism of its action.[20] All in all, the mechanisms underlying modafinil's neuromodulatory effects are complex and somewhat different from older stimulant drugs such as methylphenidate and amphetamine, potentially incorporating extracellular and intracellular effects.[6] Furthermore, they seem to focus on hypothalamus-based wakefulness circuits rather than overall brain activation.[12]

Whatever the exact mechanism of action may be, because decrease in GABA, increase in glutamate, and modulation of histamine and orexin are important for arousal, and even indirect action on DA and NA influences attention and vigilance, modafinil can produce the effect of higher neural activation and a state of heightened concentration along with decreasing the effects of fatigue.

Just how effective modafinil is can be seen in Table 16.1.

The wakefulness-promoting properties of modafinil are different from those of traditional stimulants. Namely, subjects on modafinil have demonstrated the ability to stay awake for periods of up to 64 hours with little decline in their level of performance.[10,15,16] Estrada and colleagues have summed up the available data from military studies on healthy adults and report that three daily doses of 200 mg (given at 23:00, 03:00, and 07:00 during a 40-hour period of continuous wakefulness) maintained flight performance at rested levels and attenuated the effects of 40 hours of continuous wakefulness on fatigue, confusion, and physiological arousal.[16] No adverse behavioral effects were noted; however, vertigo, nausea, and dizziness were reported as side

Table 16.1 **Effectiveness of modafinil in randomized control trials (RCT) on healthy adults**

Substance/ Dosage	*Number of RTCs*	*Number of participants*	*Age*	*Fatigue*	*Vigilance/ Attention*	*Reaction Times*	*Memory*	*Subjective assessment*
Modafinil/ 100–400 mg	6	218	19–67	0/–	+	– –	0/+	0/+

Legend: 0, no effect; +, weak increase; – weak decrease; – –, moderate decrease. Adapted from information available.[54: 854]

effects by the majority of subjects. Although amphetamine has similar effects on performance during prolonged periods of sleep deprivation, it causes "sleep rebound"—the need to "make up" for lost hours of sleep. Apparently, this occurs at a drastically lower level with modafinil.[10,12,21] Moreover, unlike amphetamine, modafinil does not create rapid effects ("rush"), euphoric effects ("high"), or a subsequent decrease in mood and energy ("crash").[ii]

This makes modafinil much less likely to cause addiction.[7,10] However, addiction cannot be entirely excluded[8–9] even though no cases of modafinil addiction have been reported to date,[22] and psychiatric adverse events related to its use have been reported in a few cases.[19–20] Also, unlike methylphenidate and amphetamine, modafinil is much less likely to cause serious cardiovascular adverse events.[23]

Apart from vertigo, nausea, dizziness, insomnia, and lowering of effectiveness of hormonal contraceptives, modafinil can cause epidermic reactions and negatively influence the immune system.[22] Indeed, the long-term effects of modafinil are unknown, but the wakefulness-promoting properties of modafinil may also be related to corticotrophin-releasing hormone (or "stress" hormone): serum C-reactive protein level (which indicates the inflammation level of an individual) tends to be increased after a single dose of modafinil.[22] This all points to the conclusion that long-term consequences of modafinil use need to be carefully assessed and compared to the short-term benefits.

Furthermore, physiological effects of long-term use and the social effects of widespread use need to be taken into account before any conclusion on the cost–benefit ratio of enhancement use of modafinil is reached. Even though the exact impact of "performance augmentation" effects of modafinil might be unclear,[iii] the "performance maintenance" effects alone could have drastic social impact, to which I turn now. A tentative conclusion of this section is that regulatory models that could provide the missing information on long-term effects would be most normatively and empirically sound, even if their preliminary assumptions turn out to be incorrect in the long run.

Social Aspects of Modafinil Use

In the literature on cognitive enhancement (CE), many authors warn about the problem of indirect coercion to enhance.[24–25] In certain parts of society, there is some evidence that this problem may well be on the rise.[26–27,iv] However, some authors are concerned that CE might have effects in many or all parts of society. George Khushf,[28–29] for example, thinks that the so-called second-stage enhancements (defined as offering radical increases that could not be studied and quantified) will have profound influence through the pressure to enhance in education, the military, and the economy. Whether or not modafinil can be

seen as a "second-stage" enhancement or not is an open question, but there is increasing evidence that modafinil is very likely to be widely used in education,[27,30–32] the military,[10,15,16,22] and business.[17,33] There have been some recent attempts to give more substance to claims about its social impact by offering examples from branches of the economy that are rarely linked with CE in the literature. Namely, in a seminal paper, Appel[34] examined the pressure to enhance in complex jobs in order to explore the social aspects of CE drug use. Drawing on Appel,[34] Dubljević[35–36] offered the "truckers on modafinil" example that is supposed to illustrate the profound dangers of allowing corporate actors to pursue positional advantage without regulation even if CE might provide only "performance maintenance."[v]

Rational choice modeling[37] has been used to confirm these intuitive examples, and anecdotal evidence,[17,33] as well as the appearance of Internet sites that offer modafinil without prescription[vi] and even video tutorials that teach people how to obtain it,[vii] seems to provide additional corroboration. Furthermore, given the fact that there is some evidence that amphetamine was used extensively by truck drivers in Australia for the same purpose,[38] the "truckers on modafinil" example has face validity. Whatever the merits of these claims are, they seem to have attracted the attention of relevant policy makers. For example, the Science and Technology Options Assessment study for the European Parliament on human enhancement explicitly warns about "second-stage" enhancements and their potential to produce society-wide harms through indirect coercion.[39] More recently, the impact of CE technologies on the economy and working conditions in the United Kingdom has been addressed by the joint report of the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering, and the Royal Society.[40]

However, the fact that a certain substance like modafinil is used, and indeed that there is social pressure to use it, does not mean per se that this is morally problematic. For example, coffee is used as a mild cognitive enhancer (at least in the performance maintenance sense of the term), and it is the second most commonly traded commodity in the world, surpassed only by crude oil.[41] It is even recommended to long-distance drivers as a "legal stimulant" to combat the effects of fatigue and increase road safety.[38] There are considerable economic and social pressures to use coffee in different kinds of jobs, but this does not generate much controversy. However, caffeine appears suitable for sustaining alertness and combating effects of fatigue only in relatively short (i.e., up to 37-hour) rather than long (i.e., 64-hour) periods of continuous wakefulness, whereas modafinil is more potent and offers substantially higher effects of performance maintenance.

Thus, it could be concluded that the wakefulness-promoting properties of modafinil might be very beneficial for society at large by alleviating the effects of fatigue during work and even freeing up new time for leisure activities.[11]

Sleep deprivation causes difficulties in tasks that require vigilance and monitoring, decision-making, awareness, fast reaction time, tracking ability, and memory, and modafinil provides rapid relief in exactly these cases and might even offer enhancement of these cognitive functions in fully rested healthy adults.[1] Furthermore, sleepiness is thought to be the cause of a huge number of otherwise avoidable traffic accidents that result in death and injury. For example, up to one in five accidents on major roads in the United Kingdom is attributed to sleepiness, contributing significantly to the approximate 3,000 road deaths recorded annually.[42] Moreover, fatigue, night work, and/or shift-working arrangements have been cited as major contributory factors in numerous well-documented accidents and incidents including Three Mile Island in 1979, Bhopal in 1984, Challenger Space Shuttle in 1986, Chernobyl in 1986, Clapham Junction in 1988, and Exxon Valdez in 1989.[42] Therefore, modafinil could be seen as a "wonder drug" that will solve many problems that modern societies are facing. Indeed, modafinil may be helpful in many cases to alleviate the effects of fatigue and sleep deprivation for persons whose work is urgently needed and requires sustained periods of productive cognitive activity during the afternoon, night, or weekend; is outside standard daytime hours; requires extended work periods of 12 hours or more; features rotating hours of work; or demands overtime and/or standby/on-call duties.

However, if modafinil is not regulated appropriately, it might produce an overall increase in above-mentioned forms of shift work, which would certainly incur significant health-related and social costs. Namely, stress, depression, and other types of sociomedical complications of shift work, such as increased mortality[43] and even second-generation decrease in cognitive performance,[44] should be included in the cost–benefit analysis of modafinil and even in the conceptual analysis of its enhancement properties. Furthermore, the fact that modafinil use increases stress and decreases the effectiveness of the immune system in itself should warrant concerns. According to available data from the American Institute of Stress, 75–90% of physician visits are related to stress, and the cost to industry has been estimated at US$200–$300 billion a year.[45] A drug that increases stress and at the same time causes an additional decrease in immunity implies a considerable rise in social and health-related costs.

However, the expansion of the drug label to include treatment of 'shift work sleep disorder', and accompanying shift in social practices promise the most drastic effects. In the past, shift work was traditionally associated with industries where 24-hour operation was either necessary, as in the case of essential public services (e.g., hospitals, the police, etc.) or because the industry would otherwise be unprofitable (e.g., mining, etc.). However, there is an upward trend in the percentage of people employed in shift work that reflects an adoption of shift work beyond the traditional sectors, in areas where shift work is highly profitable for employers (e.g., supermarkets, fueling stations, call centers, etc.).

Although this trend can be seen as a result of overall changes in society and might even be construed as supported by workers who are prepared to do shift work,[42] evening, night, weekend, and holiday work are typically not occurring by choice.[44] Furthermore, the social costs of shift work take their toll not only on individuals forced to do shift work, but also on future generations as well. For example, parental evening and night work can have negative consequences for children and families. Parents who work nonstandard shifts are more likely to have children who score poorly on math, vocabulary, and reading tests; who repeat a year; and who are suspended from school. Families with adults who work the night and evening shifts report lower quality home environments, and shift-working couples have higher divorce rates.[44]

The recent shift toward a 24-hour society and lack of employment options is literally robbing a huge number of people of any other choice, and modafinil can be instrumental in decreasing the employment range of an even greater number of people by "normalizing" an otherwise exceptional condition—work during the night. Some statistical data might help put things into perspective: the number of shift workers in the United Kingdom has gradually increased in the last quartile of 20th century, reaching a peak in 2000, when around 15% of the working population (approximately 3.8 million people) worked shifts "most of the time."[42] This phenomenon is by no means limited to one country nor is it voluntary. The same percentage of people is working shifts in the United States,[46] and, according to one report, over three-fifths of US employees working nonstandard schedules do so because they "could not get another job," because it is "mandated by the employer," or because of "the nature of the work."[44] Only the third explanation captures the traditional areas of shift work, whereas the first two point toward the effects of economic forces beyond the control of affected individuals, as illustrated by the "truckers on modafinil" example.[35–36] The potential to create social problems linked with a laissez faire attitude is succinctly formulated in a relatively recent report on the comparative analysis of working times around the world:

> In weakly regulated regimes, including those in industrialized countries such as Australia, the United Kingdom and the United States, some forms of flexible working time arrangements—even those that apparently provide a substantial degree of worker influence over their working hours—may not sufficiently protect workers who do not have the collective strength to realize their preferred hours. In the context of countries in which collective institutions are not well developed, and therefore in the vast majority of developing and transition economies, the relaxation of legislated standards on working hours in favor of flexibility, without parallel developments in collective bargaining, cannot help but raise concerns.[47: 152]

It seems that thought experiments[34–36] and the rational choice analysis of the pitfalls of the laissez faire approach to enhancement[37] have additional empirical corroboration in the analysis of recent social trends in work, family, and health. Instead of helping to alleviate problems, modafinil may exacerbate the problems faced by the population at large. The availability of modafinil may offer a perfect excuse to employers to raise the stakes, increase expectations, and overwork the unprotected population of the least advantaged. Because research shows that a steady increase in social problems can be expected as working hours increase (e.g., 60% of those working more than 48 hours a week declare that they have difficulties in balancing work and normal life),[48] detrimental effects on the basic structure of society and the prospects of future generations can be expected. Paradoxically, as a short-term cognitive enhancer, modafinil might lead to an overall long-term decrease in cognitive ability in disadvantaged populations in society.

Might not these problems be somehow solved? Isn't there some way for modafinil to be used responsibly[24] for the benefit of society? A tentative conclusion of this section is that modafinil could provide both great benefits and great threats of exploitation, depending on the legal framework and regulatory models in place. This is the topic to which I turn now.

Regulatory Aspects and Public Policy on Modafinil Use

The legal framework for the use of older stimulants, like amphetamine and methylphenidate, is clear and unified across the globe. Namely, the United Nations Convention on Psychotropic Substances[49] defines Schedules for potentially dangerous psychotropic substances and explicitly lists methylphenidate and amphetamine as Schedule II drugs (dangerous substance with known medical uses). All countries that have signed this Convention have been obligated to regulate them accordingly. Because modafinil didn't exist at the time the international legal framework was established, it is not mentioned in relevant international treaties. This has led to a situation in which every country basically arbitrarily decides whether to make modafinil a controlled substance or not, although the criteria for scheduling are all but transparent.[50]

It could be argued that health professionals should bear all this in mind when making the decision whether or not to prescribe modafinil. After all, the American Neurological Academy has issued an influential set of guidelines that concluded that medical doctors have the right to decide whether to prescribe drugs for enhancement or not based on their expertise and good medical practice.[51] However, there is a problem with such a "gatekeeper" approach. It has been argued that medical doctors have the expertise to diagnose illnesses and

prescribe therapy, whereas every citizen should have the right to decide for him- or herself whether to use enhancements or not.[36] Furthermore, the agency of persons whose personal desire is to enhance is undermined. Under the so-called gatekeeper model, if a person's preferred choice is to use modafinil, a health professional needs to be consulted. The medical doctor makes the relevant decision: if he or she thinks that this person's particular case is justified, modafinil will be prescribed; if not, two socially undesirable consequences can be produced. The first may have the patient reaching out to alternative channels of distribution, and the second may have the patient "doctor shopping."

Currently, stimulants (old and new) used for enhancement can be obtained illegally from individuals with a valid prescription or via online pharmacies that do not require prescriptions. Illegal and online access open up the possibility of uncontrolled and potentially unsafe products being used as enhancers. For example, if an online shop is set up by criminal elements (and if a prescription is not required by the pharmacy, this is criminal behavior by itself) that do not have the means of providing modafinil, but have access to, say, amphetamine or methamphetamine, enhancement seekers could find themselves addicted to illicit "hard drugs." Namely, it could be assumed that individuals without prior knowledge of the effects of modafinil would not be able to distinguish it from older stimulants and might assume that they are safe from the danger of psychological and physiological dependence.

The second alternative is also not appealing. If enhancement seekers are faced with a refusal from a health professional, all they have to do is keep changing doctors until they find access to modafinil. Now, the issue of doctor-shopping could be circumvented by introducing a model with sterner regulation by the state or regulatory bodies. Perhaps enhancement seekers could be limited to only one second opinion. That might resolve the issue of widespread "doctor shopping," but then society is stuck with the issue of unfair access of already privileged members of society. Namely, under the sterner regulation model, physicians would be very careful not to overprescribe modafinil, whereas a certain number of prescriptions would be expected and approved. But which members of society would have access to modafinil then? It is safe to assume that class differences might have some impact here, so the claims that CE drugs such as modafinil are likely to increase or maintain social inequality[36] seem to be on the point. Furthermore, issues of paternalism and the accumulation of the power to distribute enhancements to all citizens placed in the hands of health professionals makes it very difficult to justify this approach.

Because the gatekeeper approach has difficulties, other regulatory options have been proposed in the context of managing the use of cognition enhancement drugs.[2,35–37] In the discussion on regulatory options for enhancement use of older stimulants, Dubljević[37] identified the economic disincentives model (EDM) as the most effective and legitimate solution for enhancement use of

extended-release forms of methylphenidate. Because the danger profile of modafinil seems to reflect that of methylphenidate, it is worth considering the implications of a similar approach. If EDM was applied to modafinil, an already existing government agency (e.g., FDA or Ministry of Health) would offer a licensing procedure to pharmaceutical companies to market modafinil for healthy adults. In this way, all citizens could legally purchase modafinil in pharmacies; however, the imposition of taxes, fees, and requirements of additional insurance creates financial and regulatory burdens for its use.

EDM envisions an additional licensing procedure for users: to be able to purchase, possess, and use small quantities of modafinil, citizens would have to pay fees for a course about its known effects and side effects and pass an exam as proof of knowledge. Furthermore, additional medical insurance and obligatory annual medical tests would need to be taken in order to obtain (and renew) a license to use modafinil. The statistical data thus generated would be used to monitor the unwanted effects and long-term consequences of its prolonged use, but users would have the option to opt out of providing data if they have concerns about privacy. Also, the prices of modafinil would be regulated: they would contain the standard costs of production and distribution, the profit margin would be limited, and an additional tax would be imposed. The model also envisions that companies earning profits obtained from the sale of modafinil would be further taxed and obliged to invest extensively in orphan drugs. The funds gained by such a policy would be invested in providing medical necessities for the least well-off, and the remaining funds would be allocated to finance education. Bearing in mind the fact that producers of modafinil have benefited from incentives for orphan drugs, this might be a good way to repay society for the investment it made in something that turned out to be a very profitable product. Also, the issue of long-term physiological effects of modafinil would be settled by data generated with this model, and the availability of modafinil to all, along with considerable regulatory burdens for enhancement seekers, should offset any concerns about fairness.[viii]

However, the discussion of social aspects of modafinil use has identified an additional problem that might be difficult to solve with either approach, at least in some societies. Namely, by expanding the label of modafinil to include shift-work sleep disorder, medical support for the normalization of night and shift work has received FDA approval and social sanction. An employee who has trouble coping with unreasonable demands from employers merely has to state "nature of the work," and the prescription of modafinil would not even be off-label. On the one hand (and in the context of the first regulatory response), instead of acting as gatekeepers, physicians may become unwitting tools of ever greater employee exploitation in an ever-widening circle of industries and could even themselves be subjected to increasing expectations of night and shift work (and arguably exploited).

On the other hand, the EDM explicitly dissociates enhancement use from therapeutic use of cognition enhancement drugs. The provisions of EDM were not meant to apply to the therapeutic use of drugs. This means that the social pressure on people doing shift-work to use modafinil would make modafinil a drug of choice by employers, not employees, and that complications generated by confounding long-term effects of modafinil and shift work would not be captured. This could be a minor issue in countries with firm regulations on work time, but in weakly regulated regimes, including Australia, the United Kingdom, the United States, and most developing countries, modafinil might cause a considerable social problem. The social impact of modafinil might be greatest in the United States due to its extreme lack of employee protection in the issues of paid leave, maximum length of work, night work, and minimal provisions for a day of rest each week.[44] Namely, unlike 137 countries that mandate paid annual leave and 121 countries that guarantee 2 weeks or more of down time each year, the United States does not require employers to provide paid annual leave. Unlike 134 countries that have laws that fix the maximum length of the work week, the United States does not have a maximum work week length nor a limit on mandatory overtime per week. Even though only 28 countries have restrictions or prohibitions on night work, and 50 countries have government-mandated evening and night wage premiums, the United States neither restricts nor guarantees wage premiums for night work. Last, but not least, unlike 126 countries that require employers to provide a mandatory day of rest each week, the United States does not guarantee workers this 24-hour break. Due to the specific social harms that could be caused by widespread use of modafinil and lack of employee protections, one option would be to consider revisiting and/or revoking the "night-shift worker syndrome" indication for modafinil. However, such a move would necessitate a thorough discussion that is well beyond the scope of this chapter.

At the very least, modafinil should be explicitly taken into account in various "fatigue management" guides and policies. The problem of employers pushing employees into drug use is not new. For example, the self-reported prevalence of amphetamine-like substance use among Australian truck drivers has been reported to be between 19% and 32%,[38] and this prompted policy makers to introduce measures and to encourage whistle-blowing among employees who feel coerced into taking illegal stimulants.[49] With the imposition of random roadside drug testing,[52] the prevalence seems to have dropped to 3.9%.[38] However, these costly regulatory measures, where present, only test for cannabis, alcohol, amphetamines, cocaine, and opiates.[53] Modafinil is neither tested for nor is it clear what would be the appropriate reaction of society, given that recent reports encourage the use of "legal stimulants" in order to decrease safety hazards and costs[38] and that, currently, a prescription for modafinil is easily obtainable both on- and off-label.

Conclusion

The analysis of currently available data points to a conclusion that more reliable information on the neurophysiological mechanisms of action of modafinil is necessary. Even though the physiological profile of modafinil seems to be beneficial, if inadequately regulated, modafinil can incur additional social and health-related costs.

Widespread use of modafinil may decrease the range of employment options and increase pressure to perform shift work. Apart from inherent properties of increasing stress and decreasing immunity, this can lead to a plethora of indirect adverse health effects in the population, including increased risk of mortality and even a decrease in the cognitive ability of future generations. Because modafinil could provide both great benefits and great threats of exploitation, depending on the legal framework, regulatory models that could provide the missing information on long-term effects would be most normatively and empirically sound, even if their preliminary assumptions turn out to be incorrect in the long run.

EDM is a promising regulatory response, one that could generate the data needed for a more reliable assessment and provide funds to offset the adverse health and social costs of modafinil use. However, in weakly regulated regimes with an extreme lack of employee protection, the "night-shift worker syndrome" indication for modafinil might cause social problems that will be hard to track and solve. Although one solution could be to consider revisiting and/or revoking this indication of modafinil, the arguments presented in this chapter cannot resolve the issue and should be understood only as a preliminary analysis of ways in which the debate on modafinil use in society could be refined and clarified.

Notes

i. In the United States, three operative types of incentives for orphan drugs are (1) government subsidies for clinical trials, (2) a tax credit of half of clinical research costs, and (3) a 7-year monopoly for marketing the drug.

ii. The adverse effects of modafinil are minor in comparison to amphetamines and methylphenidate: these two substances have been thoroughly analyzed in my previous work.[2]

iii. It is an open question how the laboratory observations that modafinil might enable fully rested individuals to hold an average of seven digits (as opposed to the usual six) in short-term memory relate to everyday performance or enhance performance in the workplace.[13: 159]

iv. In a study by De Santis and colleagues,[27] 34% of student participants admitted that they were using stimulants illegally. Most illegal users reported using stimulants primarily in periods of high academic stress and found them to reduce fatigue while increasing

reading comprehension, interest, cognition, and memory. Furthermore, most had little information about the drugs they used and found procurement to be both easy and stigma-free.

v. Consider the example of logistics companies in a laissez faire market economy. Let's say that the most profitable trucking route is 1,250 km long. The run could be achieved in one day, although with considerable stress and fatigue. Without enhancement drugs, companies offer the service of transportation with the duration of 2 days, with the price including accommodation for the truck driver. Let's say that company A decides to assume an employment policy that is preferable to truck drivers who have no problem in using modafinil (the medical treatment for narcolepsy) to stay alert and make the run in just 1 day. The company offers the service for the same price, thus gaining extra profit, but for half the duration. Company B, the chief competitor of Company A, responds by offering the "overnight express" service and accordingly gives current employees the following choice: either they will start using modafinil in order to cope with the requirements of the job, or they will be laid off. The effects on the market are not hard to foresee. All other logistics companies would either adopt similar policies or go out of business. The truck drivers would either use drugs or be out of work. Their choice is dictated by market forces completely beyond their control. Thus, enhancement technologies could have profound influence on the everyday lives of most citizens because the working day and deadline expectations will change according to social pressure.[36: 29]

vi. See, e.g., http://medikamenterezeptfrei.biz/modafinil-bestellen/. Accessed on March 5, 2013.

vii. See, e.g., http://www.youtube.com/watch?v=m6ECTzO7Ke4 (accessed on March 5, 2013) and related content on YouTube.

viii. The effects of EDM on social equality are important, and the argument regarding justice and the model has been fully developed in my previous work (see, e.g., Dubljević[36]). Even though, for reasons of space, I cannot give a longer discussion, the model is justified because it can assure state neutrality on personal preferences, protect the interests of all citizens, provide reliable data on consumption and demand, and promote the effective evaluation of long-term health costs among CE users.

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17

Toward an Ethical Framework for Regulating the Market for Cognitive Enhancement Devices

HANNAH MASLEN

Introduction

In the past few years, a visible market has emerged for devices that promise to improve the user's cognitive capacities in some way.[1–2] Marketed to healthy individuals, manufacturers make a variety of claims about improved focus, improved memory, and improved creativity, among other things. Using principles of transcranial electrical or magnetic stimulation, these devices have many similarities to devices sold to the research community for clinical research. For example, transcranial direct current stimulation (tDCS) is a technique that is currently being investigated as a potential treatment for impairments following stroke, for depression, and for symptoms of Parkinson's disease. Researchers are also investigating the potential for using brain stimulation in healthy participants to improve cognitive function. Early results show some promise: tDCS has been shown to improve some cognitive abilities of healthy adults, including working memory, attention, language, mathematics, and decision-making.[3] Transcranial magnetic stimulation (TMS) has, among other things, been shown to improve working memory, enhance performance on various complex motor learning tasks, induce faster object naming, and improve visuospatial processing.[4] There is also some evidence to suggest that TMS can unmask so-called savant-like abilities.[5]

However, despite the similarities in mechanism, the devices sold for research are closely regulated by medical devices legislation, whereas devices sold for enhancement are held only to basic standards of product safety. The reason for this is that, in many jurisdictions, whether a device attracts regulatory oversight is largely dependent on the claims that the manufacturer

makes about the purpose of the product. The European Union (EU)'s Medical Devices Directive, for example, only deems a device to be a medical device if its intended purpose is for the treatment, diagnosis, or prevention of disease.[6] The same is true of the Federal Food, Drug, and Cosmetic Act in the United States.[7] Thus, if a device were to be marketed, say, as a treatment for stroke patients suffering with aphasia, then it would be identified by the directive as a medical device and held to particular standards of production and surveillance deemed appropriate for devices with medical risks and benefits. If, however, a manufacturer were to market the same device as a product that could improve, for example, the focus of gamers, then it would be subject to only minimal regulation because no treatment claims would have been made in the marketing of the device.

There have been a number of calls from academics and others to address this regulatory gap.[8–9] Given the risks that the devices pose and the media (and, sometimes, academic) hype that surrounds these technologies,[10] there is a strong case for putting controls on cognitive enhancement devices (CEDs) similar to those that are put on medical devices. However, although some of the claims in the popular media exaggerate the benefits of CEDs (and fail to mention their risks), the scientific evidence is accumulating to suggest that stimulation within certain parameters, coupled with the right cognitive training, can produce effects in healthy individuals. The idea of using CEDs for enhancement is not a scam dreamed up by those selling the devices, although whether the devices currently on the market produce the effects their manufacturers claim is unknown.

Fitz and Reiner emphasize that any regulatory action should not stifle innovation: if brain stimulation is an effective route to cognitive enhancement, then it should, they claim, be welcomed.[9] The difficult task remaining, however, will be to regulate CEDs in a way that provides some degree of protection from unnecessary harm while not imposing unreasonable barriers on manufacturers or users. The concept of "managed technological optimism" captures this fine balance, offering "a perspective that acknowledges the potential for substantial benefit from the technology coupled with active oversight."[9: 1]

However, even if it is broadly agreed that CEDs must be regulated in a way that does not stifle innovation or use, the details of how to achieve this are not obvious. In what follows, I consider two of the challenges that must be resolved in order to craft a principled policy for regulating CEDs. The first challenge is to determine what the general approach to regulation should be. Comparable devices used in a clinical context are currently regulated by medical devices legislation. Accordingly, it might be claimed that the similarity of the devices means that we ought to take a similar approach to legislating them. Second, regulators must decide how they will assess whether a CED presents too much risk to the user to be approved for sale. The key question here is whether the

benefits of a CED must clearly outweigh its risks if it is to be made available to the public, as is the case for medical devices. Through addressing these challenges using the EU regulatory context as the primary case study, I hope to make steps toward an ethical framework for regulating the market for CEDs. The conclusions I reach will be applicable to the regulatory systems of other jurisdictions.

What Is the Correct Regulatory Approach for CEDs?

To determine the correct regulatory approach for CEDs, the first question to consider is whether CEDs are relevantly different from their most obvious comparator—medical devices. If there are no relevant differences between the two, then this will provide a *prima facie* argument for the view that they should be regulated in the same way (assuming that we think that the approach to medical device regulation is broadly correct). At this point, it is important to be clear about the scope of the discussion. Medical device legislation, such as the Medical Devices Directive in Europe and Chapter V of the Federal Food, Drug, and Cosmetic Act in the United States, encompasses the laws created to govern the safety of medical devices on the market.[6–7] These laws control which devices are approved for sale on the market and put into service, setting out provisions for conformity, pre-market assessment, and post-market surveillance (among other things). The scope of this legislation does not extend to governing which devices are to be subsidized by the health care system or reimbursed by health insurance providers. The respective remits of the Medical Devices Directive and the Federal Food, Drug, and Cosmetic Act are restricted to controlling the market and thus do not extend to health care policy. Whether enhancement should be made accessible through health care systems is an important question, but this chapter deals only with the issue of the regulation of the CED market.

ARE CEDS DIFFERENT IN KIND FROM COMPARABLE MEDICAL DEVICES?

Perhaps one of the most obvious differences between some CEDs (e.g., the foc. us device)[11] and medical devices is their appearance. However, the fact that two devices differ in appearance is clearly not an adequate basis for claiming that the two devices should be subject to different legislation. Devices might differ in color, shape, and style and yet still be functionally equivalent.

Mechanisms and Structure

The mechanisms of action of CEDs and comparable medical devices are essentially the same. tDCS involves placing two or more electrodes on the scalp and

passing electrical currents though the skull to alter spontaneous neuronal activity. Although the strength of the electrical currents delivered by different devices may not always be the same, and although the size and position of the electrodes may vary, the underlying principles and effects on the brain are the same. Variation in the structural configuration of different devices does not result in devices of different kinds in any meaningful sense. The structural differences between different devices sold for tDCS research will be as great as the differences between research devices and tDCS devices marketed for enhancement.

If a device with putative enhancement effects were to appear on the market without an obvious medical comparator, then the argument based on mechanistic similarity might be more difficult to maintain. In such a scenario (which seems unlikely), we should first delineate the features that demarcate a device as a "medical device" and establish whether the "enhancement device" shares similar features. The definition of a medical device in the UE is as follows:

> Any instrument, apparatus, appliance, software, material or other article, whether used alone or in combination, including the software intended by its manufacturer to be used specifically for diagnostic and/or therapeutic purposes and necessary for its proper application, intended by the manufacturer to be used for human beings for the purpose of:
>
> - diagnosis, prevention, monitoring, treatment or alleviation of disease,
> - diagnosis, monitoring, treatment, alleviation of or compensation for an injury or handicap,
> - investigation, replacement or modification of the anatomy or of a physiological process,
> - control of conception,
>
> and which does not achieve its principal intended action in or on the human body by pharmacological, immunological or metabolic means, but which may be assisted in its function by such means.[6:5–6]

It is unlikely that any device could plausibly make claims to enhance cognition without modifying physiological processes in the brain; in terms of what CEDs *do*, they have much in common with medical devices. However, a potentially relevant difference is that that CEDs are not *intended* by the manufacturer to be used specifically for diagnostic and/or therapeutic purposes. Indeed, it is this feature of the definition that currently prevents CEDs from falling within the remit of the directive. Accordingly, the argument could be made that CEDs and medical devices are not of the same kind because they are used for a different purpose.

Purpose

Does the purpose for which the device is intended make a difference? CEDs are marketed (and presumably mostly used for) purposes that differ greatly from those under investigation in clinical trials. Stark comparisons can be made: whereas researchers are investigating the potential for tDCS as a method for improving speech and communication impairments caused by a stroke,[12] healthy adults are purchasing devices to (supposedly) enable them to perform better on computer games. From one perspective, these purposes appear at two ends of a spectrum: the former constitutes an attempt to repair basic functionality important for carrying out a full life; the latter constitutes an attempt to improve performance on a leisure activity. However, although these examples indeed make for a stark contrast, the distinction between enhancement and medical purpose may not be as sharp as it first seems. Not all medical uses of tDCS would be attempting to redress debilitating neurological impairments. For example, recent research has investigated the use of tDCS and cognitive training as a therapeutic tool for cognitive control impairments in conditions such as attention deficit hyperactivity disorder (ADHD).[i],13,14 Furthermore, not all potential enhancement effects would be pursued for goals related purely to leisure: studies have shown that tDCS is a promising technique to enhance language learning in healthy adults.[15–16]

The underlying aim in all these examples is the same: the improvement of brain function. Whether labeled as treatment or enhancement, the purpose of the interventions here is to make the recipient more efficient or effective in a particular cognitive domain. The line between treatment and enhancement is often very difficult to draw and inevitably involves a degree of social construction. For example, delimiting normal from defective powers of concentration for the purpose of ADHD diagnosis involves marking a categorical point on what is otherwise a continuum (cf. Schermer and Bolt[17]). The specified point therefore could, within limits, be designated further to the left or right on that continuum of functioning. To make a sharp distinction between the treatment of control impairments associated with mild ADHD and the enhancement of the control of a person who happens to fall just above the designated point seems conceptually unsatisfying in the face of gradual changes on a continuum.

However, despite the reality that the functioning of most cognitive skills exist on a scale from better to worse, the state does create sharp boundaries for the purpose of making laws and enacting policy. For example, a distinction between treatment and enhancement is implicit as a marker of which interventions should be made accessible through the health care system or reimbursed by health insurance. In the United Kingdom, the National Health Service will not fund interventions unless there is a clear clinical need. In this case, the use of a distinction between treatment and enhancement implicitly serves as a yardstick for assessing how health care resources should be prioritized.[ii]

For our current purposes, we can concede that societal distinctions between treatment and enhancement can sometimes have pragmatic value and express certain attitudes. However, notwithstanding the importance of setting priorities for public resources, when we consider the range of effects a brain stimulation device can have, we see how difficult drawing the line can be. For example, a person who finds language very difficult could be said to enhance herself if she uses tDCS to improve her performance; the talented linguist who suffers a minor stroke might attempt to treat her resultant impairment by stimulating the same brain area. It is feasible that the latter may end up with the same linguistic capacity as the former. To call these instances of enhancement and treatment, respectively, would mask this fact.

Thus, even if the manufacturers of CEDs claim that their devices can be used for purposes not normally pursued in a medical context, when we look more closely at what individuals would be trying to achieve by using CEDs and comparable medical devices, the underlying aims are the same even if the starting points will often be different. The relevance of different starting points is central to the argument made in the final section.

If appearance does not matter and mechanism and fundamental purpose are the same (or at least not relevantly different) for both CEDs and comparable medical devices, does this provide enough justification for regulating CEDs in the same way as medical devices? The argument would be that they are essentially the same kinds of device and thus whatever regulatory approach is justified, it should be the same for both. However, it could still be argued that the context in which medical devices are used represents an important difference between the two sorts of device. Even if the treatment/enhancement distinction is often theoretically blunt, there might still be reason to draw a distinction between medical devices and consumer or "lifestyle" devices, a category into which CEDs fall. Drawing this sort of distinction, it could be argued, justifies adopting different approaches to regulation.

AN ARGUMENT FOR REGULATING MEDICAL AND CONSUMER DEVICES DIFFERENTLY

Consider cardiovascular training devices that measure the user's heart rate. In a medical setting where doctors might be overseeing a patient's return to physical activity, for example, it is imperative that the heart rate monitor is accurate.[iii] Doctors draw conclusions about the patient's health and progress based on the readings the machine provides. Strict regulation must be in place to ensure that no fitness machines used in medical settings will give inaccurate readings. In a gym, however, such strictness of regulatory oversight does not seem necessary. Although the fitness machines used in gyms would give accurate readings in an ideal world, it does not seem that the degree of need

for accuracy here would justify incurring the same regulatory burden and resources as it would in the medical setting. This example suggests that the fact that a device performs the same function as a medical device is not enough to make a conclusive case for regulating that device in the same way as medical devices.

The example indeed raises a *prima facie* challenge to my argument. I here wish to point to two related ways in which CEDs might be importantly different from fitness machines in an attempt to reinstate the appeal of using the same regulatory approach for CEDs and comparable medical brain stimulation devices.

Relative Level of Risk

In the case of fitness trainers, a suboptimal heart rate monitor usually poses less risk to the gym-goer than it does to someone undergoing rehabilitative exercise in a medical setting. Presumably, the person using the fitness machine heart rate monitor for rehabilitation will be in ill health or recovering from ill health. Medical practitioners overseeing an exercise session will use the heart monitor either to avoid overexertion or to measure a patient's progress. Having accurate information will be very important for maintaining an appropriate course of exercise to improve the patient's health and to identify when certain targets have been reached, indicating successful treatment.

In comparison, the level of risk that an inaccurate heart monitor poses to the gym-goer is arguably much less. It seems plausible to assume that people using heart monitors at the gym are much less likely than medical practitioners to use the machine's heart monitor to determine whether they should continue to exercise at a given intensity or not. Many gym-goers use such monitors to keep track of *changes* in their heart rate during exercise over the course of different gym sessions because such changes are one easily comprehensible metric by which gym-goers can measure improvements in their cardiovascular fitness. In contrast, it seems unlikely that many gym-goers use the monitors to check whether they are close to overexerting themselves at a particular time; indeed, many casual gym-goers are probably unaware of what sort of heart rate measure would indicate that they are coming close to overexertion.[iv] If this is right, then it seems unlikely that an inaccurate heart monitor on a gym machine will be instrumental to a user overexerting themselves: most gym-goers will therefore not have their health put at risk by a suboptimal heart rate monitor. Whereas the monitor is a useful feature of a gym machine for those who want an easily comprehensible rough metric by which to measure changes in their cardiovascular fitness, it is not central to the *purpose* of using the machine, as it can be in a medical setting.

However, a similar difference does not apply when it comes to archetypal CEDs. Whereas it matters little for most gym-goers if the heart rate monitor

of a gym machine is suboptimal, whether the stimulation provided by a CED is suboptimal is hugely significant *regardless* of whether it is used in a clinical or nonclinical setting. Incorrect stimulation (and, in some cases, correct stimulation) poses the same risks to patients and home users alike: stimulation that is too strong, persists for too long, or is of the wrong polarity will cause harm or adverse effects to any brain, not just the brains of patients or research participants. In fact, it could be argued that, unlike the heart monitor of the fitness trainer, nonmedical use here will present *greater* risks if a device is faulty because home users are not supervised by a qualified researcher or medical practitioner.[v] Thus, CEDs, unlike fitness devices, are not separated into two regulatory worlds due to the level of risk posed to different categories of users.

The Risk Is to the Brain

Even if it were the case that there is a greater need for regulation of medical devices than comparable "lifestyle" devices in general, it could be argued that the special status of the brain would still make medical regulation appropriate in the case of CEDs. It is commonly held that the brain has a particularly special status. As the Nuffield Council on Bioethics points out in their report on novel neurotechnologies:

> The brain has a special status in human life that distinguishes it from other organs. Its healthy functioning plays a central role in the operation of our bodies, our capacities for autonomous agency, our conceptions of ourselves and our relationships with others—and thus in our abilities to lead fulfilling lives.[19: 72]

On the basis of this assessment, the Council concludes that brain intervention technologies raise various concerns that are not raised to the same extent by other biomedical technologies. As well as being the seat of most physiological functions, modifications to the brain raise concerns about personal identity. Views diverge on whether modification may (problematically) disrupt the essential nature of a person or might (valuably) facilitate his becoming who he wants to be (see Bublitz and Merkel[20]). Either way, modification of neural activity at least has the potential to change a person's character and capacities in some way.

Correspondingly, given that the risks that CEDs pose are directly to brains, the argument for having regulatory oversight that has a medical focus and framework seems stronger than for other technologies that do not effect parts of our physiology so central to our functioning and personhood. Medical devices regulation provides the opportunity to utilize approaches and expertise appropriate for devices that pose risks to human physiology and functioning.

The appropriateness of medical device regulation for nonmedical products might be a matter of degree rather than categorical distinction, but there appears to be a particularly strong argument for devices that directly modulate brain activity.

In comparing CEDs and comparable medical devices, I have argued that there are no relevant differences between the devices that fall under these labels. In conjunction with the fact that both sorts of devices have the purpose of changing brain activity, this conclusion suggests that a medically orientated regulatory approach should be taken to CEDs. The sorts of risks posed by these devices and relative assessments of safety will rely heavily on medical knowledge and prior experience of regulating brain stimulation devices for research. Having come to this conclusion, the next challenge is to determine how stringently CEDs should be regulated. As I will argue, in this case, the nonmedical context of CED uses should make a difference to the regulatory approach that should be taken.

How Stringently Should CEDs Be Regulated?

When we discuss the stringency of the regulation for CEDs there are two things to consider: first, what level of risk it is acceptable for devices to present to users and, second, the number and nature of the requirements to which manufacturers of CEDs should be subjected. In connection with the first consideration, regulators must consider both the maximum acceptable level of risk for a particular device and the extent to which risks must be outweighed by benefits. Although different regulations will define risk differently, for our purposes, we can understand risk to refer to the potential harm posed to the health, safety, or welfare of the user, with consideration of its likelihood of occurrence. For example, high risk might be attached to a device that was very likely to cause a seizure. A device that was only likely to cause seizures in a minority of users (e.g., those with epilepsy) might be seen to pose a moderate risk in this respect. An example of a low-level risk might be a transient headache.

In this section, I focus on the questions related to acceptable risks, making the case for a less risk-averse regulatory standard for CEDs than comparable medical devices. To be clear: the argument will not be that CEDs should be less carefully overseen but, rather, that there are reasons stemming from the nature of the effects pursued that justify erring more on the side of consumer choice when assessing risks and benefits. I begin by considering the most common and perhaps strongest argument against this view, which holds that CEDs must pose minimal risk or that the benefits must greatly outweigh any risks that are larger than minimal.

NEED AND ITS IMPLICATIONS FOR ACCEPTABLE RISK

Perhaps the most common argument for requiring a higher level of safety for medical devices than enhancement technologies is that, because there is no medical need for the intervention, only small risks should be tolerated. The idea underlying this claim is that the more one has to lose by not choosing a particular intervention—that is, the worse the option of maintaining the status quo is for one—the more one should be permitted to risk in choosing the intervention. This sort of argument has been made in relation to enhancement research: as medical need falls, the potential benefits of participating in research must increasingly outweigh any risks in order for the study to be ethical. For instance, Nicholas Agar takes this view, saying:

> [t]he cost/benefit analysis is different for enhancement. While those who are experimenting with treatments for serious diseases may only succeed in substituting one kind of misery for another, those experimenting on human enhancement are likely to substitute a miserable life for a happy one.[21: 167–168]

Moving from research to the context of clinical neuropsychology, Bush argues that, for neuropsychologists considering entering the subspecialty of enhancement of the healthy, one conclusion seems clear: "[when] the possible benefit of the intervention is the enhancement of normal functioning instead of the treatment of disease, only minimal risk is acceptable."[22: 128–129] This conclusion is based on duty of nonmaleficence: neuropsychologists have an obligation to avoid causing harm to those within their duty of care, and, because the greatest possible negative effect may be subtle and undesirable mental change, facilitating it could do much harm.

A similar argument motivated the Medicines and Healthcare Products Regulatory Agency (MHRA) to propose that nonmedical cosmetic devices be subject to a more risk-averse assessment than medical devices. In their 2012 consultation, the MHRA proposed that the European Medical Devices Directive should be amended so that it included a range of implantable or other invasive devices without a medical purpose. The devices they had in mind were cosmetic in nature and included things like dermal fillers and cosmetic contact lenses. The MHRA argued:

> Weighing up the risks and benefits of a product which does not have a medical purpose is different than for medical devices. Therefore Annex I, which sets out the safety and performance requirements of devices, requires manufacturers of implantable or invasive products without a medical purpose to ensure that these products present

> either no or the minimum acceptable risk which is consistent with a high level of protection for the safety and health of persons. The instructions for use must also include information on the absence of clinical benefit for these products and the risk of using them.[23: 10]

However, the argument for limiting risk based on the relevance of medical need has a flipside. It could be argued that because patients have a need for treatment, they are more likely to accept the interventions on offer. Although the informed consent of patients is routinely obtained before proceeding with any medical intervention—and thus risks are carefully explained—it seems that a patient's deterioration in health may put her in a vulnerable position in which it is likely she will be more inclined to accept risky treatments, even when medical practitioners carefully explain the risks. One is less able to calmly and comprehensively reflect on the risks involved in accepting an intervention if one is particularly in need. This inclination may be bolstered by the perception that the intervention on offer is "endorsed" by an expert medical professional. Furthermore, given the nature of the treatment—to improve impaired or dysfunctional cognitive capacities—it may also be the case that at least some patients electing to undergo brain stimulation treatment would have difficulty fully understanding (and thus validly consenting to) the risks of which they are informed.

Given these considerations, there is a plausible argument that, in the medical context, a device should only be approved if it is clear that the risks are reasonable when weighed against the potential benefits and that this should involve an objective assessment of the efficacy of the intervention to achieve the stated therapeutic goal. In contrast, decisions about the purchase and use of CEDs are made absent these vulnerabilities, which could justify giving individuals more choice about how to assess the risks and benefits of any particular device in the context of their own values, nature, and life circumstances; an assessment they are best placed to make for themselves. So, if the argument about medical need is that a medical device can pose more risk because the patient's status quo is particularly disagreeable, this can be reversed to point out that when a healthy individual's status quo is *not* particularly disagreeable, it exerts less pressure to commit to taking risks.

This conclusion may seem somewhat surprising given the earlier argument about the conceptual difficulty in drawing a sharp distinction between treatment and enhancement. If CEDs and comparable medical devices are not sharply differentiated, then how does medical need make any difference to regulatory standards? The answer is that although there is no deep difference in what the devices do (both CEDs and comparable medical devices modulate brain activity to improve cognitive functions), the contexts in which the decisions about whether to use the device is made *are* relevantly different.

As medical need falls, consumer freedom to assess the reasonableness of risks for themselves should rise. This argument is bolstered when we consider that it may not even be possible for regulators to effectively conduct a risk–benefit assessment for CEDs and that this provides an additional reason for regulators to avoid being too risk-averse in their assessment of whether a CED should be approved for the market.

HOW SHOULD THE BENEFITS OF CEDS BE ASSESSED?

In some of the commentary on enhancement regulation, the question is raised whether assessing the benefits of enhancement would have to proceed differently to the standard approach employed for assessing medical benefits. For example, writing about neurocognitive enhancement, Farah et al. suggest that "[r]egulatory agencies might find their responsibilities expanding into considerations of 'lifestyle' benefits and the definition of acceptable risk in exchange for such benefits."[24: 422] Although acknowledging that the assessment of clinical benefit can involve some subjective measures (e.g., in the case of pain relief), Mehlman suggests that assessment of the benefits of some genetic enhancements might be more analogous to cosmetic surgery and therefore more subjective.[25] For example, in the case of liposuction devices, the panel of experts advising the US Food and Drug Administration (FDA) decided "that it could only characterize the benefits from these devices in terms of patient satisfaction."[25: 678] Correspondingly, Mehlman considers:

> We would need to evaluate [the effects of genetic enhancements] not only in terms of the magnitude of their direct impact—extra inches of height or IQ points, for example—but in terms of the ultimate benefits that these effects produced: the increased probability of becoming a professional basketball player or of getting into Harvard. In addition, we would need to place a value on being a professional basketball player or a Harvard graduate.[25: 677]

The consultation on European medical device regulation took the approach that "weighing up the risks and benefits of a product which does not have a medical purpose is different than for medical devices."[23: 10] The view appears to be that, if a risk–benefit assessment is not possible or appropriate for nonmedical devices, then a risk-averse approach should be taken, approving only those devices that pose no or minimal risk (presumably because it is thought that since there will be error, erring in the direction of prohibiting a possibly-safe-enough device is better than approving a possibly-not-safe-enough device).

Despite suggestions that nonmedical devices present challenges for risk–benefit assessment, Mehlman and Berg have questioned whether it really is

the case that the methods for assessing the benefits of enhancement would actually be any different from the methods used to assess medical benefits.[26] They suggest that, in fact, the methods could be very similar: they point out that "both health oriented and enhancement research may employ qualitative, quantitative, objective and/or subjective measures."[26: 549] Those currently engaged in tDCS research with healthy individuals are able to use the same instruments used in medical research to measure things like improvements in working memory or speech production. It might be the case that the tests are more demanding for healthy individuals, but they will still produce an objective measurement of improvement in the same way.

However, it could still be argued that the benefits of enhancement are more subjective compared to the benefits of medical interventions. Some illuminating parallels can be drawn with other enhancement interventions. For example, studies with cognitive enhancement drugs have shown that, in healthy human volunteers, modafinil improved subjective attention and alertness.[27] Regardless of whether performance is objectively improved, the users of modafinil might argue that the effects that they experienced were beneficial. If evidence emerges that CEDs confer similar subjective benefits then, it could be argued, the classical medical approach to balancing the effectiveness of an intervention against its risks could be too restrictive.

However, such a view would perhaps rest on a skewed perception of the benefits of medical interventions as mostly mechanical and the benefits of cognitive enhancement as more experiential. Although it is the case that interventions affecting the brain will be likely to involve an experiential element, it is not the case that this is always untrue for medical interventions. For example, subjective ratings of pain relief or of mood improvement will be central to the assessment of the effectiveness of an analgesic or antidepressant drug or, indeed, clinical investigations of tDCS for these purposes (see, e.g., Fregni et al.[28]; Nitsche et al.[29]).

What might be the case, however, is that the *value* that people attach to the effects of cognitive enhancement (both objective and subjective) might be more personal than the value that people attach to the effects of treatment—and, as such, might vary more. The extent to which an effect is valuable for a person is part and parcel of whether it is of benefit to them and so, if the value attached to cognitive enhancement varies much more than the value attached to medical treatment, then benefits are more difficult to assess in the case of the former.

Highlighting the point that value does not necessarily track objective or subjective improvement, interviews with healthy scientists taking modafinil for cognitive enhancement purposes revealed that the subjective effects ranged from moderate to "mild *but very valuable* to me"[30:1159] (emphasis added). The proposed contrast with medical treatments would be that whereas most people put great value on being without pain and functioning physically and

psychologically well enough to go about the basic activities of life, the effects of cognitive enhancement are not so universally valued.[vi]

So, as a framework for assessing the benefits of CEDs, it might be helpful to draw a distinction among three things: (1) *Objective benefits* of CEDs could be coextensive with a measure of effectiveness similar to that determined in laboratory experiments. Using tests, experimenters can measure the average improvements in various cognitive skills and their variation. (2) *Subjective benefits* may elude measurement and may be more personal: a sense that one is smarter or sharper may be central to an individual's experience of enhancement but may not be possible to quantify and may not attend everyone's experience. (3) *The value of a benefit* will vary depending on the person's goals and preferences. Both objective and subjective benefits may be valued more or less by different people. Measurable improvements to working memory might be invaluable to the mathematician but less important to the athlete; feeling sharper might be very important to an older person worried about impending cognitive decline but less important to a younger person who sees herself as in her prime.

The consequence of the variation in the value that different people attach to enhancement is that a regulatory system should err on the side of leaving room for users of CEDs to attach their own values to the potential benefits. It is worth noting that the same goes for the risks: the weighting of some of the risks of using CEDs could also be seen as equally value-dependent. For example, studies have shown that improvements in some domains of cognition come at the cost of impairments in others.[31] In the same way that people will value improvements to different degrees, two individuals might differ greatly on the extent to which they see a particular impairment as disadvantageous. So, regulators should require manufacturers to provide substantiated information about the risks and effectiveness of a CED. However, unlike the medical assessment, it should not be a requirement that the benefits clearly outweigh the risks because this is not an assessment regulators can make. Coming to a similar conclusion about the inadequacy of the medical approach to assessing the benefits of biomedical enhancement research, Mehlman and Berg[26] cite the President's Council on Bioethics:

> [T]here are difficulties when medical practice moves beyond therapy. Where the goal is restoring health, the doctor's discretion is guided by an agreed-upon and recognizable target. But a physician prescribing for goals beyond therapy is in unchartered waters. Although fully armed with the means, he has no special expertise regarding the end—neither what it is nor whether it is desirable.[32: 306]

Although this is a comment about the extension of medical practice to offer enhancement, the final point is just as relevant to product regulation: the

extent to which individuals will find the various effects of enhancement *desirable* (what I have labeled the *valuable*) will show more divergence than the desirability of basic health, which is a foundational requirement before enhancement can be pursued. Note that this divergence in value will persist even if the particular enhancement target (e.g., improved memory, improved language skills) is clearly defined.

It might be wondered how this conclusion can have been reached while denying the theoretical utility of a sharp treatment/enhancement distinction. Indeed, the argument that the benefits of CEDs might be harder to determine than the benefits of medical interventions does not here rest on the difference that medical context can make. However, it should be remembered that denying the existence of a sharp distinction between treatment and enhancement interventions does not preclude adopting a view that all such interventions (and, more specifically, their effects) will move an individual up his or her continuum of well-being (cf. Savulescu, Sandburg, and Kahane[33]). The effects of interventions usually regarded as "treatments" tend to improve on lower states of well-being whereas interventions typically labeled as "enhancements" will tend to improve on states of well-being further up an individual's continuum. Because (1) what is fundamental for a basic level of well-being will be more or less universal to all individuals, but what is required for higher levels of well-being will diverge in line with the diversity of individuals' life goals and (2) because a basic level of well-being is necessary before higher levels of well-being can be reached, the effects labeled as treatments will be more universally valued than the effects labeled as enhancements. Given the divergence in value as well-being increases, conducting a risk–benefit assessment is much more difficult for CEDs than it is for comparable devices used to treat cognitive dysfunction.

Whereas the medical approach to assessing effectiveness and risk will be crucial for filtering out particularly dangerous devices, for conducting a rough assessment, and for determining the information of which users should be made aware, it cannot be decisive where there is reasonable disagreement about the overall weighing of risks and benefits. Furthermore, the difficulty of measuring the benefits (and some of the risks) of enhancement does not justify taking a "minimal risk" approach, as some have advocated. Instead, it justifies delegating the finer points of this assessment to the individuals who are deciding to take the risks and accrue the benefits.

Conclusion

I have argued that CEDs should be regulated broadly following the approach taken for medical devices. CEDs and comparable medical devices are the

same sorts of devices, exerting the same physiological effects on brains, with the same broad aim of cognitive improvement. However, I have provided a series of arguments in support of the claim that CEDs should not have to demonstrate the same level of benefit over risk as is required of medical devices. Importantly, this was not premised on reintroduction of a sharp distinction between the devices themselves, but instead on the idea that the difference between the medical versus nonmedical context in which a person chooses to undergo brain stimulation provide reasons to be less risk-averse in the regulation of CEDs. In addition, it was argued that as individuals attempt to increase their well-being to higher levels, they will diverge more in what they believe their well-being consists in and what risks they think are reasonable in its pursuit. Given that regulators are therefore ill-equipped to weigh the risks and benefits of CEDs, this provides the strongest argument for placing some of the assessment of acceptable risk in the hands of the consumer. Regulators should err toward approving devices where there is reasonable disagreement about whether benefits outweigh risk while placing strict requirements on manufacturers to provide users with comprehensive, substantiated information about the effectiveness, risks, and safe use procedures associated with their device.

Notes

i. Moreover, some have argued that the continuity between the impulsivity of those suffering from ADHD and the impulsivity of certain healthy individuals calls into question the ethical relevance of the distinction often invoked between treatments and enhancements (see, e.g., Pugh): some "treatment effects" may be indistinguishable from some "enhancement effects."[14]

ii. Of course, even here, there will be disagreement about what constitutes treatment. For example, it can be disputed whether cosmetic surgery can constitute a treatment in cases where the only benefit is psychological. The main point, though, is that, in health care policy, a distinction is drawn even though the boundaries may be fuzzy.

iii. I am grateful to participants attending a workshop on enhancement and CEDs at Oxford in May 2014 for this counterexample.

iv. It should be noted that professional sports people might use the heart monitor of a fitness machine to track their heart rates more closely. In such cases, they are likely to use a machine that makes explicit claims about its ability to accurately measure heart rate. In the UK guides on borderline medical devices, a distinction is made between gym equipment placed on the market specifically to measure heart rate and gym equipment that merely contains within it an element that measures heart rate. The latter "is not a medical device because its primary purpose is as a piece of fitness equipment, not principally to measure a physiological function."[18: 5]

v. Although this could be seen to support a stricter standard for (home use) CEDs, the remainder of the chapter argues that the inability for regulators to adequately assess the benefits of CEDs generates reasons to approve devices where there is disagreement about whether benefits outweigh risks. This is not to say that dangerous devices will be approved, but that the requirements of the risk–benefit assessment are somewhat relaxed for devices posing mild to moderate risks.

vi. In making this argument, I do not have to rely on the claim that health is intrinsically valuable whereas enhanced capacities are not—such an argument would open the door to reintroducing the treatment/enhancement distinction. Instead, the suggestion is an empirical one: the value that people place on health varies less than the value that people put on enhancement. Even if we conceive of both treatment and enhancement effects as improvements to well-being, a certain *level* of well-being is more fundamental because it must be in place before higher levels of well-being can be pursued.

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18

A Constitutional Right to Use Thought-Enhancing Technology

MARC JONATHAN BLITZ

Introduction

Should there be a constitutional right to cognitive enhancement? In a sense, there already is, at least in the United States. Thanks to the freedom of speech guarantee found in the First Amendment of the Constitution, Americans have a right to sharpen their thinking or expand their mental capacity—as long as they do so with words or other forms of expression. Government may not prohibit me, for example, from extending my natural memory with the aid of pen and paper or with computers and word processing software. If I take notes about an occurrence to help fix it in my mind, the government may not arrest me for doing so or confiscate my notes so that their contents are more easily forgotten. Nor may officials stop me from improving my mental operations with the aid of *other* people's writing or artistic expression. They may not restrict my access to self-help books or meditation manuals, to instructional videos that enlighten me, music that energizes me and perhaps markedly changes my mood, or video games that allow me to hone certain skills as I play them.

Of course, these examples leave open the question of whether the US Constitution protects or should protect our use not only of measures we take to enhance our thinking with language or art, but *also* the type of conduct that writers (like those in this volume) are usually talking about when they talk about "cognitive enhancement"—that is, enhancement carried out with drugs such as selective serotonin reuptake inhibitors (SSRIs) and methylphenidate or medical procedures such as transcranial magnetic stimulation (TMS) wherein the electrical activity within the brain is altered by electromagnetic coils placed just outside the head. Is there a constitutional right in the United States to reshape one's mind not merely with words or images but also with chemicals or electrical currents?

On first blush, it may seem that the answer is "no." If the Constitution protects cognitive enhancement when we use (or act as an audience for) language or art, perhaps it does so only by accident. If we enhance our mental functioning with books, meditation videos, or mind-training iPhone apps, such enhancement is protected. But this is not because the Constitution protects cognitive enhancement itself, one might argue, but rather because it protects books, poems, manuals, and apps.

The First Amendment's language, after all, protects "freedom *of speech*" not freedom of *all* conduct that allows individuals to exercise mental autonomy or reshape their own psyches.[i] This focus on speech and other expression is supported not just by text, but also by tradition. The linguistic tools we use to transform our minds with books, conversations, or prayers, for that matter, have long been treated by the United States, and, to a lesser extent, by certain other liberal democratic systems, as largely off limits to state control. It is up to me, not the state, what beliefs I adopt, what opinions I voice, or what religion I practice.

Matters are different, however, when our tools of cognitive enhancement come from the more hazardous and extensively regulated realm of medical treatment. Medications, of course, can have physically harmful side effects. They can have unexpected consequences that, had they been known to someone taking the medication, might have led her to avoid it. It is thus not surprising that the US Food and Drug Administration (FDA) has long restricted the marketing of drugs[1: 703, 723–724] and does not approve them for sale or use prior to a showing of safety and efficacy.[2: 245, 255] Nor is it surprising that courts have classified the communication integral to prescribing a drug (or administering other medical treatment) as medical conduct outside the First Amendment's scope.[ii]

This is one plausible stance on the constitutional status of cognitive enhancement. This chapter briefly sketches another. In short, it argues that, if, as the Supreme Court has said, constitutional "liberty presumes" and protects "an autonomy of self,"[5: 562] then there is a strong case to be made that individuals are engaging in a key exercise of such autonomy when they use modern technology to reshape their thinking processes. First, it takes a closer look at First Amendment law and explains why, although it speaks only of "freedom of speech" and "freedom of religion," it also provides strong protection for freedom of thought. It also explains why we can illuminate this freedom with the help of recent writings on the concept of the extended mind. Second, it explains why and how this freedom of thought protection might persist even where there is a substantial need for government health and safety protection measures. In short, the Constitution's protection of individual autonomy does not simply vanish in environments where government must closely monitor and regulate activity in the interest of health and safety. Autonomy protection instead takes a form that is compatible with such health and safety protection.

To be sure, there is an important limit built into this argument: the constitutional protection it sketches for cognitive enhancement comes from a

particular Constitution (that of the United States) and from a feature of that Constitution that distinguishes it from that of most other liberal democracies (the extraordinary strength of the protection it accords to speech and other expression). As explained in the conclusion of the chapter, however, although the analysis herein draws heavily and focuses on America's First Amendment jurisprudence, it may still have value for legal systems that protect freedom of thought and expression in other ways.

Constitutional Freedom of Thought and the Right to Use Thought-Enhancing Technologies

As noted earlier, the First Amendment of US Constitution nowhere mentions the phrase "freedom of thought." That has not stopped the Supreme Court from finding it there. On the contrary, it has said clearly that the Amendment covers "freedom of thought" or "freedom of mind."[6: 714] It does so, said the Court, because even if the words of the First Amendment do not demand protection of private unexpressed thoughts, "the philosophy of the First Amendment" does.[7: 566] "Our whole constitutional heritage," it said in 1969, "rebels at the thought of giving government the power to control men's minds."[7: 565] But although it has developed an extraordinarily extensive and complex doctrine regarding freedom of speech, it has had far less to say about freedom of thought. It is no less important, according to the Court.[iii] But it is far more mysterious and ill-defined. This may be, in large part, because courts have felt less need to protect it. Whereas unpopular speech can be identified and silenced by the state, dissenting thoughts remain unknown to the government until they are given expression. Moreover, even when officials can infer that a person has a belief disfavored by the state, they lack the tools to forcibly change it from the outside. Thus, John Locke said in 1689 that "such is the nature of the understanding, that it cannot be compelled to the belief of any thing by outward force."[11:20] This view was echoed by Justice Murphy of the Supreme Court more than 250 years later. "Freedom to think," he said, "is absolute of its own nature; the most tyrannical government is powerless to control the inward workings of the mind."[12: 618]

Why, then, does freedom of thought need any recognition in or help from the Constitution? The Court has warned that government is constitutionally barred from restricting or controlling a man's "private thoughts."[7: 566] But why erect a constitutional barrier of this sort against abuse that government is powerless to inflict?

One answer, perhaps, is that freedom of thought is not distinct from freedom of speech but rather simply another way that courts use to describe the same liberty. Our thought, one might argue, becomes vulnerable to government attack when it is given expression in spoken or written words or in

artistic work.[6] Our speech merits protection, on this view, in large part because it is the vessel and outward manifestation of thinking. A second explanation is that government *can* sometimes attack our thought even without attacking our speech by targeting its underlying biology: it can subject us to forcible psychiatric medication or other psychiatric treatment. Thus, the Court has drawn on the Constitution—and specifically its "due process" requirements and the safeguards they raise against arbitrary restrictions on bodily freedom—to assure that government does not impose such treatment on prisoners or mental patients without powerful reasons.[13–15] A third answer is that whereas reliable mind-reading technology is not available to the government, officials might still draw inferences about our thoughts—not only from our speech but from our other outward behavior—and then inflict punishment on us because of what they have inferred we are thinking or in order to stop such thought from continuing (or emerging on a future occasion).[iv]

My focus, however, is on a different role that freedom of thought might play—and that is to protect the tools and other resources in our external environment that support and enable our thought. We typically conceive of thoughts as occurring inside of our heads and thus safe there from government intervention. In Justice Murphy's quoted words, thought is generated by "the inward workings of the mind," where government power generally cannot reach.[12: 618] Thought is more vulnerable to attack, however, when it is generated in part by resources outside us.

Andy Clark and David Chalmers argue that such resources form a key part of our mental processes. Some of what counts as cognition, they claim, is produced not simply by processes that occur in our brain, but also by processes that occur, at least in part, outside the mind. It follows, they say, "in some cases interfering with someone's environment will have the same moral significance as interfering with their person."[18:232] In short, their claim is that where a certain kind of thinking is not only triggered by elements of the external environment, but is actually carried out through them, then government (or other external) interference with those aspects of the environment might be an attack on thinking itself.

We can illustrate this point with the help of the hypothetical that Clark and Chalmers present to show how mental processes can extend outside our heads. They ask the reader to imagine an individual with Alzheimer's disease—Otto—who carries a notebook everywhere and uses it as a substitute for the biological memory that his Alzheimer's has weakened. Because he can no longer rely on his brain biology to record and retrieve memories, he instead writes down everything he learns (e.g., a museum's address) in his notebook and looks it up when he has a need for it.[18: 232] The notebook thus serves the same function for Otto that neuronal processes serve for other people who are free of Alzheimer's. And we might add (elaborating on the original hypothetical) that

a government measure that stopped him from using the notebook in this way would cripple his ability to form and retrieve memories to the same extent that forcible psychosurgery or memory-damaging drugs might cripple the brain processes relied upon by other people.[v]

This example, however, does not fully capture the kind of damage that government might do to our thinking from the outside. Otto's memory store is in a journal outside of his body and thus more vulnerable than it once was to government attack only because his natural internal memory has faltered and requires an artificial substitute. But in many cases in which we think with the aid of the outside world, we do so not to substitute for what the brain once did but rather to give ourselves cognitive powers that our biology (by itself) never gave us. As Neil Levy writes, it is not just "external representations" (like those in Otto's notebook) that form an "integral part of cognition" in modern life—it is also "external tools" that we use to "enhance our thought."[21: 38] Writing, for example, is a resource in the external world that gives us mental powers that we did not have before the use of pen, paper, or other tools for recording our thinking. As Levy notes, "all kinds of ways of thinking become accessible for the first time with the invention of ways to keeping track of our thoughts by representing them externally."[21: 39] Even if thought is enhanced by tools that have *no* analogue in our brains, such tools may nonetheless be essential to our existing thinking process—and also require protection against government restriction or manipulation.

In this sense, the law of free thought might be elaborated on the model of the law of free speech. After all, the freedom of speech provided by the US Constitution does not just protect an individual's right to voice, or write down, words. It does much more than that: it protects her right to use printing presses and Web servers to create messages for wider audiences than she could reach with her voice or notepad alone;[22: 266] to use megaphones (or recorded messages) so that her words will not only be voiced, but also heard;[23: 561] or to use video cameras to create films[24] or projectors to screen them.[25: 717]

This characteristic of free speech law—the extension of rights protection to technological tools necessary for certain important exercises of the right—might be true not only of the First Amendment's freedom of speech, but also for its freedom of thought. Indeed, as noted earlier, one well-known thought-enhancement technology is written language itself and perhaps use of language more generally. As Levy writes, "speech does not merely allow us to articulate thoughts that we would have had in any case. Instead, it allows us to externalize our thoughts and thereby treat them as objects for contemplation and manipulation. Externalized thoughts can be worked over, criticized, and improved."[21: 38–39]

Courts and scholars alike have been keenly aware of this thought-generating feature of language and have identified it as providing one of

the central reasons for First Amendment speech protection. As the Supreme Court noted in 2002, the Constitution protects speech at least in part because "the right to think is the beginning of freedom" and "speech is the beginning of thought."[26: 253] As Timothy Macklem writes in explaining the logic of free speech protection, "mediums of expression do not simply convey a person's thoughts to the world; they do a great deal to shape the content of those thoughts."[27: ix] And freedom of speech is justified in part to protect those thought-shaping capacities. Seanna Shiffrin likewise argues that one of the most important purposes of freedom of speech is to protect a person's interest in "the free development and operation of her mind."[28: 287] Language, she writes, echoing Levy, gives a person capacity "to externalize bits of one's mind" and then remember or reflect upon them in ways that would be impossible without speech and writing. And the First Amendment exists in large part to assure that this expansion of cognition is possible.[28: 287] Why, then, not treat the government restriction of cognitive enhancement as being—like censorship or punishment of speech—an unconstitutional limit on a person's "free development and operation of her mind?"

Reconciling Individual Autonomy and Government Interests in Regulating Cognitive Enhancement

There are a number of different reasons that courts and legal thinkers might reject such an argument for treating enhancement through medicine as constitutionally equivalent to enhancement through expression. But here I focus and respond to one major objection: that the Constitution expressly and specifically protects our use of one means to a particular end does not necessarily leave courts free to substitute other means to the same end and give those means the same constitutional status. The First Amendment does not merely aim to protect each individual's interest in the "free development and operation of her mind"; it protects that interest in a particular way—by protecting a person's unrestricted use of language. If we decide to use drugs rather than books to reshape our mental processes, constitutional protection will not necessarily move with us from the realm of language to that of medicine.

As one constitutional scholar has written, one key purpose of First Amendment law and other aspects of the Bill of Rights is to mark and give force to a boundary, long significant in liberal theory, between "the outward realm of the state and the inward life of the individual."[29: 657] When a person takes a project of self-revision from his private or local library to the realm of medicine, some might argue that he is effectively carrying it to the "outward side" of this dividing line, a side where dangers to health justify extensive state monitoring and regulation.

There is, however, another way to conceive of what happens when individuals use medical tools to reshape their minds. In the first place, even if First Amendment rights cannot move with a person as he moves from the realm of speech and other expression to the realm of medical conduct, there are other constitutional rights that *can* apply in the latter realm. American courts have found that the due process rights in the Constitution's Fifth and Fourteenth Amendments protect against state interference in certain kinds of very personal decisions, including decisions about whether to use birth control[30] or terminate a pregnancy[31] and whether to refuse medical treatment.[32] One could conceivably argue that just as these personal decisions about medical procedures are insulated from the state power, so, too, should be the decisions someone makes about whether to receive a particular kind of psychiatric or psychological treatment. So far, however, courts have rejected the claim that individuals have due process rights to receive treatment from a psychologist or psychiatrist.[4: 1232–1233]

In the second place, there is another answer to the argument that freedom of thought loses its constitutional shielding when it is exercised with tools that raise medical dangers. This is not how courts analyze speech-enabling tools. Rather, they follow an alternative model that is far more protective of autonomy and does not simply surrender the challenge of protecting it as soon as one is in territory where some state regulation is justified. As noted earlier, in the modern world, effective communication requires not only that I am left free to speak and write, but also that I have access to certain technologies and communications media. It may require, for example, that I have a cell phone, a computer, and an Internet connection. My cell phone technology, cell phone service, and Internet connection are, in certain important respects, regulated by the Federal Communications Commission (FCC),[vi] but that does not mean the FCC has the power to regulate what I say or write using such communications media. The government might likewise regulate the chemicals in paints[vii] but be barred from restricting the type of art that I create with such paints. We might ask whether such a line—between what is off-limits to government and what is fair game for official restriction—can and should be drawn not only for speech-enabling technologies, such as phones and computers, but also for thought-enabling technologies. Even if government may (and perhaps must) monitor and regulate the way that drugs or TMS devices affect our health and safety, there may be aspects of the way we use such cognitive enhancement tools that should be reserved by the Constitution (or perhaps through other means) solely for free and unrestricted individual choice.

Such an approach makes sense because it is not accurate to place cognitive enhancement solely on the state's side of the dividing line between "the outward realm of the state and the inward life of the individual."[29:657] Rather, it is more accurate to locate cognitive enhancement activity as situated partially

on both sides of this boundary line. On the one hand, the health risks it raises bring it at least partly onto the traditional territory of state regulation. On the other hand, the fact that it, like language and art, is a central tool for shaping one's thinking places it in the inward realm of individual autonomy.

Fortunately, when constitutional law is faced with such boundary-crossing activity, courts are not condemned to act as if the regulated activity is solely on one side of the boundary line and ignore its presence in the other. Rather, they have developed constitutional doctrine that allows the state to act (and sometimes act vigorously) at this boundary line between state power and individual liberty—but under careful monitoring by courts to assure that the state stays, to the greatest extent possible, on its own side of the line. They have done so largely in two ways. First, they examine the government's motive in regulating any such activity to assure that government is really aiming its coercive power at a matter that is the legitimate business of the state and is not simply using such a matter as a pretext to restrict speech or thought it dislikes. For example, government is permitted by First Amendment law to punish serious threats of violence ("true threats").[35: 359] But if officials selectively prosecute a government opponent for making such threats while ignoring threats of the same kind and gravity made by government supporters, a court might conclude that the government is not pursuing the legitimate end of acting against violence and intimidation but is rather using this rationale as a pretext to punish political opponents.[35: 360–361;36: 381]

Second, courts at times go further: even if the government's motive is a motive of the right kind, courts still sometimes worry that the incidental damage its regulation does to speech or thought is not justified by the government's interests or not necessary to further those interests. The leading case on this issue is the 1968 case of *United States v. O'Brien*, wherein a man was arrested and prosecuted when he burned his draft registration card to protest the Vietnam War—in a kind of expression that is carried out through nonverbal conduct rather than words (and hence is often called "expressive conduct" or "symbolic conduct").[37: 377] As in the "true threat" example I have just discussed, the Court began by asking about motive: the First Amendment here, the Court concluded, prevents the government from targeting the protester's anti-war message but leaves officials free to target (and stop) the damage he does to the draft registration system. But it also went further. Even where the government is *not* targeting the expression of a protestor or other speaker—even when it is focusing on the conduct side of "expressive conduct"—it still inevitably does some incidental damage to speech by banning people from burning draft cards as a show of disgust. And the Court thus imposed an additional hurdle in the way of a state restriction on draft card burning to make sure there is a good reason for this incidental damage (a "substantial government purpose" rather than a trivial concern) and that the government has taken steps to minimize the damage

it does to expression (that its measure does not bar substantially more speech than is necessary to achieve this substantial government purpose).[37: 377–378]

Consider, then, how each of these two methods of constitutional boundary analysis might be applied to cognitive enhancement. Consider laws that allow antidepressant drugs to be prescribed only to patients with a diagnosed illness, not to healthy patients who want to feel "better than well."[38: x] The courts' first response to such a law might be to ask why the government is imposing such a ban. If the government is doing so because it wishes to stop individuals from generating the confidence or happiness they seek, or generate any other mood likely to arise from use of the SSRIs, government would seemingly be violating the freedom of mind mandate by restricting mental processes themselves. It would arguably be attempting assert government power over a decision that the Constitution reserves to each individual: namely, how to feel, how to shape the cognitive or emotional lens through which they will experience the world. If, by contrast, government bars use of SSRIs because of concern about the risks of serotonin syndrome, for example, or other dangerous side effects, it would be acting with a constitutionally permissible motive. Quite likely, that would be the end of a court's inquiry. It would find the government's ban on SSRI use by the healthy is constitutional because banning potentially dangerous drugs is a rational way to promote the legitimate objective of protecting patient safety.

However, courts might go further and address the concern that, even where government regulation of cognitive enhancement drugs is rooted in legitimate safety concerns, this should not—by itself—give the government authority to restrict individuals' mental freedom or "cognitive liberty" far more than is necessary to address those safety concerns. Perhaps, for example, government has imposed a complete ban where something less restrictive will satisfy the safety concerns it is worried about. For example, the state might instead institute a "gatekeeper" system in which a doctor must assess and discuss risks for a particular individual before drugs are prescribed or require a mandatory course on side effects before use of cognitive enhancement drugs.[39]

This is not currently the legal regime that courts use to evaluate cognitive enhancement regulation. But the government motive inquiry component of it has already found a place in freedom of thought jurisprudence in obscenity cases. In the leading case on this issue, the 1969 case of *Stanley v. Georgia*, the Court found that Georgia violated the First Amendment when it arrested and prosecuted a man (Robert Eli Stanley) for possessing an obscene film in his own house.[7: 565] Whereas obscenity was not, and is not, generally protected under First Amendment law,[40] the Court seemed to think that when government punished a person for having obscene materials in the privacy of his own home, it could have no purpose for doing so other than to "protect an individual's mind from the effects of obscenity." This, said the Court, was an

impermissible government motive: "Government," it insisted, may not "constitutionally premise legislation on the desirability of controlling a person's thoughts."[7: 566] By contrast, restriction of thought is permissible—as the Court made clear in later cases—where it is merely the by-product of government action targeting something else (that is a legitimate target of government regulation). Government does not violate the First Amendment, for example, when it prohibits possession of child pornography and does so not to prevent the would-be viewer of such pornography from having certain feelings in response to it but rather to protect the children victimized by it.[41: 109] As one court put this idea, only "governmental regulations aimed at *mere* thought, and not thought plus conduct, trigger freedom of thought protection." "Regulation aimed at conduct which have only an incidental effect on thought," it said, "do not violate the First Amendment's freedom of mind mandate."[42: 765]

However, applying this model to cognitive enhancement raises at least two problems. First, how does one tell what counts as an impermissible government purpose? One major problem with attempting to draw a legal line of this sort—between "the outward realm of the state and inward realm of the individual"—arises if we concede that the state is warranted in safeguarding mental as well as bodily health. The goal of protecting mental health inevitably seems to bring the state at least some way into "the inward realm of the individual." For example, the FDA might require warning labels (and conceivably more restrictive measures) on the marketing of a drug if one of its side effects is increased depression.[43] And because the line between mental health and mental well-being is not an entirely clear one,[viii] some courts may find that if government has a right to regulate use of SSRIs or methylphenidate to guard against increased depression, it should also be allowed to do so in order to protect against other negative psychological effects (or risks) of cognitive enhancement that do not rise to the level of mental illness. Consider, for example, a situation in which certain legislators worry that use of SSRI drugs might make people feel less authentic.[45: 182] Or make them feel emotionally flat or numb to certain painful experiences that a fulfilling life—for them and for their family—requires they face, cope with, and learn from rather than avoid.[46: 255] Or that someone who takes these drugs to battle shyness will not only erase that shyness, but also unthinkingly eliminate with it some of the unheralded benefits that characterize the life of an introvert.[47: 166–167; n. 36] Would any or all of these attempts to assure people's mental well-being (and that of their family) be on the constitutionally permissible side of the dividing line between permissible and impermissible government purposes?

To the extent that such a line is a blurry one, it becomes far less useful for courts. First Amendment law on speech might again provide some guidance here. Among the technologies of speech that have been granted protection in recent years are video games and other uses of computer-based technology.

Like pharmacological enhancement, such technology has been blamed for altering human psychology and changing it for the worse. Many, for example, feel that violent video games make those who play them more aggressive.[48] California went so far as to ban the sale of violent video games to minors[49] in a statute that the Supreme Court struck down (in 2011) as inconsistent with the First Amendment's free speech protection.[50] Others have argued that young individuals' absorption in texting, Web surfing, and other behaviors of the Internet era is "rewiring their brain" in ways that reduce their capacity for serious thought. Nicholas Carr writes that "the Net's cacophony of stimuli short-circuits both conscious and unconscious thought, preventing our minds from thinking either deeply or creatively."[51: 115] In the American constitutional system at any rate, such concerns about psychological effects do not by themselves empower the state to restrict speech, art, or video game playing.[ix] Courts have been hesitant to let the state use such grounds as justifications to cross into—and impose restrictions in—spheres set aside for individual autonomy. This is perhaps because such spheres would not provide a very secure shelter for autonomy were officials permitted to intrude upon them any time they could tell a plausible story of how video games—or for that matter, music, movies, and even books—could have negative psychological effects. Perhaps, then, the law should take the same stance toward the psychological effects of cognitive enhancement drugs where such effects do not rise to the level of physical illness or what society regards as serious mental illness: the possibility of negative psychological effects, should not, by itself, be enough to justify government restriction. Skeptics or critics of cognitive enhancement might still argue vigorously and successfully against their use. But, like arguments against certain forms of expression, such arguments would generally have to be aimed at individuals and their doctors rather than at state regulators.

This analysis might be somewhat different when the concern about cognitive enhancement is not that it might harm someone who seeks it out and voluntarily undergoes it, but rather that it might impose harms on unwilling parties. For example, some writers have worried that if cognitive enhancement drugs such as methylphenidate are legal, people will feel pressured to use them—either to keep up with those who are enhanced or in response to pressure from employers or others with a stake in their performance at work or school (see, e.g., Pasquale[53: 609–610]). Legalized enhancement can also harm those unable or unwilling to use it by leaving them on the less fortunate side of a stark inequality between enhanced and unenhanced members of society (see, e.g., Sandel[54: 15]) or possibly by transforming an individual in ways that weaken or harm relationships with family members, friends, and co-workers or interfere with fulfillment of certain social responsibilities (see, e.g., Restak[55: 121, 138]).

Such possible harms to third parties merit a different analysis. When the state is restricting harm to others rather than harm to self, it is more clearly on

its *own* side of the dividing line between state power and individual autonomy. It is fulfilling the state's central responsibility to protect people from violence, coercion, or other harm. However, in the American context at least, courts have still usually set a high bar for claims based on third-party harms. They have insisted that such proponents establish a clear causal link between the harm they fear and the expression they blame for it. The state, on this view, should not be able to exercise power over something it generally may not regulate (thought and expression) by connecting it, only with a tenuous or dubious link, to something it may regulate (threats of physical harm or coercion).[x] Moreover, it is only a certain *kind* of setback to third-party interests—such as physical harm or violence, or significant economic harm—that has traditionally justified limits on expression that causes it. Hurt feelings by themselves have not been sufficient (unless they amount to severe emotional distress).[57: 52–54]

Nor have courts found speech restrictions justified by the inequality resulting from certain individuals' greater access to resources for producing speech or learning from it. Certain individuals in American society already have greater access to the cognitive enhancement made possible by books, videos, and sources of private instruction. If the state may not restrict individuals' access to these forms of enhancement on the ground that it is unavailable to others, it is not clear why it should be able to restrict pharmacological enhancement on this basis (unless there is something distinctive about the inequality generated by this medically enabled form of cognitive enhancement).

Apart from the challenge of deciding when the state's targets for regulation are legitimate objects of state power, there is also a second challenge that arises if courts worry about the unintended effects of such power: when, one may ask, should government officials be constitutionally obligated to justify or mitigate such unintended effects? After all, as one federal court has pointed out, "thought and action are intimately entwined; consequently, all regulation of conduct has some impact, albeit indirect, on thought."[42:765] Driving laws, for example, prevent us from having some of the experiences one would have from driving faster than the speed limit (or driving while intoxicated). Gambling laws bar us from the experiences associated with certain forms of that activity. Should government have to show, for each of these legal restrictions, that the limitations that such laws place on thought are justified by substantial government interests and that their restrictions on thought are not substantially more extensive than necessary to achieve the state's goals? Such a regime would be deeply at odds with the presumption in American constitutional law that most regulation is presumed constitutional.

Consequently, if courts adopt special safeguards for the tools we use to enhance thinking, these cannot be safeguards for everything else we do. Freedom of thought, in other words, must be characterized by principled limits, and free speech law might again provide a model. The First Amendment

protects not only against censorship at the moment of communication, but also that which muzzles communication also at other points "of the speech process," including the process of creating the speech, by recording a film, drafting a written work, or gathering the thoughts one will convey in later expression.[24:596] There is a difference, however, between extending constitutional protection to all parts of the *speech process* and extending it to all *human action that might be the subject of speech*. It is one thing for the state to restrict our use of ink or word processing programs to write essays of our choice. It is another for the state to leave us with full access to those tools or resources for speech creation but deny us the right to commit illegal action (such as exceeding highway speed limits) that we might like to make the subject of an essay. A similar distinction might guide constitutional thinking on cognitive enhancement: regulators may—and inevitably will—stop us from taking certain actions in the world, such as plunging ourselves into the excitement of a chaotic fight or a dangerous driving experience. They can restrict such actions even though we might wish to make them the subject of a memory or the trigger for a certain feeling. And they should not need to justify the incidental limits that each such restriction has on our mental life. By contrast, requiring justification from officials make more sense when the restriction is to bar or impede our use of certain therapeutic tools designed to give us greater control over our thoughts and feelings.

Conclusion

Given the complexity of the tradeoffs for mental well-being that might accompany cognitive enhancement, some might argue that decisions about it are best left for democratic deliberation and policy-making—not constitutionally insulated from this collective process of debate and discovery. This is a plausible position. However, in a constitutional system like that of the United States, which, as the Supreme Court has noted, is committed to the liberal idea that certain spheres of life must be set aside for "autonomy of the self" and where state power must be strictly limited,[5: 562] there are at least strong arguments that cognitive enhancement—even through medical means—has a place in such a sphere. When there is a feature of my mental processing that I wish to change, but it has roots (at least partly) in brain characteristics I cannot will away, then my only option (or best option) may be to tackle the problem at its source by altering the brain features that give rise to it. Mental autonomy of this sort may be possible only with medical tools. Although the state may well have strong reasons to regulate such activities in any case, to protect my physical and mental health, the Constitution's freedom of thought protection might nonetheless require courts to assure that the state is genuinely acting from those reasons rather than out of a desire to restrict a person's control of her

own thinking and that the state does not limit such mental autonomy more than it needs to in order to achieve its health and safety goals.

This argument admittedly takes as its starting point and draws on the jurisprudence of a particular constitutional system—that of the United States. The US legal system is, of course, not unique in offering constitutional protection for freedom of thought and expression. Numerous other countries safeguard freedom of conscience and expression, as does the European Union. However, that another jurisdiction recognizes a right to freedom of speech or freedom of thought does not mean that it will understand and protect those rights in the way that American courts do. Other systems, for example, might be less willing to extend protection for free speech to certain technologies that enable or amplify speech. They might also be more willing to find that other state interests outweigh interests in free expression or free thought. Or courts in such systems might be more willing to leave to legislators the task of balancing autonomy interests and other interests.

Still, the framework here at least provides one possible model for legal systems that take seriously the long-standing claim of liberal thinkers that there is a certain sphere of individual thought and action that should usually be reserved for individual autonomy and thus be off-limits to government control. In any such legal system, courts and other legal actors will likely have to struggle with the challenge presented by activities that arguably straddle both sides of the line that divides the realm of individual autonomy from the realm of legitimate state power—and the constitutional model described here offers one starting point for meeting this challenge when individuals use technology to alter the way they think.

Notes

i. The First Amendment's speech clause states "Congress shall make no law . . . abridging the freedom of speech."

ii. The First Amendment's speech protection does cover certain *communications about* medical issues—even when they are made by commercial actors marketing medications.[3] However, courts are far more reluctant to find that the First Amendment applies to conduct that is not only about health, but directly affects it.[4: 1228–1229]

iii. Justice Holmes, for example, said that "if there is any principle of the Constitution that more imperatively calls for attachment than any other it is the principle of free thought."[8: 654–655] Justice Cardozo said that, together with freedom of speech, freedom of thought is "the matrix, the indispensable condition of nearly every other form of freedom."[9: 326–290] And the Court has stated that "The First Amendment gives freedom of mind the same security as freedom of conscience in religious matters."[10: 531]

iv. In these cases, the Court assessed situations in which the government fired individuals on the basis of external indications of party loyalty (and was thus using evidence of their belief as a basis for firing them).[16,17]

v. Idem. For more extensive analyses of this issues, and also of how the discussion that follows about how freedom of thought may protect cognitive enhancement tools or other external tools for thinking, see Blitz[19: 1188–1189] and Blitz[20].

vi. For example, the FCC indicates on its website that it "has adopted rules aimed at improving the reliability of wireless 911 services and the accuracy of the location information transmitted with a wireless 911 call, as part of its efforts to improve public safety."[33]

vii. For example, violations of the Consumer Product Safety Commission rules restricting the use of lead paint in the United States have resulted in millions of dollars in fines.[34]

viii. Synofzik observes that "in principle, every treatment aims at enhancing a certain state and is in fact legitimated only by the assumption that it will somehow improve the patient's quality of life." In other words, all medical treatment is about improving the well-being of the patient, and there is sufficient clear distinction between circumstances in which these improvements lift someone out of "disease" and those in which they address low well-being. The same confusion might apply to an analysis of side effects (or intended effects) and the question of whether they can be said to reduce psychological well-being in a way that amounts to illness or medical harm.[44: 91]

ix. In evaluating the California video game restriction ultimately struck down by the Supreme Court, Ninth Circuit stated, "in evaluating the State's asserted interests, we must distinguish the State's interest in protecting minors from actual psychological or neurological harm from the State's interest in controlling minors' thoughts. The latter is not legitimate."[53: 962] Courts are perhaps more willing to expand what counts as psychological harm when laws apply to minors but, in this case, still demanded scientific proof of damage to children's functioning that the state could not provide.

x. Thus, speech may not be classified "incitement" and restricted or punished because of the violence or other lawless action it inspires unless the government shows it is "directed at inciting that action" and likely to do so soon after the speech occurs.[56: 447]

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19

Drugs, Enhancements, and Rights

Ten Points for Lawmakers to Consider

JAN-CHRISTOPH BUBLITZ

In the past decade, the academic debate over cognitive enhancement (CE) unfolded largely isolated from the notoriously thorny debates about drug policy reform and the successes and failures of the international drug control regime (ICR). In hindsight, this approach proved beneficial. Not engaging with an ideologically saturated debate fueled by public fears afforded steering discussions onto a more rational path and addressing some foundational issues at the intersection of neuroscience, philosophy of mind, and ethics. However, moving from philosophical thought-experiments and speculative future enhancement devices that occupy contemporary academic debates to concrete regulations of those neurotools that exist today, the reality of millions of problematic drug users, addictions to licit and illicit substances and consequential social problems, general issues of health policy, and the existence of a global regulatory system designed to restrict availability of many perilous substances to medical use can no longer be neglected. Drug policies have been extensively dealt with on theoretical, political, legal, and—one should not forget—practical levels. Much of the knowledge of experts and commissions, social or medical workers, and users that informs drug policy has not been tapped and systematically reviewed in the enhancement debate. Unless it provides novel insights rather than arguing for old drugs in new veins, initiating a regulatory debate without taking notice of the century-old drug discourse and without drawing on the manifold experiences to regulate mind-altering tools appears pretentious and futile, not least because amending the regulation of controlled substances is technically a revision of current drug legislation.

The central aim of this chapter is to build bridges between these closely related yet not sufficiently connected discourses, primarily in normative aspects. I shall develop ten points for novel regulatory frameworks that lawmakers should observe. Connecting the debates is timely for two reasons: surveys

indicate that the prevalence of (illicit) use of CEs seems to be on the rise in Western countries.[i] Furthermore, the political consensus that sustained the ICR over the past 50 years has slowly but perhaps irreversibly begun to unravel.[2] At what appears to be a turning point in the war on drugs, novel regulatory frameworks for recreational, enhancement, and other nonmedical uses are urgently needed. Moreover, owing to rapid advances in neuroscience, novel nonpharmacological interventions into minds and brains, such as transcranial magnet stimulation (TMS) and various forms of electric stimulation of the brain through electrodes placed over the scalp (tDCS) or deep inside the brain (DBS) have become available recently. Their use for therapeutic and nontherapeutic purposes has to be regulated soon, especially because tDCS devices that are marketed with the (scientifically not yet validated) claim to enhance vigilance are in many countries freely available without due regulatory oversight.[3,4] Due to wording, the international drug conventions apply only to pharmaceuticals. But from a normative perspective, different regulatory paradigms for various means appear unpersuasive. These novel technologies are—just like familiar pharmaceuticals—direct means to alter electrochemical properties of the brain or, more precisely, influence the electrochemical activity within neurons and the interactions between them. Regulating these interventions faces similar normative and practical problems. The challenge for lawmakers is thus much larger than defining appropriate enhancement uses: to develop a framework encompassing all forms of direct interventions into minds and brains for nonmedical and nonscientific purposes.

The International Control Regime and Its Problems

To begin, let us briefly review the structure and problems of the ICR. Production, distribution, and consumption of psychoactive substances are regulated in various ways and on different levels by international, supranational, and domestic institutions. The overarching ICR is formed by three United Nations drug control conventions that almost every country has ratified.[5–7] The ICR provides the blueprint for and largely shapes the content of domestic regulatory systems. Some substances with potential enhancement effects, such as amphetamines, methylphenidate, or cocaine, as well as classic recreational drugs like cannabis or psychedelics are controlled by the ICR. Whether and to which degree substances are scheduled is decided in a process involving the Commission on Narcotic Drugs (CND) and the World Health Organization (WHO).[ii] The standards for scheduling are laid down in the treaties, primarily comprising two factors: the medical (or scientific) benefits of a substance balanced against its liability for abuse and its harmfulness.[iii] Interestingly, not only the chemical properties of substances and their hazards to individuals are taken into

account, but also and explicitly the "seriousness of public health and social problems" they may cause.

Once a substance is scheduled, states are obliged to ban its use for any other than medical or scientific purposes, details of which depend on the subcategory in which the drug is placed (I–IV).[iv] Although the treaties do not define "medical use," it is clear from context that it is understood synonymously with "therapeutic use" (i.e., measures necessary to cure or alleviate a medically recognized disorder).[v] The treaties thus distinguish between therapeutic and nontherapeutic use. Unofficially, the latter is often indiscriminately termed "recreational use," which includes consumption for leisure as well as enhancement. Many national drug laws mirror the distinction between therapeutic and nontherapeutic use and expand it to other substances not controlled by the ICR. Details vary from one country to the next. In many jurisdictions, it is unclear whether healthy persons can legally obtain a prescription of a noncontrolled substance for overt enhancement use.[vi]

The stated aims of the ICR are to ban use of controlled substances for nonlegitimate purposes without unduly restricting their availability for medical and scientific ones.[vii] Accordingly, the treaty organs have largely focused on the eradication of drug consumption, reflected, for example, in the motto of the UN General Assembly Special Session on Drugs in 1998: "A drug free world—we can do it."[12] In national disputes, the ICR often serves as a justification (or pretense?) for restrictive and punitive policies, quelling reform debates by referring to international obligations. The reasoning behind the prohibitive framework is fairly simple: controlled substances are harmful, and curbing their consumption promotes health and prevents or alleviates social problems.

CURRENT CONTROVERSIES: WAR ON DRUGS

The strategy to eliminate illicit use consists in targeting both supply and demand. Most national drug policies rest on four pillars: prevention of consumption (through public awareness and deterrence), therapy (often aiming at abstinence), reduction of further harms to individual and society (such as blood-borne diseases), and repression (destruction of crops, criminal prosecution, incarceration), with varying emphasis by each country. In the past decade, the repressive side has come under fierce criticism. In the eyes of many, the War on Drugs that Richard Nixon declared in 1971 has failed. More than 40 years later, hundreds of millions of people illicitly consume drugs, and, despite their worldwide ban, substances are almost universally available. A drug-free world is not even a distant glimmer on the horizon. Critics persuasively point out that repressive state actions have caused massive harms in terms of health, welfare, and human rights violations.[12–15] The War on Drugs has always been a war against people, against anyone who stands in some relation to drugs in

the long chain from their production, often in developing countries, to their consumption, mostly in rich Western states. Some countries still impose the death penalty, inhumane labor camps, or torturous rehab programs for drug-related offences; others have witnessed mass incarceration with roughly every fourth criminal conviction stemming from drug-related offences. Enforcement of anti-drug laws and human rights have been described as "two parallel universes" because many drug users are deprived of rights and withheld necessary medical care.[16] This situation even prompted the UN High Commissioner on Human Rights to remind governments of their obligations toward "individuals who use drugs" who "do not forfeit their human rights."[17] In producing as well as consuming countries, drug-related crime and social and ecological problems have proliferated. Out of governmental control, drug markets are in the hands of criminal organizations that destabilize the rule of law and democratic institutions in entire regions, from Latin America and Mexico to Afghanistan. These facts give rise to the suspicion that the War on Drugs may have caused more harm than it averts. Whether it truly has failed primarily depends on the precise conditions of success or failure, which have unfortunately never been fully formulated. In the absence of objective yardsticks, the failure of one strategy can only be declared if a different one has proved more successful. But as alternative regimes have never been tested, not least because of the ICR's global reach, advocates of a hard stance can still respond by claiming that without the war on drugs, prevalence and drug-related problems would be much higher. Unable to compare the present to a counterfactual state of the world, one should resist drawing sweeping conclusions.

Nonetheless, the persistence of production, consumption, and consequential social problems allows politicians, nongovernmental organizations, and the concerned public contemplate novel strategies. Most likely, they require replacing the priority of prevalence reduction with harm reduction. The harm reduction paradigm has emerged as the central topic in drug policy since the outbreak of HIV/AIDS, but is still not the unanimously accepted default position. In fact, only a few countries strictly orient their policies in its light, and the position of the UN is inconsistent and varies between agencies.[18] Harm reduction considers nonmedical drug use as a perhaps undesirable yet unavoidable social phenomenon that ought to be addressed with the aim of reducing costs to both the individual consumer and society at large. Rather than curbing consumption, policies should primarily aim at minimizing drug-related risks.[viii] Practical examples range from needle exchange and medically supervised injection facilities to drug-checking services or heroin on prescription, measures that prevent the transmission of communicable diseases and overdoses and effectively save lives. In spite of such promising prospects, many states are reluctant to make even moderate concessions to drug consumers and to offer assistance beyond medically supervised abstinence programs because

they consider any form of support as aiding and abetting drug use. Harm reduction implies accepting and managing the social reality of drug consumption, whereas the ICR and national policies seem sternly committed to eradicate it.

One source of the regime's current crises thus lies in its conflicting objectives: reducing prevalence or counteracting health and social problems? Evidently, the former is understood as a means to the latter, yet some health and social problems are best averted if drug use is accepted and accompanied by supportive measures rather than criminalized. The preambles of the conventions state that the parties are "concerned with the health and welfare of mankind." However, these objectives are not straightforwardly pursued in the following articles of the treaties nor in the practical work of the ICR, predominantly concerned with "combating the evil" of drug use.[ix] One cannot but get the impression that the ICR has confounded means with ends. Whoever opposes drug use in the name of public health—or even "human welfare"—might have to embrace harm reduction or welfare promotion rather than repression and prevalence reduction. The tension between these objectives, barely visible on first glance, lies at the root of many controversies over drug policies.

Unfortunately, the ICR has proved inflexible and unreceptive even of modest reform proposals, aptly demonstrated in the recent controversy over Bolivia's quest to exempt the local custom of chewing unprocessed coca-leaf from international control.[x] Even the often praised Dutch coffeeshop model verges on treaty violation and is possible only with the paradoxical situation that possession, use, and purchase of small amounts of cannabis in designated shops are de facto tolerated, whereas growing and selling remain punishable offenses (the so-called backdoor problem). Other dissatisfied European countries, such as Spain and Portugal, push the treaty limits by pursuing their own pragmatic ways of de facto decriminalization. In 2014, Uruguay became the first country to openly defy the ICR and to fully legalize the production and consumption of cannabis. Despite the *prima facie* reasonableness of experiments with cannabis legalization that even some US states have realized, the outspoken and influential International Narcotic Control Board (INCB) that monitors treaty compliance meets reforms with resistance, regularly condemning states for novel or experiential approaches, including harm reduction programs such as injection rooms.[xi] The INCB still faithfully believes in the tenet of a drug-free world.[xii] Its mandate can only be changed by reforming the ICR. This option, however, requires strenuous diplomatic efforts and agreements between more than a hundred nations with diverging economic interests, drug-related problems, cultural traditions, and geopolitical agendas. Thus, treaty reform seems politically almost inconceivable at the moment. Yet, the long-term survival of the ICR in its present form appears equally unlikely—future developments are hard to project.[24–26]

The present problems and the hesitance to embrace harm reduction provide for an important lesson: regulatory systems are no ends in themselves. They are a system of rules designed to achieve objectives, and these objectives and their relation to each other have to be clearly specified: what is the ultimate aim of drug control—promotion of "health and welfare of mankind" or reduction of prevalence? Objectives have to be observed on all levels of implementation (e.g., law enforcement), otherwise means and ends are easily confounded. The consequences of regulation, achievements as well as failures and unintended harms, have to be evaluated in light of these objectives, preferably by previously defined standards. Furthermore, the unfortunate current situation is partly caused by regime inflexibility that leads to a stalemate. Without treaty revision, the ICR is factually cast in stone, and the international monitoring bodies that have some latitude for treaty reinterpretation and policy reform are not politically accountable for the outcomes of prohibition. National lawmakers, by contrast, who have to deal with consequential harms of drug policies and often enjoy popular support to reform them, do not possess sufficient leeway for policy experiments. A system more sensitive to social and political developments and allowing for local adjustments seems preferable.

FURTHER CRITICISMS

With a view on future policies, it is useful to rehearse two further criticisms commonly leveled against the ICR. For one, scheduling and classification of substances appear incoherent. To many scientists and users, it remains unintelligible why lethal substances such as tobacco and alcohol are more easily accessible than, for example, cannabis. As a general legal principle, restrictions have to stand in a proportionate relation to the hazards of the object of regulation. A group around the British psychiatrist David Nutt has submitted a proposal to assess harms objectively on a multicriteria harm scale, with the perhaps unsurprising but nevertheless remarkable result that current classifications are incoherent and do not correspond to experts rating of harmfulness.[27,28] Although one may argue about the criteria of their harm scale,[29–31] the underlying normative point should be beyond dispute: unfounded and arbitrary distinctions between substances not based on empirical research but on dubious preconceptions and prejudices cannot be justified and undermine the persuasiveness of the entire control regime. Moreover, as science progresses, substances should be reassessed. But many substances have never been reviewed since their initial scheduling decades ago.[32]

Second, the ICR does not fully appreciate that the great majority of illicit drug users are moderate users, not suffering from serious health problems. A minority of problematic users causes the bulk of drug-related problems, mainly because of the particular substances they consume, their consumption

patterns, and individual vulnerabilities as well as socioeconomic conditions. On the one hand, any regulatory model has to be formulated in abstract and general terms and thus has to disregard individual circumstances to some extent. On the other, a regulatory model that is in principle unable to draw finer distinctions than across-the-board prohibitions forfeits the idea of providing adequate solutions for concrete cases. A more nuanced approach that affords differentiations is thus desirable.

CASE EXAMPLE: THE SWISS CUBE MODEL

A prime example that drug policies can incorporate such considerations is the Swiss Cube model, developed by the Swiss Federal Commission for Drug Issues.[33] It is a guide to appropriate state measures in regard to different substances and consumption patterns. The model comprises all psychoactive substances including alcohol and prescription drugs. Also, it differentiates between three types of consumption patterns: "low-risk use," "problematic us,e" and "dependence." It has four sets of policy options: "protection and promotion of health," "therapeutic options," "harm reduction," and "control of the market." Policy and state actions can be fine-tuned according to each category. For instance, low-risk use of a comparably harmless substance might be best addressed by measures of the "protection and promotion of health" and "market control" categories (e.g., informing consumers and licensed distribution), whereas dependence to more harmful substances calls for "harm reduction" and "therapeutic options." Of course, the model is descriptive and cannot by itself provide the objectives of drug policies, but it serves to identify incoherencies in and priorities of policies and forms the basis for a more fine-grained system with different responses to different situations. Policy makers are well-advised to consult the Swiss Cube model.

How the CE Debate May Change Drug Discourse

To date, the CE debate has not had much impact on drug reform debates. However, it possesses the potential to shift the discourse in various ways. The ICR rests on the distinction between medical/therapeutic and nonmedical use, with the latter commonly understood as "recreational." But enhancement (altering capabilities without therapeutic ends to improve them beyond normal functioning) does not easily fit in this dichotomy, one marked by therapeutic necessity on the one hand and what appears as hedonistic lifestyle choice on the other side. For one, enhancement may become a part of medicine proper in the same way as nontherapeutic medical interventions for aesthetic purposes already have. Moreover, rather than recreational, a way to "tune-in and

drop-out" (Timothy Leary), enhancements appear to many as an option to cope with increasing demands in social and economic life. In terms of purpose, enhancement seems to constitute a third category.

At any rate, the ICR's distinction implicitly relies on the one between therapy and enhancement. The tenability of this distinction has been called into question because many authors consider the categories of illness and health and, correspondingly, of treatment and enhancement as somewhat arbitrary cutoffs in a continuum of mental capacities and properties. Some support for this claim can be found in the fact that the range of mental disorders steadily expands with every novel psychiatric diagnostic manual, up to a point at which ordinary life experiences such as grief and shyness become pathological disorders. But even though this criticism of overpathologization has some merits, one should recall that any normative distinction is hampered by a residue of arbitrariness. As long as prototypical examples of healthy and ill persons can be discerned, a difference between both exists wherever borders precisely run. However, the permeability of the distinction causes problems for the legitimacy of the ICR because it ties very different legal consequences to each side. It calls on states to provide access for medical use and, simultaneously, to mobilize its repressive apparatus to prevent and prosecute consumption for other purposes. This great discrepancy in state actions ultimately hinges on the thin and evolving line between therapy and enhancement and appears unpersuasive in gray areas. For instance, persons who consume controlled substances for (unsupervised) self-medication or to alleviate everyday nuisances such as stress, sleep deprivation, fatigue, or mild cognitive decline are not considered ill in a medical-pathological sense. Their use thus constitutes enhancement. Yet, a categorical denial of the permissibility of these uses, or even its criminalization, does not seem warranted. At the very least, the enhancement debate prompts us to reconsider those categorical cutoffs between licit and illicit use.

But the impetus of the enhancement debate reaches beyond cases in the gray area between normalcy and illness. In short, the ICR is based on a risk–benefit assessment in which the only benefits eligible for consideration are those of therapeutic or scientific value. However, millions of people use drugs in order to experience other effects that they presumably consider beneficial. The ICR a priori excludes these benefits from further evaluation. How can this ignorance be justified? Conventions and commentaries remain remarkably silent on this issue. Apparently, the entire ICR is founded on the premise that risks of controlled substances always outweigh benefits. This contention might be explained by several reasons: for one, drug legislation in general seems ignorant of the interests and motives of users who are mostly either characterized as weak-willed addicts or demonized as threats to society. The idea that many of them are reasonable autonomous persons has not found much resonance, so that benefits, as conceived by them, are discounted. Moreover, the ICR appears

to maintain a sometimes exaggerated view on addiction. Its historical origins lie in the Opium Conventions, and, until today, drug debates are often set against the backdrop of highly addictive substances such as heroin (Europe), crack, or methamphetamine (United States). Surely, the often miserable state of users of those substances may not be justified by whatever benefit they perceive. However, not all controlled substances lead to this form of dependence, and the poor conditions of users are not only due to the intrinsic properties of drugs but exacerbated by social circumstances, partly generated by the prohibitive regime.[34] Finally—and without trivializing addiction—the concept and its policy implications are much more complex than the conventions suggest.[35–37]

An unspecified risk of addiction might by itself not necessarily warrant the categorical dismissal of nonmedical benefits. Without engaging and evaluating benefits in detail, the premise that such benefits are always outweighed by risks is merely an assumption. In classic recreational use, benefits often consist in pleasurable experience. Even if one were to discount drug-induced pleasure as "false" and "illusory," its exclusion by a system "concerned with the welfare of mankind" is not only philosophically remarkable. Even more perplexing, in the logic of prohibition, the pleasure-inducing properties of a substance count in favor of its ban insofar as they increase the likelihood of "abuse" (i.e., repeated nonmedical use).[38] Apart from attaining pleasure, the enhancement debate has highlighted many nontherapeutic effects *prima facie* beneficial for both the individual and society, from improving cognitive capacities and altering one's personality structure in the quest of self-creation to strengthening moral dispositions. Not unlikely, some of these benefits may outweigh risks. Whoever contends the contrary, *pace* consumers, has at least to provide a framework and criteria by which these questions can be evaluated. The absence of such and the silence of the ICR on these matters is notable given the harsh consequences it stipulates for disobedience.

COGNITIVE LIBERTY AND THE RIGHT TO TAKE DRUGS

Surely, developing a framework to assess risks and benefits beyond medical usefulness is fraught with difficulties: how to compare effects in supposedly incommensurable domains—health versus pleasure, longevity versus richness of experience, emotional dullness versus self-control or improved cognition? Who makes these decisions and by which standards—subjective, objective? This leads to a more general point: should substances be exclusively evaluated by an objective risk–benefit model at all? Risk–benefit assessments are, in the end, arguments from utility. A policy is right then if, all things considered, the objective benefits prevail over risks. However, such an exclusive risk–benefit assessment might not be the appropriate normative standard. Potential consumers may have a legal right to use drugs for nonmedical purposes, and

this right is not based on—or may trump—considerations of utility. In other words, even if it turned out that strict prohibition were indeed the best way to reduce overall drug-related harm, persons might nonetheless be entitled to use drugs.[39] Their right could override an objective risk–benefit assessment.

But is there a right to enhance oneself? Legal scholars have advanced the notion of cognitive liberty as every person's right to self-determine what is in and on her mind, to configure one's own mental system[40–44] (philosophical views[34,45,46]). Cognitive liberty entails the permission to use mind-altering tools. At the moment, most national and international legal systems do not recognize such a right, but strong theoretical reasons speak in its favor. Its foundations lie in the classic liberal democratic idea that people should be free to decide for themselves in self-regarding matters—autonomy. Whereas autonomy is often primarily understood in relation of a person to her body, there are no intrinsic reasons why it should be confined to bodily matters. Mental autonomy is the logical expansion of any form of autonomy.

In legal theory, some currently ill-defined rights pertain to mental autonomy: freedom of thought (a universal human right) and the right of a person to herself, the original right of every person in classic Enlightenment reasoning and its modern formulations in the right to privacy or personality.[47] More abstractly, the idea that governments should not have the power to control the minds of citizens is deeply entrenched in constitutional theory, albeit the suggestion that controlling tools to alter minds could amount to controlling minds has not yet been fully explicated. At any rate, the strong position of autonomy in the architecture of fundamental rights and duties can hardly be denied, and at least *prima facie* autonomy encompasses the use of neurotools. It implies that persons can define for themselves what is good and valuable to pursue. By allocating the power to make decisions over mental alterations in the hands of affected persons, they are bound to evaluate risks and benefit for themselves and according to their own standards.

Surely, autonomy is not limitless. States can limit liberties to prevent harm to others and to foster social goals. Furthermore, most legal systems confer on governments the power to curb individual freedoms for paternalistic aims (i.e., for the good of the affected individual herself). The extent of permissible paternalism, especially whether it can justify punitive sanctions against those whose welfare it portends to protect, and its deeper justification are controversial issues not to be pursued further here.[48,49] Assuming the permissibility of paternalism in principle, the protection of mental capacities required for informed decisions and the prevention of mental harms or debilitating addictions are prime candidates for legitimate governmental intrusions into user's freedoms.

But even if one concedes that states can restrict cognitive liberty and therewith the use of neurotools, the structure of the overall argument changes profoundly. Restrictions of human rights require justification, whereas the

ICR takes the legitimacy of its prohibitive stance for granted. The ICR often appears unwilling to self-critically engage with human rights concerns and is strikingly ignorant of the autonomy of drug users. This may even cast doubts on its compatibility with international law. UN agencies are bound by human rights, as guaranteed in the Universal Declaration and the Covenant on Civil and Political Rights, and international treaties such as the drug conventions have to be interpreted in their light.[12,25,50]

In a rights-based approach, public health—which is currently considered the paramount value and ultimate goal of drug policy behind which other interests of users have to step back—would have to be supplemented with and to some extent replaced by the human rights of users, primarily cognitive liberty. Instead of "combating the evil of drug use" by sometimes quasi-military means, states would have to respect people's right to mental autonomy and curb it, if necessary, in the least restrictive manner.[51] Any restriction needs to be justified taking all (perceived) benefits of drug use into consideration and be grounded in sound empirical data. The enhancement debate has demonstrated that many classic anti-drug considerations might not apply to every instance of voluntary mind transformation so that it is anything but self-evident that across-the-board prohibitions could be justified under a rights-based approach. At any rate, rather than being the rule, criminalizing people because they seek to alter their minds would be possible only, if at all, in exceptional circumstances.

Furthermore, the problem of lacking differentiations between problematic and less problematic users resurfaces. Whereas the rights of the former may be curtailed for paternalistic reasons, it needs to be argued why the liberties of the latter should be equally infringed. At least, it has to be recognized that restricting the liberties of millions of people for reasons that only apply to a subset of them is deeply problematic. Regulatory systems should thus aim to incorporate the idea of the Swiss model to draw distinctions between problematic users and consumption patterns and those who merely expose themselves to risks that never realize. The latter is a legitimate exercise of personal autonomy. Such an approach requires taking individual health, genetic dispositions, and other vulnerabilities as well as social factors into consideration. In practice, this seems achievable only through a model involving prescription by a psychiatrist or equivalently trained professional.

THE RIGHT TO REFUSE ENHANCEMENT AND THE DOPING ANALOGY

Because its overarching idea is self-determination, cognitive liberty implies the permission to use but, by the same token, to refuse mind-altering tools. It

opposes any mandatory use of psychoactive substances—be it for therapeutic or enhancement purposes. Before the enhancement debate, a right to abstain from drug use was barely worth mentioning.[xiii] However, it may likely become a key consideration in coming regulations of neurotools. Therefore the idea of cognitive liberty can and should be embraced not only by transhumanists and drug liberals, but also by bioconservatives who often ground their case against enhancement on the perils of a society in which drug use becomes an uncritically accepted part of daily life.[42] Even if individuals are not coerced in a strict sense and retain the formal power to reject enhancing themselves, the idea of cognitive liberty may be more demanding and include freedom from societal and economic forces or soft coercive influences on people to alter their minds.[xiv]

It does not take a clairvoyant to predict that liberal regulatory schemes will cause a widespread use of enhancements, especially in competitive fields such as job markets in a economy of knowledge. Artists and writers, software programmers, academics, freelancers, and CEOs will be tempted to resort to performance-enhancing tools, first to meet urgent deadlines and then, perhaps, to cope with informational overload and increasing demands of the job market. At this point, the often invoked analogy of enhancement and doping in sports comes into play. Proponents of enhancement argue that athletics is sufficiently dissimilar to other parts of social life. In many aspects, their diagnosis is correct: sport is competition for its own sake, the achievement of arbitrary goals (to run so many meters jumping over hurdles, to put an object into another object only touching it with the feet, etc.). The rules of sport seek to preserve and promote the spirit of sport and specific notions of fairness that form the basis of the sport's immanent aim of constructing winners and losers. Doping potentially undermines the very endeavor of competitive sports. With doping, we may "win races, but lose racing."[xv] Because of its peculiarities, the rules of sports and its understanding of fairness and competition might—and should—not be those by which other domains of social life are governed. As a consequence, anti-doping arguments cannot be transferred to other fields by simple analogy.

Nevertheless, doping regulations provide a persuasive answer to a structural challenge for autonomy in competitive fields where the decisions of some actors pressure others into following their lead. Once enhanced persons outperform abstainers, win the pitches and get the jobs, the latter are very likely confronted with the dilemma of either giving in to enhancement or taking negative social and economic consequences upon themselves. To abstainers, a merely formal guarantee of autonomy might not be worth much in face of strong factual forces. The objective of doping regulations is best conceived as the protection of athletes against competitive forces to expose themselves to risks above a certain threshold. The same reasoning applies to mind-doping. So whereas cognitive liberty entails the right to enhance, it equally entails the right to refrain from enhancing. Whoever appeals to cognitive liberty to argue

for her right to use drugs cannot, on pain of self-contradiction, deny others the right to refuse so.[xvi]

This conflict between the interests expressed in rights *to* and *against* enhancements cannot be resolved by simply favoring one side over the other. Countervailing interests have to be carefully reconciled by developing an objective threshold of what one may call "legitimate socially acceptable risks." Health concerns are among the most important, but by no means exclusive, considerations. Here is an analogy with today's most widespread enhancer—coffee: although its consumption increases vigilance and may thus provide a competitive edge, the idea of banning coffee from offices to protect non–coffee drinkers appears absurd. Apart from established cultural praxis, the main reason is that the negative effects of coffee are considered socially acceptable risks. The same might not be true for many pharmaceutical enhancers. Whereas no one can seriously expect and demand to live in a risk-free world, citizens are entitled to a societal risk management that demarcates the realm of acceptable risks and seeks to minimize all the others. The right to refuse enhancements therefore gains momentum and outweighs the right to their use if—and arguably only if—the particular substance or device entails risks above a threshold of socially acceptable risks. Where the borders of the realm of acceptable risks precisely run has to be defined by democratic legislators. They should roughly correspond to the regulation of other perils of life, from nuclear power plants and car traffic to extreme sports.

The doping analogy calls for a two-step regulatory system that differentiates between competitive and noncompetitive use. Competitive contexts in which individuals who prefer to abstain are pressured into using enhancements have to be regulated more tightly. This supposedly necessitates gatekeepers and, as a means of last resort, banning those neurotools that exceed a threshold of socially acceptable risks from competitive domains. Bans would, of course, raise a host of practical problems much more intricate than anti-doping laws. How to ensure that, for example, academics or self-employed businessmen refrain from using enhancements? Here, the creativity of regulators—and of society—is put to the test. In academia, where regulatory issues are often solved by relying on credibility and reputation of researchers, soft measure such as codes of conducts or self-commitments could be introduced.[53]

Ten Points for Lawmakers to Consider

The enhancement debate has seriously challenged the normative foundations on which the entire prohibitive framework of the ICR rests: the treatment/enhancement distinction, the principled ignorance of nonmedical benefits of drug use, and its exclusive concern with health rather than human rights. Once

health as the only legitimate aim of drug policy is supplemented with the idea of cognitive liberty, new problems and complexities such as social pressure in competitive contexts emerge. Many more questions need to be answered. Whether states should encourage or discourage enhancements and the objectives of drug policies ultimately depends on value judgments, in the absence of which concrete policy proposals are premature and tend to put the cart before the horse. Nonetheless, the foregoing affords to formulate some standards for novel regulatory frameworks:

1. Although self-evident, the reluctance of the ICR to promote harm reduction strategies and its adverse consequences on health and welfare prove that any regulatory system must pursue clearly stated objectives that are recognized at every level of implementation.
2. Any novel regulatory framework should seek to overcome today's piecemeal approach by setting coherent parameters for the use of all means to directly intervene into minds and brains, from pharmaceuticals to magnetic or electrical brain stimulation.
3. Risk profiles have to be specified for each neurotool and for different use patterns based on empirical findings of risks and benefits and according to an objective harm scale. Assessments should be reviewed in due course. To enable informed decisions by individuals or legislators, governmental bodies should insist on transparency in pharmaceutical trials and possibly fund non–industry sponsored research.
4. Human rights must be the central principle to guide regulations: the main objective of drug policy must consist in their protection and enforcement. The exclusive focus on public health must therefore be supplemented by—and possibly yield to—the human rights of users not only with respect to issues in the enforcement of anti-drug laws but also in regard to access to neurotools. The yet to be fully accepted human right to cognitive liberty entails the *prima facie* permission to use as well as to refuse neurotools.
5. Consequently, the therapeutic value of neurotools cannot be the only applicable criterion in risk–benefit assessments. Instead, regulatory models must be sensitive to account for those effects that users deem beneficial, from attaining pleasure to improved cognitive capacities.
6. Thresholds for permissible/impermissible harms should be uniform for all neurotools and correspond to thresholds of acceptable self-harm in other fields (e.g., risky sport activities).
7. Depending on the permissible degree of paternalism, protection of health and prevention of dependence are legitimate aims to limit cognitive liberty. However, restrictive measures must demonstrably promote these goals and have to be superior to other approaches. Harm reduction strategies from syringe exchange and injection rooms to drug checking should be adopted.

8. Because states are obliged to restrict liberties only in the least invasive manner, regulatory models should avoid across-the-board prohibitions that disregard individual (health) dispositions or consumption patterns and develop more fine-grained systems suited to incorporate difference among users and use patterns. This likely requires a prescription model.
9. To ensure the right to alter one's mind, states should not set insurmountable hurdles to access to neurotools in addition to those required by considerations of safety or the rights of others.
10. To ensure the right to refrain from using neurotools, social pressure on abstainers in the form of incentives to induce or persuade them to using neurotools should be minimized. To reconcile the rights of potential users and nonusers, different regulations for typically competitive and noncompetitive domains of social life have to be devised. Neurotools typically utilized to enhance performance in competitive fields have to be regulated more strictly if they create risks that abstainers cannot be legitimately expected to bear. Neurotools unsuitable to enhance performance in competitive fields (recreational drugs in a more literal sense) may not have to observe these additional limits.

Policy proposals should be tested against these ten points. Although they might appear unfamiliar, most of them are, at least from a theoretical view, hardly controversial. They follow from general legal principles that presumably roughly apply to many jurisdiction and form the outer structure of a reasonable rights-based regulation. The rest is politics. Further argument and eventually value decisions by legislators are required with regard to the strength or weight of the right to cognitive liberty, the degree of permissible paternalism, and thresholds for socially acceptable risks. The most challenging factual demands on regulatory systems are the separation of competitive and noncompetitive purposes as well as a proper recognition of individual dispositions. Within the confines of these parameters, lawmakers have leeway to calibrate regulations according to further aims and public interests through measures such as eligibility requirements, consumption under supervision, regular health checks, taxation, and further preventive or repressive measures.[xvii]

Brief Assessment of Current and Proposed Regulation

To conclude, let us briefly evaluate one example of current regulation, as well as Veljko Dubljević's recent proposals for a reform of the regulation of methylphenidate in light of these ten points. First, the strict control of one class of neurotools stands out as particularly questionable: psychedelics (e.g., LSD,

psilocybin). Following the strict and partly politically motivated scheduling of psychedelics in the 1970s, research and psychotherapeutic use of psychedelics halted for decades. A couple of pilot studies in the past decade have renewed the clinical interest in psychedelics.[56,57] According to users and experts, these substances afford intriguing experiences, profound and yet illuminative transformations of consciousness with sometimes long-lasting positive effects.[xviii] Users report that they were able to gain insight into subconscious thoughts and emotions, a clearer view on themselves, dissolution of ego boundaries, and an understanding of the working mechanisms of cognitive processes such as perception. In a recent study on psilocybin, more than half of the participants considered the psychedelic trip as one of the five most meaningful experiences of their lives.[57,58] Provided these reports are correct, the legally interesting point is that these effects are not recognized in regulation (apart from their potential value for therapy). But how can a regulatory regime deny persons such "profound and meaningful experiences" and outlaw tools that appear valuable for self-development under most conceptions of a good life that incorporate the ancient Greek imperative to "know yourself?" And without even acknowledging a need to justify such a deprivation? Although not free from dangers, the risk profile of psychedelics appears comparably low. They are not dependence-producing, and side effects mainly involve short-lived negative experience while under the influence ("bad trip").[59] A recent population study in the United States concluded that psychedelics do not seem to be "an independent risk factor for mental health problems."[60] However, case and anecdotal reports indicate that vulnerable persons might develop psychiatric symptoms such as psychosis or anxiety disorders, so more research is necessary. To err on the side of caution, measures to minimize risks such as instruction classes, psychiatric screening, and supervision by a trained "trip-sitter" could be developed. Because they are not performance-enhancing, psychedelics are unsuitable to generate competitive pressure on nonusers. A strict ban of psychedelics can thus hardly be justified in light of the idea of cognitive liberty (again, assuming the empirical effects can be validated).

Second, Dubljević has recently forwarded a proposal for reforming the regulation of methylphenidate (Ritalin) and amphetamines (Adderall).[61] He recommends lifting the strict control of methylphenidate in extended, slow-release (SR) form but disincentivising its use through taxation and safety requirements. The prohibition of amphetamines should be upheld. Dubljević argues that the risks of Ritalin-SR are comparably low, whereas amphetamines are the most widely abused drug in Europe. His proposal deserves credit for being among the first to explicitly address the enhancement use of controlled substances, and I concur with large parts of his argument. However, it does not explain why states should discourage the use of methylphenidate. The basic objective of regulation remains unspecified or unsupported by argument.

Nor does it suggest a standard of permissible paternalism, and it relies on a comparison among the risk profiles of Ritalin, Adderall, and other drugs. This approach is understandable but bypasses the crucial question about permissible degrees of self-harm that no regulatory model can leave unanswered. Moreover, because methylphenidate is the paradigmatic candidate of a performance enhancer in competitive contexts, it remains to be shown that its negative mental effects are of a kind that everyone can be reasonably expected to accept. Reports of detrimental effects on emotion, if correct, might suggest the contrary, particularly because enhancement effects in healthy adults are not (yet) proved.[62,63] At the moment, taking methylphenidate for enhancement purposes is experimental. Amphetamines, by contrast, are often used recreationally (outside of competitive contexts), so a blanket prohibition comprising nonrisk users and consumption patterns needs to be justified. A less restrictive prescription model might avert imminent health dangers through medical supervision and quality control of substances without unreasonably impinging on the right to cognitive liberty.

Notes

i. A number from Germany: 12-month prevalence among university studies was 20% in a recent study.[1]
ii. The Single Convention and the Psychotropic Convention stipulate slightly different procedures.[8]
iii. Article 2 Nr. 4 Psychotropic Convention: "If the WHO finds that (a) the substance has the capacity to produce (i) (1) a state of dependence, and (2) central nervous system stimulation or depression, resulting in hallucinations or disturbances in motor function or thinking or behaviour or perception or mood, or (ii) similar abuse and similar ill effects as a [other controlled] substance . . ., and (b) that there is sufficient evidence that the substance is being or is likely to be abused so as to constitute *a public health and social problem* warranting the placing of the substance under international control, [the WHO shall provide an assessment] including the extent or likelihood of abuse, the degree of seriousness of the public health and social problem and the degree of usefulness of the substance in *medical therapy*" (emphasis added).
iv. Scientific purposes shall be left out of the following, not without noting that strict scheduling poses severe obstacles to research (cf. Nutt, King, and Nichols[9]).
v. Treaties and commentaries speak of "usefulness in medical *therapy*." For the Single Convention see United Nations[10: 85] and Chatterjee.[11: 284, 470]
vi. A parallel case is Viagra: In some countries, it is freely available over the counter whereas it requires prescription for therapeutic purposes in others.
vii. Preamble to the Single Convention,[5] also see Chatterjee.[11:351, 456]
viii. There is no fixed definition of harm reduction; instead, there is a set of shared beliefs as well as different opinions, particularly on its (value-neutral) stance toward drug use.[19–21]
ix. Cf. Preamble to the Single Convention.[5]
x. Instead of granting an exemption (which the treaties arguably allow), the adamant control regime let Bolivia renounce the treaties. Some countries even attempted to preclude its subsequent reaccession with qualifications.[22]
xi. For more on the (unfortunate) role of the INCB, see Bewley-Taylor.[2: ch. 5]

xii. Signs of a new way of thinking in the UN Office on Drugs and Crime can be found in the statement of its executive director, Yury Fedotov[23: 50]: "It is important to reaffirm the original spirit of the conventions, focusing on health. The conventions are not about waging a 'war on drugs' but about protecting the 'health and welfare of mankind.' They cannot be interpreted as a justification—much less a requirement—for a prohibitionist regime."

xiii. Such a right against the mandatory use of mind-altering tools has been argued with respect to coerced psychiatric treatments of mentally disordered patients and treatment of drug dependence, two issues left aside here.

xiv. The extent to which states have positive obligations to optimize the interests that stand behind fundamental rights is a complex legal theoretical topic that cannot be addressed here. Suffice it to say that under many ideas of fundamental rights, states are obliged to create social conditions in which right-holders are not pressured into accepting setbacks to their protected interests. The pertinent analogy here is working conditions detrimental to bodily health. Although workers are not strictly compelled to accept jobs under such conditions and thus expose themselves to risks voluntarily in a legal-formal sense, the state may well have an obligation to regulate working conditions to attenuate respective risks.

xv. This phrase is borrowed from McKibben, quoted in Merkel's discussion of the distinction between what he usefully calls output- and engagement-oriented activities.[52: 344]

xvi. A fuller exposition of the logical relations between a right to enhance and a right to refuse enhancements can be found in Bublitz.[42]

xvii. The case of tobacco is instructive: through soft measures, ban in public places (harm to others), and taxation, many European states have successfully reduced smoking.

xviii. Cf., e.g., the writings of LSD's inventor, Albert Hofmann[54] or of the recently deceased experimental chemist Alexander Shulgin.[55]

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20

Cognitive Enhancement in the Courtroom

The Ethics of Pharmacological Enhancement of Judicial Cognition

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Introduction

What would it mean to enhance the cognition of judges, and on what basis could one say there is an obligation to do so? In this chapter, we sketch out some possible responses to these two questions. In doing so, we aim to contribute to the contemporary debate over "cognitive enhancement" and "moral enhancement" in the neuroethics literature, where these terms usually refer not to traditional methods of education or healthy lifestyle but to so-called artificial enhancements via pharmaceuticals. We also limit our focus to trial judges acting in civil or criminal matters without a jury. In many jurisdictions, including in some countries that have a jury system, a great deal of judicial decision-making takes place with the trial judge acting alone.[1]

Others have explored the question of whether those practicing certain other occupations may have a moral or even legal obligation to use techniques of cognitive enhancement. The most frequently cited occupations are those in which errors may have serious consequences for the health and safety of others, such as pilots and surgeons.[2–4] However, judicial actors have also been raised in this debate. Sandberg et al. have raised the question of whether actors in the judicial process ought to enhance their cognitive capacities given the significance of the decision for litigants and society.[5]

There are unsurprising yet still disquieting signs that judicial decision-making is affected by various legally irrelevant factors and that judges suffer from many of the same flaws in decision-making as other human beings.

Danziger et al. recently tested the caricature that "justice is what the judge ate for breakfast" by reviewing a sample of parole decisions.[6,7] The proportion of decisions favorable to the prisoners was highest at the beginning of the day and after each food break and declined to near zero during each decision session. They interpret this as a demonstration that depletion of mental resources causes judges to default to the status quo of continued incarceration. Guthrie et al. offer evidence that judges are prey to the same systematic errors as the rest of us due to the effects of cognitive heuristics and biases.[8]

Implicit (unconscious) biases are a pervasive feature of human thinking and also of judicial decision-making. For example, using the implicit association test (IAT), Rachlinski et al. found that a sample of American judges do carry implicit racial biases.[9,i] They found that, on average, these implicit biases did not affect the verdict in a hypothetical case in which the defendant's race was varied, which the authors explain as deliberate self-correction. Although it is reassuring that conscious monitoring and correction for bias is possible, it depends on motivation and adequate time. Rachlinski et al. cite multiple studies documenting less favorable results for black defendants than comparable white defendants at various stages of the criminal process in the United States, suggesting that we should remain concerned about the impact of racial bias on judicial decision-making.[9: 1196]

The emotions of judges have traditionally been highly suspect components of judicial decision-making out of fear that they would undermine objectivity in legal reasoning.[10] However, in some adjudicative contexts, emotional responsiveness may be very important. For example, Rousseau and Foxen report on the emotional detachment or desensitization of those adjudicating refugee claims upon hearing repeated stories of violence.[11]

Given the high stakes in judicial decision-making for both the parties directly concerned as well as for society in general, the question of improving the quality of those decisions is important. Some factors, such as adequate legal education, experience, and a good mental and physical state (e.g., adequate rest, nutrition, health), are obviously useful. Beyond this, it is less clear what we ought to optimize. Judicial decision-making is heterogeneous, involving multiple types of tasks, each of which may use multiple cognitive and emotional processes to varying degrees. This raises the possibility that attempts to enhance one aspect of judicial cognition might undermine another. A further complexity that arises in the judicial context—which does not arise in the more straightforward case of the desire to enhance the alertness of pilots or surgeons, as discussed in the literature—is that it is possible that judicial cognition might be enhanced "too much." In other words, decisions that diverge too much and too often from the judgment of the "unenhanced" population might put public support for the justice system at risk. Of course, mature societies are aware that justice according to public opinion is rarely just, and there

is thus some understanding and tolerance for decisions that upset the majority. However, there may be limits to this as well. This distinguishes our case from those of pilots and surgeons whose capacities we would very much like to be better than our own.

However, the fact that the quality of judicial decision-making is important to litigants and to society does not necessarily imply an obligation to enhance cognition or, if there is such an obligation, to use a particular method to do so. There are many things that are desirable to others that people are not morally obliged to do. Further explanation is therefore required to justify any such obligation. Candidate theories that might ground a moral obligation to enhance cognition flow from the traditional professional ethical obligations of judges enshrined in Codes of Judicial Conduct or from the concept of fiduciary obligations. Professional occupations are typically identified by their fiduciary nature, namely as relationships in which the beneficiary is vulnerable to and reliant upon the good faith and loyalty of the fiduciary. In the case of judges, we have two classes of vulnerable parties: litigants whose interests are directly affected and society, which has collectively granted to judges considerable independence and power and which has an interest in the fair and effective administration of justice.

What Cognitive Functions Should Be the Object of Efforts to Enhance Judicial Cognition?

THE TASK OF JUDGING

A trial judge must perform multiple tasks in the course of judicial decision-making.[ii] For our purposes here, we distinguish between two main tasks for the judge acting without a jury, each of which is complex in its own right—"finding the facts" and "applying the law."[iii]

The process of finding the facts involves hearing expert and nonexpert testimony and examining other evidence such as documents or objects; determining the weight to attribute to the evidence based on judgments about credibility, quality, and relevance; and ultimately choosing which "story" is more likely and whether the evidence has established a degree of likelihood that is legally sufficient. For example, in criminal matters, the prosecutor must prove the guilt of the accused party beyond a reasonable doubt. In civil suits, the plaintiff must establish a case "on the balance of probabilities." Obviously, this is a complex set of tasks involving a multitude of cognitive processes.

Trial judges must also apply multiple bodies of law. The rules of evidence may be invoked in relation to the fact-finding process. The parties will also advance a claim to an outcome on the basis that a particular law is applicable and directs

that outcome. The process of applying the law involves careful deliberative processes including identifying the relevant legal rules, interpreting their meaning, and determining how they apply to the facts of the case at hand.

Given the complexity and heterogeneity of cognitive tasks that a judge performs, what then would it mean to enhance judicial cognition? Sandberg et al. consider this matter in relation to judicial actors generally—including judges, jury members, and lawyers—and focus on problems of alertness and memory.[5]

Indeed, alertness is undoubtedly important for a sitting trial judge. Periodic complaints about the "sleeping judge" reveal this to sometimes be a problem.[13] Doubtless, caffeine is used frequently in the judiciary for this purpose, as it is elsewhere. Memory is also an important cognitive function, although court transcripts and note-taking can assist with remembering the evidence and arguments.

The Danziger et al. study is also troubling, although the causes of the oscillating pattern of parole decisions coinciding with snack and lunch breaks are unclear. If it does reveal the impact of the depletion of mental resources, this seems more alarming than actual somnolence, which can be detected by others more easily. It is presently unclear whether any of the "cogniceuticals" commonly mentioned in the cognitive enhancement debate, such as methylphenidate or modafinil, could address this type of problem. As with other occupations, the solution of reduced workload and more breaks runs up against economic pressures.

Another important capacity for judges is emotional regulation, given the sometimes upsetting nature of the evidence or the frustrating behavior of some of the parties and lawyers. Concerns about uncontrolled emotional reactions to extremely upsetting evidence are revealed by rules of evidence that weigh the probative value of evidence against its inflammatory or prejudicial effect. This type of concern is reasonable in light of evidence of the effects of gruesome photographic evidence on mock jurors' verdicts, although judges may react differently by virtue of repeated exposure.[14]

In what follows, we select two other potential areas for the enhancement of judicial cognition. We will consider the problem of implicit racial bias in assessing the credibility of testifying witnesses because it is an important issue that strikes at the bedrock requirement of impartiality in judging. It also reveals an interesting quandary specific to the enhancement of judicial cognition—the problem that enhancement may serve the legitimate interests of one set of litigants at the expense of the legitimate interests of another. In particular, as we will explain, measures to enhance judicial decision-making by reducing the effects of implicit racial bias might undermine the accuracy of deception detection more generally. This type of problem does not arise when we consider the more commonly discussed enhancements of surgeons or pilots because everyone has a similar interest in the alertness of surgeons and pilots.

Second, we will consider evidence from recent research into the role of emotions in moral reasoning and the significance of drugs that may cause judges to be more or less retributive or consequentialist in their judgments about appropriate criminal sentences. Some have suggested that criminal punishment should be more consequentialist rather than being based on retributive moral blame, and there are signs that certain pharmaceutical manipulations could have this effect. This example also reveals an interesting problem specific to the cognitive enhancement of judges. The legitimacy of the justice system relies on the respect and acceptance of the public, and so there is a risk in enhancing judges too much if this causes their decisions to deviate too much from public moral sentiments.

ENHANCING THE DETECTION OF DECEPTION

Judges, acting as finders of fact, must make judgments about whether or not to believe witnesses. The judicial system places considerable and possibly misplaced faith in the human ability to detect deception on the basis of demeanour.[15,16] Appellate courts customarily defer to trial judges because of their supposed advantage in being able to observe the demeanor of witnesses, whereas appeal judges must rely solely on the transcripts. Multiple experiments testing the human ability to detect deception reveal that accuracy is on average only slightly better than chance.[17–19] It is difficult to extrapolate from these results to the real courtroom, where motivation to deceive successfully may be higher. On the other hand, judges may also have other evidence beyond demeanor to assist them in judging the plausibility of a witness' story. Despite this, many cases will turn on the credibility of witness testimony as judged largely by demeanor.

There are many reasons to be concerned with credibility assessments based on witness demeanor. First, systematic errors may arise in cross-cultural contexts where cultural differences in behavior such as the degree of gaze aversion, level of displayed emotion, or illustrative hand and arm movements while speaking may be natural for one group but misinterpreted as deceptive by another.[20] Second, demeanor that is inconsistent with expectations may also undermine credibility, as with the expectation that complainants in sexual assault cases will testify in a highly emotional manner.[21,22] Third, people testifying in their second language may be more likely to be interpreted as deceptive because the difficulty of communicating in their second language leads to decreased fluency or less detailed accounts.[23] Finally, a range of implicit (unconscious) biases also affect credibility assessments. People with attractive facial features are also perceived as more honest, and attractive defendants are more likely to be found not guilty, to be given shorter sentences, and to be considered less dangerous than unattractive defendants.[24]

All these concerns have led to suggestions that judges should be educated about these risks so as to be equipped consciously to suppress the various implicit biases and incorrect stereotypes that may hinder accurate detection of deception.[24,25]

A recent line of research has raised the question of how it can be that human beings are so bad at the socially vital capacity to detect deception. Researchers are now suggesting that the poor results are an experimental artifact produced by the focus on conscious efforts to detect deception, and they have provided some evidence that unconscious (or less conscious) processes are superior in detecting deception.[26,27]

This presents the possibility that a judge may be better at detecting deception when not focusing explicitly on the issue or trying too hard to do so. Yet, as described earlier, efforts to address implicit bias tend to recommend conscious self-monitoring and correction. Thus, it is possible that efforts to remedy implicit racial bias by encouraging conscious attention to its effects when making credibility assessments might sacrifice the advantages of unconscious lie detection processes.

To our knowledge, the recent research suggesting that unconscious lie detection processes are superior to conscious attempts to do so does not examine the impact of implicit racial bias. As a result, it is unclear whether and how implicit racial biases affect unconscious processes of lie detection. If it transpires that implicit racial bias does indeed impede unconscious lie detection processes, it may be that the interests of litigants from different races might diverge. Where witnesses from the majority racial group may prefer to have judges use unconscious processes, those from a minority group that suffers from the negative impact of implicit bias might prefer judges to be directed to monitor and self-correct for those biases. In such a case, the prescription for how to enhance the judicial capacity to detect deception is unclear given the diverging interests of different groups of litigants.

Admittedly, this is not an example of pharmaceutical enhancement, and it relies on a recently emerging and developing area of research. Therefore, our remarks are speculative. However, we regard it as a useful one in that it suggests another type of complication for efforts to enhance the cognitive capacities of judges—enhancements may improve matters for some groups at the expense of others.

One possible form of pharmaceutical enhancement that might address implicit racial bias is suggested by recent research from Terbeck et al.[28] They set out to determine whether emotional arousal influenced by noradrenergic transmission plays a role in implicit racial prejudice. They tested the impact of propranolol (a beta-blocker) on responses to an implicit association test. They found that propranolol reduced implicit (but not explicit) racial bias and concluded that this offers support for the idea that noradrenaline-mediated

emotional responses are involved in negative implicit biases. To the extent that implicit racial bias encourages judges to discount the evidence of witnesses from racial minorities, propranolol might represent a potential pharmacological enhancement. As noted earlier, the problem of implicit racial bias in judicial decisions is a topic of considerable concern. Although Rachlinski et al.'s experiments suggest that judges are able to consciously correct for implicit racial bias, they worry that time pressures may make it hard for judges to engage the "corrective cognitive mechanisms they seem to possess."[9: 1225] Further research into whether propranolol alters the impact of implicit racial bias on credibility assessments and on verdicts in mock cases would be of value.

ENHANCING SENTENCING DECISIONS

One of the topics being actively researched in moral psychology is the question of the role of emotions and conscious reasoning in generating judgments in moral dilemmas.[29] There are competing theories, and this question remains open and subject to much debate,[30,31] but one influential theory advanced by Greene et al. is known as the "dual-process" theory of moral judgment.[32] According to this theory, the emotional circuitry in the brain produces automatic, rapid, intuitive judgments about the rightness and wrongness of certain actions whereas separate circuitry subserves the slower, conscious deliberation that tends to be involved in consequentialist moral reasoning (i.e., reasoning that considers and weighs the consequences of particular actions in order to determine their rightness or wrongness). Support for the importance of emotion in moral decision-making comes from neuroimaging as well as from studies of the abnormal moral judgments of people with lesions in those parts of the brain thought to generate emotional responses.[33]

Others are researching the neurobiology of moral reasoning at the level of neurotransmitters, and recent work has documented how the manipulation of neuromodulators like serotonin affect social cognition and behaviors such as trust, punishment, moral judgment, conformity, and empathy.[34] Crockett et al. found that a drug that enhances serotonin function (citalopram, a common antidepressant) makes people less likely on average to endorse directly harming one innocent person to save many others, and it also reduced the tendency to punish unfair offers in a version of the "ultimatum game."[35,vi]

Another line of research has investigated the effect of propranolol, a beta-blocker commonly prescribed for hypertension, on moral decision-making. This drug suppresses noradrenergic activity and reduces the physiological symptoms of emotional arousal. Terbeck et al. found that compared to those taking a placebo, participants who took propranolol were less likely to endorse harming one innocent person to save many others (i.e., they were more likely to reject the utilitarian solution to the moral dilemma).[36] This result was contrary

to their hypothesis that reduced emotional arousal due to propranolol would lead participants to make utilitarian rather than deontological judgments driven by emotional intuition.

The selection of the appropriate sentence is admittedly quite a different decision from those discussed in the preceding research, and so the impact of manipulating judges' level of emotional responding via drugs is hard to predict and will not necessarily produce lighter sentences (e.g., where the consequentialist objective of deterrence is prioritized for cases involving modest perceived blameworthiness). For our purposes here, we assume that it might be possible to make judges less retributive by using drugs.

The question still remains as to what are the "right" moral answers in the trolley dilemma or in sentencing criminal offenders. Are those with so-called abnormally utilitarian tendencies in moral reasoning thereby wrong? Should efforts be made to shift people with "normal" patterns of moral decision-making further toward deontological or utilitarian tendencies? Some of the researchers avoid stepping into normative conclusions on the basis of the descriptive or explanatory accounts of human moral cognition,[33] but others propose normative implications in their work. For example, Greene and Cohen regard the emotional basis for moral judgments as suspect[37]—a concern that is reflected in the justice system, where cool dispassionate objectivity is traditionally exalted. They argue for a reform of the system of criminal punishment away from retributivism toward consequentialism on the basis of their dissatisfaction with the emotional roots of retributive impulses[38,v] as well as on the basis of increasing understandings about the role of neurobiological factors beyond our control that predispose some to criminal behavior.[37] Much more could be said about whether either of these things should indeed cause us to shift away from retributive criminal justice to consequentialism in punishment, but this is not the central concern of this chapter. Instead, assuming that Greene and others are correct that retributive impulses should be suppressed in favor of consequentialist calculations about the future benefits of punishment, would this be a sensible target for the enhancement of judicial cognition?

At present, judges are directed to apply both retributive and consequentialist principles in setting criminal sentences. For example, the *Criminal Code of Canada* proclaims that sentences must be proportionate to the gravity of the offense and the degree of responsibility of the offender *and* are intended to serve a variety of forward-looking objectives such as deterrence, rehabilitation, and public protection.[39] This reflects the co-existence of both retributive and consequentialist impulses in the criminal justice system. If judges are "enhanced" to be less emotionally driven and retributive in their sentencing, their judgments may diverge from those of the "unenhanced" public. Small and subtle divergence is unlikely to upset anyone, but retributive impulses can be strong, particularly in the wake of highly publicized and upsetting crimes.

This points to an interesting feature of efforts to enhance moral reasoning in judges that distinguishes it from other forms of cognitive and moral enhancement discussed in the literature. It is true that some of the concerns raised about these forms of enhancement would apply also in the case of judges, such as concerns about inequality between the enhanced and unenhanced and equitable access to enhancement technologies, as well as erosions of autonomy due to explicit or implicit pressures to use enhancement drugs. Another concern, mentioned in relation to enhancements in moral reasoning, is the difficulty of agreeing on what is the right set of moral judgments to encourage.[40]

However, another problem is suggested by the idea of enhancing moral reasoning in judges. The enhancement of cognitive features such as alertness and memory in pilots or surgeons (and perhaps judges) would not presumably pose a problem because it is to our benefit that they have superior capacities in this regard. However, in a democracy, judges and legislatures wield power delegated to them by the population. Judges are meant to be independent in order to function as a "check and balance" on the excesses of majoritarian politics, and their explicit role in criminal cases is to mediate between the prosecutor representing the public and the accused. Therefore, it is clear that their role is not simply to issue whatever sentence the public would think appropriate in an individual case. Nonetheless, there are limits on how big a gap can be tolerated between the results produced by the justice system and the public views of what is just and fair—including those views that emanate from the moral intuitions of the unenhanced public. As a practical matter, the prospect of actual dissatisfaction with judicial decision-making by the public is fairly unlikely outside high-profile cases or where there is a particularly large deviation from public opinion in a case. However, the legitimacy of judicial decision-making in a democracy is called into question from a theoretical perspective when judges do not decide according to the principles—or the balance of competing principles—that the citizenry intended. There may be, in other words, "too much" enhancement of the faculties of moral reasoning of judges. On the other hand, constitutions operate to curb the freedom of democratic majorities. The public usually tolerates the constitutional limits on its democratic choices imposed by judges. Public education about the value and purpose of these constitutional limits—a form of democratic "self-control" or precommitment to certain values—appears sufficient to maintain the legitimacy of judicial institutions. However, it is also quite likely that judges avoid decisions that stray too far from what the public can tolerate in interpreting and applying the usually rather abstract rules set out in constitutions. In any event, it is at least possible that the public, educated about the processes of moral reasoning, might come to regard unenhanced decisions as inferior and be willing to rely on enhanced judges even if they generate decisions that the unenhanced public would not have reached.

Is There an Obligation to Enhance Judicial Cognition?

We turn now to the question of whether judges have an obligation to enhance judicial cognition. If there is such an obligation, a subsequent question is which methods of judicial cognitive enhancement judges could reasonably be obliged to adopt. In the preceding sections, we considered various forms of pharmacological intervention. It might seem wholly unreasonable to us now that judges might be obliged to take drugs to remedy flaws in their cognition, and it is hard to imagine the system that would verify compliance. However, it is worth noting that other professional occupations are subject to obligatory biomedical interventions meant to improve their professional functioning such as mandatory influenza vaccines for health care workers[41] or an epileptic surgeon's responsibility to maintain capacity by using, for example, antiseizure drugs.[42]

Our case differs from these examples in targeting the much more heterogeneous function of cognition, where changes are likely to be fairly subtle (unlike, for example, the presence or absence of seizures) and where the impact of both cognitive deficiencies and efforts to remedy them will be difficult to discern in the ultimate judicial decisions given the many factors that combine to produce those decisions. Another difference lies in the novelty and lack of clearly demonstrated efficacy of the various cognitive enhancement drugs that are commonly discussed. Nonetheless, we explore the possible foundations for an obligation to enhance cognition in general given that there are other forms of nonpharmacological enhancement (e.g., training and education programs or breaks to restore mental resources) where an obligation to enhance might strike us as more reasonable and because superior cognition enhancing drugs may be developed in future. Furthermore, an obligation to enhance need not be imposed directly for there to be pressure on judges to adopt enhancements. Some potentially cognition-enhancing drugs may already be widely used by judges (such as the anti-hypertensive drug propranolol) and, if the evidence establishes that it effectively reduces implicit racial bias, might we prefer judges already taking that drug to adjudicate in cases involving parties from racial minorities?

All of this is admittedly speculative, and so this section is meant to sketch out the general structure of the argument for an obligation to enhance without arguing for any particular form of cognitive enhancement.

ETHICAL CODES OF CONDUCT FOR JUDGES

In one of his famous essays on responsibility, H. L. A. Hart explained the various meanings ascribed to this term, one of which is the concept of "role

responsibility."[42] Certain roles attract responsibilities in virtue of their institutional or social position:

> [W]henever a person occupies a distinctive place or office in a social organization, to which specific duties are attached to provide for the welfare of others or to advance in some specific way the aims or purposes of the organization, he is properly said to be responsible for the performance of these duties, or for doing what is necessary to fulfil them. Such duties are a person's responsibilities.[43: 212]

The social role or institution of the "judge" varies among legal systems (e.g., between countries with civil versus common law legal traditions or between jurisdictions in which judges are appointed or elected), and the general respect paid to the institution also varies from society to society. However, some common principles may be deduced from the *Bangalore Principles of Judicial Conduct* (2002), which were endorsed by the UN Human Rights Commission in April 2003 and are recognized and embraced by many legal systems around the world.[44]

Among the six core ethical principles set out in the *Bangalore Principles* is the duty of competence and diligence. The *Bangalore Principles* go on to explain the practical meaning of this duty, including the statement (intriguing for our purposes here) that "[a] judge shall take reasonable steps to maintain and enhance the judge's knowledge, skills and personal qualities necessary for the proper performance of judicial duties, taking advantage for this purpose of the training and other facilities which should be made available, under judicial control, to judges."[44: sec. 6.3] Similar expressions are found in the codes of conduct for judges in some countries.[45] In an often-quoted passage from a 1993 lecture on "Judicial Ethics," Lord Bingham asserted that "[i]t is a judge's professional duty to do what he reasonably can to equip himself to discharge his judicial duties with a high degree of competence."[46]

It is safe to say that the drafters of the *Bangalore Principles* did not contemplate the enhancement of skills and personal qualities by pharmacology, seeing that they cited training as their example of enhancement. However, the general principle that there is an obligation not just to have a basic level of competence but also to take active steps to enhance the skills and qualities necessary for the proper performance of judicial duties is important. The reference to judicial control of training (and presumably any other potential enhancement methods) discloses the concern to protect judicial independence, another core ethical principle set out in the *Bangalore Principles*.

The *Bangalore Principles* also shed light on what the "knowledge, skills and personal qualities necessary for the proper performance of judicial duties" might be. For example, impartiality is "essential to the proper discharge of

judicial office,"[44: para. 2] and judges must perform their judicial duties "without favour, bias or prejudice."[44: sec. 2.1] The risk of racial or other forms of social discrimination in adjudication is also taken most seriously, and the value of ensuring equality of treatment is identified as another core principle of judicial ethics.[44: para. 5] The Canadian Judicial Council's *Ethical Principles* comments that "[j]udges should not be influenced by attitudes based on stereotype, myth or prejudice. They should, therefore, make every effort to recognize, demonstrate sensitivity to and correct such attitudes."[47]

From this, we can deduce a general acceptance that the judicial role comes with a responsibility to satisfy certain ethical obligations, including the obligation to acquire and enhance the skills necessary for proper performance of judicial duties (including impartiality and nondiscrimination on grounds of race, religion, sex, socioeconomic status, etc.).

THE JUDGE AS A "FIDUCIARY" IN DEMOCRATIC THEORY

Theories regarding the role of judges in democracies also supply a foundation for the ethical obligations just described. One of the perennial problems in constitutional democracies is the relationship of unelected judges to the people and the legitimacy of judicial decisions that overturn as unconstitutional the expressions of the popular will contained in legislation or the actions of democratically elected representatives. This is a fascinating topic in its own right, which we do not address here. However, we find one recent line of discussion to be intriguing and helpful in our present context. Several North American legal theorists have advanced the argument that the relationship that best captures and explains the role of judges in a democracy is that of a fiduciary.[48,49] The fiduciary relationship is one in which the fiduciary holds discretionary power over the interests of beneficiar(ies).[vi] This relationship is one of dependency, vulnerability, and trust on the part of the beneficiary and duties of loyalty, good faith, and diligence on the part of the fiduciary. Judges wield enormous power over the interests of the litigants before them, as well as indirectly over the interest of all members of the society in the fair and effective administration of justice. They are granted considerable independence in order to protect their ability to make decisions in line with the rule of law rather than the rule of the powerful. The judicial decision-making process is complex and difficult to monitor, and so the public and litigants are forced to a great extent to trust in the integrity and good faith of judges. Together, all of these characteristics suggest that judges are fiduciaries with obligations to litigants and to society to be impartial (the duty of loyalty) and to perform their roles in the interests of all beneficiaries with reasonable diligence and competence.[vii]

PRECEDENTS FOR THE IDEA OF AN OBLIGATION TO MAINTAIN OR ENHANCE COGNITION

Although serious problems with judicial decision-making are rarely raised, it is likely that subtler flaws in cognition that are common to all of us also often affect judges, as the Danziger study of the cyclical fluctuations in judicial leniency during the workday indicates.[6] These subtler flaws are less obvious and tend to be detected as systematic trends in a group of cases rather than as obvious errors in individual cases.

The case of the sleeping judge is one of the more obvious instances of a problem with judicial cognition. This is one of the most common situations raised in the context of the ethical duty of competence and diligence. Grunstein and Banerjee chronicle 14 cases of judicial sleepiness reported in the media involving cases from the International War Crimes Tribunal in the Hague, the US Supreme Court, the UK Court of Appeal, American federal and state courts, Canadian courts, and American state judicial conduct commissions.[13] They suggest that judging is "a white-collar monotonous workplace in which sleepiness may have consequences,"[13: 625,viii] and they argue that there is "a need to develop preventative or monitoring strategies in judicial systems to prevent is occurrence."[13]

Despite the medical explanation in some of these cases, public reaction demonstrates the impact that apparent cognitive failures can have on public confidence in the administration of justice.[13] Falling asleep is seen as a serious breach of ethics, which may be cause for discipline and perhaps removal in some cases,[50] even though sleepiness is likely a common problem. Indeed, one English circuit judge wrote in 2006 that "It would be foolish to pretend we don't ever feel sleepy. Some judges even take smelling salts into court with them."[50 citing 51]

In cases of more pronounced or permanent cognitive incapacity, judges may be encouraged to resign or be may be subject to removal. Reported cases of removal are few because either judges resign on realizing that they are no longer capable of performing their judicial functions or because their colleagues cover for them while attempting to convince them to step down from the bench. For example, in 1979, the Lord Chief Justice of England and Wales, Lord Widgery, had dementia and repeatedly fell asleep in court. His colleagues covered for him, going so far as to write his judgments before Lord Widgery finally retired nine months later.[13] In another high-profile incident, US Supreme Court Justice William O. Douglas refused to resign after suffering a debilitating stroke. He insisted on continuing to participate in the work of the US Supreme Court despite his incapacity. Chief Justice Warren Burger believed that Douglas was developing paranoid qualities. Douglas's colleagues were unable to convince him to retire and dealt with his incapacity by agreeing to postpone any case in

which Douglas would cast the deciding vote.[52] Essentially, the members of the court agreed to work around their disabled colleague who refused to resign. Douglas finally retired in November 1975, more than 10 months after his stroke.

These are obvious cases in which the basic threshold of cognitive competence was not being met. Beyond such cases, however, there is a growing recognition that the ethical duty of competence and diligence includes an affirmative obligation for judges to monitor and maintain their mental and physical health. The most popular new judicial education programs in North America are wellness programs. Such programs recognize that the physical and mental health of judges impacts their ability to diligently perform their judicial function.

Another context in which an affirmative obligation to improve judicial decision-making is often raised is in relation to what is called "social context education." In essence, these initiatives seek to promote fairness and equality within demographically diverse societies by ensuring that judges are aware of and understand the experiences of all of those who may come before them.[53] The Canadian Judicial Council observes in its *Ethical Principles for Judges* that judges who are unfamiliar with "cultural, racial or other traditions . . . should attempt by appropriate means to remain informed about changing attitudes and values and to take advantage of suitable educational opportunities . . . that will assist them to be and appear to be impartial."[47]

Conclusion

The case of judicial cognition is an interesting one for the exploration of the neuroethics of cognitive enhancement. This is because judicial cognition involves a multitude of cognitive processes different from those required of the surgeons and pilots more commonly discussed in the cognitive enhancement literature. It is also different in that it raises the issue of democratic legitimacy, where judicial decision-making is enhanced in a way that decisions start to deviate markedly from the views of the unenhanced public. In the neuroethics literature, various concerns have been raised about the enhancement of only a minority of a population, such as the unfairness of enhanced competitive advantage. The case of judicial cognitive enhancement offers another variant on the issue of the consequences of the enhancement of only a subset of the society.

The practical conclusions of our discussion are that there are indeed some good ethical and theoretical arguments for a judicial obligation to enhance the capacities necessary for judicial decision-making. Current codes of conduct and judicial practice make it clear that what is contemplated is reasonable care for one's mental and physical health and the pursuit of certain educational

opportunities. At present, it is highly unlikely that it would be viewed as ethically obligatory to adopt the drugs that are now entering general public use for the purpose of cognitive enhancement (e.g., methylphenidate or modafinil). Time will tell whether an obligation to optimize cognition via a broader range of techniques, perhaps including improved pharmacological techniques, will come to be recognized.

Notes

i. The IAT is a computerized sorting task in which unconscious stereotypes are revealed because stereotype-congruent stimuli are sorted more quickly than stereotype-incongruent stimuli. For more information and to test oneself for implicit bias, visit the Project Implicit website:https://implicit.harvard.edu/implicit/.
ii. Our presentation is necessarily simplified given the variation in tasks even among trial judges (see Wistrich[12]).
iii. These processes are interwoven, as with the application of the rules of evidence to constrain the presentation of the evidence on the basis of which the facts will be determined.
iv. In the Ultimatum Game, a proposer and a responder must agree on a way to share a sum of money or else neither will receive anything. The proposer must choose a division and then the responder decides whether to accept. Rejecting an unfair (but nonzero) offer punishes an unfair proposer at the expense of the responder.
v. Greene writes: "[F]or me at least, understanding the source of my moral intuitions shifts the balance . . . in a more Singerian, consequentialist direction. . .. Likewise, when I understand the roots of my retributive impulses, I am less likely to afford them moral authority."[38: 76]
vi. Examples include the following relationships: guardian–ward, physician–patient, lawyer–client, corporate officeholder–shareholder.
vii. See the argument developed by Leib et al.[47]
viii. It is interesting to hypothesize whether judicial sleepiness would be less of a problem in systems that have a career judiciary in which judges begin their careers at a younger age—in their 20s or 30s—as opposed to those systems where judges are appointed from among senior members of the legal profession, typically in their late 40s or early 50s.

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Epilogue

A Feast of Thinking on the Naturalization of Enhancement Neurotechnology

JUDY ILLES

This latest volume on cognitive enhancement, with its focus on ethical and policy implications from different international perspectives, brings a fresh array of thinking to the enhancement table. Showing an appetite for this topic that clearly has not yet been sated, authors such as Levy and Wolbring provide discussions about enhancement from banality to ability. Readers learn from authors such as Stein and Loewe about the place of the discussion in underresourced areas of the world in both the northern and southern hemispheres, and from Jensen and colleagues, Braude, and Sattler about views on the positional advantages enhancement may offer in countries where there is much less to want. For law and policy, Bublitz, Chandler and Dodek, and others bring further thoughtful and palatable courses to this metaphorical meal.

What ought we take away from these rich new contributions alongside prior writings and the discourse that they complement? First, there is a recreational role for cognitive enhancers as drugs of lifestyle, but that role is neither unitary nor ubiquitous across cultures and countries. Second, more research is still needed on the effects of enhancement drugs, particularly for nonclinical performance use. Evaluations to date are poor or incomplete, and the knowledge gap about long-term effects is especially wide. Third, the clinical use of amnestic agents such as beta-blockers to treat vulnerable people suffering from mental health disorders, including post-traumatic stress syndrome, phobias, and addiction, deserves keen attention and should be an imperative for ethical discourse. All told, the key interests and themes are supported by discovery, data, and deliberation and, as visualized by a Humeian-type pathway (Figure E.1), inform strategies for guidance and neuropolicy.

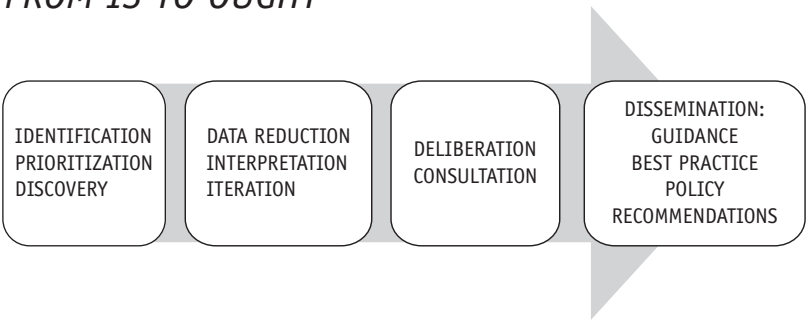

Figure E.1 From Is to Ought. Figure inspired by E. Racine, Pragmatism and the Contribution of Neuroscience to Ethics, Essays in the Philosophy of Humanism, vol. 21, no. 1, (2013), 13–30.

Even with such a concerted effort, and irrespective of whether the focus is on cognitive and emotional boosters such as methylphenidate or oxytocin, or on cognitive blunters such as propanolol that nip the tip off the iceberg of emotional trauma, the foundational divides in the discussion of enhancement remain unchanged. Fully acknowledging the blurriness of the lines that distinguish them, they are:

- *Recreational enhancement* and the perception that it is the *sina qua non* of social freedom, reflecting the desire for personal and short-term situational pursuit of knowledge about a cognitive or emotional *other* from which full recovery may or may not have long-lasting experiential benefit.
- *Performance enhancement*, reflecting the human desire for a competitive edge for both time and content—faster speeds, higher heights, richer colors, and deeper prose achieved. These are attempted, on the one hand, through better attentional control and, on the other, for example, suppressed autonomic responsiveness to danger yielding an augmented acceptance or disposition to risk.
- *Clinical (therapeutic) enhancement*, leading to beneficial restoration of function, reduced suffering, and decreased burden of disease.

The intersection and tensions between these categories can themselves be appreciated by another division of three: for each, common and differential desired effects, motivation, and uptake strategies. These are shown in Table E.1, together with a summary of some of the primary neuroethical concerns they engender. Their qualities and quantities change along the continuum of goals, motivations, and patterns of use.

For clinical uses other than tampering with memories that stands out, the applications and neuroethical concerns around enhancement largely follow those of other advances in conventional or alternative medical sciences and ethics. For recreational uses, assuming experimental and transitory use, how

Table E.1 **A triad of uses for neurocognitive enhancers**

	Desired Effects	*Motivation*	*Uptake strategies*	*Neuroethical (+)*	*Considerations (–)*
Recreational Uses	Casual and transient	Self-creation within social norms Curiosity	Random	Personal freedom	Unknown long-term neurobiological effects Short-term social harm Compounded effects with other concurrent interventions or lifestyle choices
Performance Uses	Transient, possibly enduring	Self-governance	Variable and modulated	Personal freedom Expanded creativity Speed and efficiency Cognitive focus	Challenges to human values and authenticity Fairness Possible harm to self through risk-taking Loss of learning and historical narratives Competing individual and societal interests Undermined potential to evolve naturally Quality control
Clinical Uses	Enduring	Reduced burden of disease	Principled	Well-being through prevention or restoration	Absent starting and stopping guidance Masked pathology Interaction effects Compromised or questionable veracity of recounted narratives in the legal context Undermined potential for recovery Cultural relevance and nuances Access and justice

troublesome can they really be if the benchmark of physical safety is met? But it is performance applications that are vexing because they may take on both a regularity and substitutive nature. In fact, we might well ask what it is we are trying to learn or liberate with routine uses of cognitive performance enhancers. There is a Chinese proverb that says: "Give a man a fish and he will eat for a day; teach a man to fish and he will eat for a lifetime." Might performance enhancers thus actually limit rather than expand our potential for lifelong success?

Human well-being and betterment is an important long-term goal, but it is a moving target. Whether for fun, fulfillment, or function (a third triad), there is no current evidence to date to support the assertion that broad uses of enhancers will equate to broad, let alone global, social benefit. Unless one subscribes to the gloomy thought experiment espoused by John Harris[i] that only by harnessing all possible ways for self-preservation will we avoid the catastrophe of human extinction, the risk of *not doing* would appear to exceed that of evidence-absent *doing* today. Now, that is not to say that there are *no* benefits, only that the scale still tilts in favor of noninvasive rather than invasive remedies to the insatiable human urge for self-improvement, however defined.

The continuing need for discussion and action that moves the Academy beyond necessary but still siloed writings about our neurochemical and neurotechnological future underlies the importance of internally formulated guidance. When derived from within a community of engaged scholars, issues of scientific validity, quality control, informed use and informed hope, and protections of personal and brain privacy will be met. Most importantly, protections of users, research subjects, patients, consumers, and, above all, the vulnerable whose relationship with this topic is the most complex and circular of all must be a focus. We can achieve this. The authors in Jotterand and Dubljević's volume have already rolled up their sleeves and amply set the table for the next feast of what "*from is to ought*" still to come.

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Note

i. *Is there a responsible use of cognitive enhancement in healthy people*? A debate between John Harris and Hervé Chneiweiss, First annual meeting of the ICM Neuroethics Network, June 24, 2014, Paris, France.

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