

Who Should Enhance? Conceptual and Normative Dimensions of Cognitive Enhancement*

Filippo Santoni de Sio[†]
f.santonidesio@tudelft.nl

Philip Robichaud[‡]
p.j.robichaud@tudelft.nl

Nicole A. Vincent[§]
me@nicolevincent.net

ABSTRACT

When should humans enhance themselves? We try to answer this question by engaging in a conceptual analysis of the nature of different activities. We think that cognitive enhancement is morally impermissible in some practice-oriented activities, such as some educational activities, when it is the case both that cognitive enhancement would negatively affect the *point* of those activities (i.e. learning *through a certain kind of effort*) and that we have good reasons to value that point. We then argue that cognitive enhancement should be allowed in two groups of cases, namely in practice-oriented activities, such as recreational activities on which little moral value or social import hangs, and in some prominently goal-directed activities, such as high-responsibility professions, the goal of which has significant moral or social value. Finally, we argue that the use of efficacious and relatively safe cognitive enhancers may even be obligatory in those high-responsibility professions under certain *special circumstances*.

* This article was written as part of the “Enhancing Responsibility” project, which is funded by the Responsible Innovation Programme of the Netherlands Organisation for Scientific Research (NWO). We are grateful to Maureen Sic, Nicole van Voorst Vader-Bours, and Arno Wouters for their valuable comments on a previous version of this paper.

[†] Delft University of Technology, Netherlands.

[‡] Delft University of Technology, Netherlands.

[§] Georgia State University at Atlanta, USA and Delft University of Technology, Netherlands.

Introduction

When should humans enhance themselves? In this paper we try to answer this question by focusing on a particular kind of enhancement: cognitive enhancement. Typical examples of cognitive enhancers are pharmacological substances like methylphenidate and modafinil, which are reported to improve people's performances in terms of wakefulness, attention, concentration and retention of memory, not only when taken by people diagnosed with mental deficits or disorders, but also when taken by healthy subjects (Repantis et al., 2010). Even though the current efficacy of these substances is far from conclusively proven, and their side-effects not well known yet, their use is reportedly quite widespread, especially among students (McCabe et al., 2005; Weyandt et al., 2013). At present, issues of safety represent the most serious argument against off-label use of such substances. However, in a hypothetical but realistic future scenario in which some of these substances are proven to be both effective and safe, new and possibly more complex moral questions will arise.

We take an analytic approach to the issue of the morality of (cognitive) enhancement. Our approach is analytic insofar as we refuse to take a general stance for or against enhancement. We think that different activities and circumstances require different ethical answers on the use of enhancers. In our view, cognitive enhancers should be forbidden in some circumstances and allowed in others. We also argue that cognitive enhancement may even be obligatory in some circumstances. In order to justify these ethical claims, we will first outline a systematic conceptual framework. Whereas many current ethical approaches focus on issues of authenticity and/or fairness, we think that other crucial normative considerations can be made apparent by engaging in a conceptual analysis of the nature of different activities (Santoni de Sio et al., forthcoming).

Our main claim is that in order to determine whether enhancement is forbidden, allowed or obligatory, one must also attend to the metaphysical characteristics of the activity in question, and in particular whether the activity is prominently goal-directed or practice-oriented. We think that cognitive enhancement is morally impermissible in some practice-oriented activities, such as some educational activities, when it is the case both that cognitive enhancement would negatively affect the *point* of those activities (i.e. learning *through a certain kind of effort*) and that we have good reasons to value that

point. We then argue that cognitive enhancement should be allowed in two groups of cases, namely in practice-oriented activities (e.g. non-competitive Sudoku), on which little of moral value or social import hangs, and in some prominently goal-directed activities, such as high-responsibility professions, the goal of which has significant moral or social value. Finally, we argue that the use of efficacious and relatively safe cognitive enhancers may even be obligatory in those high-responsibility professions under certain *special circumstances*.

We think that our reasoning may have a wide interest, as the arguments that we put forward in relation to pharmacological cognitive enhancement may also be applied - maybe with some modification - to other kinds of human enhancement. We thus hold that the structure and methodology we follow constitutes a template for a fruitful ethical discussion in this and in related areas.

1. The Nature Of Activities

In order to make way for an analytic answer to the question on the permissibility of cognitive enhancement in different activities, we will outline the basics of a theory of the nature of human activities. All human activities are defined through their point¹. Sometimes the point is an *external* goal (e.g. *gaining* money through one's work as a financial broker), and sometimes the point is the realization of a certain goal *internal* to the practice (e.g. *deploying* certain physical or intellectual abilities in a game, or *enjoying* the company of other people in an informal friendly chat). Admittedly, most human activities are in that respect complex, as they usually have both external and internal points. In other words, human activities have no simple essence. However, either an external or an internal goal is often prominent in the definition of a given activity. On the one hand, certain activities are prominently defined through their external goals - financial intermediation is mainly about gaining money, medicine is about healing people, the military is concerned with defending a state's territory or other strategic interests of a country. In contrast, other activities are prominently defined through their internal goals - friendly chatting is about spending time with friends or acquaintances (rather than merely exchanging information), running is about engaging in a certain

¹ See section 2 below. For a more detailed presentation of the relationship between the point and the nature of activities, see Santoni de Sio et al. (forthcoming).

kind of physical activity (rather than merely reaching a given destination faster than walking), reading fiction is about engaging a certain kind of intellectual activity (rather than merely to learn a story).² For the rest of the paper we call activities prominently defined through their external goal *goal-directed activities*, and we call activities prominently defined through their internal goal *practice-oriented*. A simple test to realize whether a certain activity is goal-directed or practice-oriented is to try to mentally eliminate either the realization of the internal or external goals of a given activity, and see which one would result in the loss of that activity's point. Would it make sense, for instance, to go out with friends if one did not enjoy their company, or to play a certain game if one did not find the activity amusing or challenging or interesting? As the answer to both questions is negative (setting aside other goal like wishing to develop the friendship or to acquire an appreciation for the games), one may conclude that those are practice-oriented activities. In contrast, would it make sense to work full-time at a brokerage without the prospect of making money or to work as a physician without the prospect of healing patients? As the answer to both of these questions is negative (assuming one does not, for instance, view these mainly as the realization of a childhood dream which it is important to pursue or a promise which has to be maintained, i.e. that becoming a broker or a physician was your ambition or something you promised to do), one may conclude that these are goal-directed activities.³

This analysis of the nature of activities has an important implication for the status of the *rules* that apply to them. According to what has become a commonplace in philosophy, rules come in two kinds. Some rules are merely *regulative*, as they set standards for practices that exist apart from the rules.

² This point has been fruitfully elaborated in the philosophical literature through the idea of internal as opposed to external goods pursued by or through an activity (MacIntyre, 1985). See Schermer (2008) for a discussion of the relevance of internal goods in the debate on enhancement.

³ Yet again, we are well aware that, as our qualifying comments (in brackets) highlight, in real life activities may often have a mixture of many practice-oriented and goal-directed facets. For instance, as academics we are blessed for having jobs that involve scratching intellectual itches which we might have done (and we sometimes do) even without being paid a salary to scratch. Nevertheless, earning an income is also part of the reason why we do what we do. In real life the situation will always be complex, but we also think that some activities have features in virtue of which they are either significantly more practice-oriented or goal-directed, and this is the simplifying assumption under which we now proceed.

Other rules are *constitutive*, as they are necessary preconditions for the existence of the practices to which they apply (Rawls, 1955; Searle, 1995).⁴ As goal-directed activities are defined through the goal that they attain (the outcomes they bring about), there are no conceptual, or *a priori* limits to *the way* in which or the means by which these activities may be performed, and so the current rules of the practice can be changed without any particular concern for the point of the activity being lost or the nature of it being distorted. Examples of such goal-directed activities would be professions like surgery, civil aviation, and the military, but also scientific research. Here, as long as people are healed, or safely and efficiently brought to their destination; as long as national strategic assets are protected; as long as scientific breakthroughs are achieved, the point of surgery, civil aviation, military, or science is realized. Of course, a violation of or a change in the current rules of the practice in a goal-directed activity like surgery, for instance a rule prohibiting the use of a given technique or technology, may raise different kinds of concern. It may raise *prudential* concerns, as the change or violation of a prudential rule may lead to unpredictable outcomes; but also *ethical* concerns, as the change or violation of such rule may be in conflict with societal values like fairness, safety, or others. However, what is at stake here is the best regulation of an activity, not the nature of the activity being fatally distorted, and its existence thus being jeopardized.

On the other hand, the relevance of internal goals in practice-oriented activities makes certain rules *constitutive* of the activity, constitutive because they are necessary for the existence of that activity, not only for a fair or efficient regulation or perhaps for coordination of it. The presence of constitutive rules thus poses *conceptual*, or *a priori* limits to the way in which a certain activity can be performed. A violation or a change in one of these rules may therefore make that activity lose its point and hence its very nature. Clear examples of this concern come from sport. If one shows up at the starting line

⁴ Examples of regulative rules are the rules for driving a car or the rules of bon ton for consuming a meal. Examples of constitutive rules are the rules of the game of chess and the rules of language. Whereas it is conceptually possible to drive a car in the absence of traffic rules, and to consume a meal in the absence of any bon ton, it is conceptually impossible to play a game of chess without the rules of chess or to speak a language without any grammatical rules. Chess and language exist in part thanks to their rules. Take the rules away, and the game of chess will not exist anymore (only small wooden pieces being shuffled around on a black-and-white chequered surface will be left). Take the rules of grammar away, and language will not exist anymore (only sounds and doodles on papers). At this level, only a purely naturalistic description of the phenomena remains available.

of a marathon wearing roller-skates⁵, they would be not only violating a regulative rule of marathons, but also a constitutive rule of the game. Hence, they would be doing something ‘wrong’ in *two* different ways. At an *ethical* level, they would be trying to get an unfair advantage against the other runners. At a *conceptual level*, they would be *missing the point* of running a marathon, and hence, given that human activities are defined through their point, they would be simply engaging in a *different kind of activity*. In the latter sense the roller skater would be doing something ‘wrong’ in a morally neutral but metaphysically loaded sense - wrong in the sense of violating the rules that are constitutive of the relevant activity.

2. When Enhancement Is Forbidden

The debate on the morality of enhancement has been so far particularly hot in relation to sport activities. Even though the use of performance-enhancing substances in sport does not qualify as cognitive enhancement, we will briefly discuss an argument that has been often put forward in the context of this discussion, as this may be helpful to frame an argument against the use of cognitive enhancement in certain educational activities. Many think that the use of performance-enhancing medical substances in sport (often referred to as ‘doping’) must be banned not only because of the risks for the health of athletes, but also because the use of these substances is against the “spirit” of sport, i.e. it violates the constitutive rules of sport practices. The logic of this argument implicitly rests on our analysis of the nature of activities. In order to fully understand this logic a further conceptual distinction has to be made, that between *coarse-grained* and *fine-grained* descriptions of activities.

As Wittgenstein famously wrote, there is no such thing as a single feature shared by all games, by virtue of which it is possible to decide once for all what should count as ‘a game’. Both letting a little rubber ball repeatedly bounce on the wall in front of you while sitting alone at your desk and professional rugby are ‘a game’. In a similar vein, it may be said that also a particular game can be played in very different ways in different times, places, and circumstances. There were car races sixty years ago as are there today, and basketball is played by children in parks and courtyards, as it is played in packed NBA arenas. Still, one can draw distinctions among these games by employing coarse- or fine-

⁵ This example, originally presented by Whitehouse et al. (1997), is also discussed in a similar vein by Schermer (2008) and Murray (2008).

grained descriptions of activities. According to a coarse-grained description - one which takes into account only some macroscopic features of the activity - 1950s' and contemporary car racing are *the same game*. Similarly, a courtyard basketball game between children is *as much a basketball game as* an NBA Final. However, according to a more fine-grained description - one that takes into account a larger number of features of the activity, 1950s' and contemporary car racing are *not* the same. When one considers how much cars have changed with respect to their top-speed and their embedded technology, how driving technique has evolved and so on, one will hardly resist the conclusion that today's car racing is *not* the same game as sixty years ago. Similarly, once the marked differences in rules, skill level and training that are present in NBA games are compared to typical courtyard basketball games, it is natural to infer that these are two *different games*.

The possibility and legitimacy of fine-grained descriptions of sport activities may constitute the basis for a moral argument against the use of enhancing substances. Consider a sport S in which the use of a new powerful pharmacological enhancer P is not, as things stand, included in a fine-grained description of the sport's rules and regulations. According to a sufficiently fine-grained description of S, it can be said that athletes using P engage in a different activity, i.e. S_E. As a consequence, *if* there are substantive reasons to value some aspect of traditional sport S that is going to disappear in enhanced sport S_E,⁶ *then* there is a *prima facie* moral reason to oppose the use of the substance P in S.⁷ In the case of performance-enhancing medical substance in sport, unlike what many people think, it is debatable whether either of the two conditions (the conceptual and the moral) for ban are met.⁸

6 This seems to be, for example, the concern behind the words of President's Council on Bioethics, when he says that the sportsmen who would use biotechnological enhancements would be bad sportsmen—"not simply because they cheated their opponents, but because they also cheated, undermined or corrupted themselves and the very athletic activity in which they seem to excel." (President's Counsel on Bioethics, 2003, p. 161–164), also cited by Schermer, (2008, p. 86).

7 Admittedly, in order to make these *prima facie* reasons against the use of enhancers conclusive more is required, namely the *prima facie* reason against must not be outweighed by stronger reason(s) for the use of such enhancers.

8 A discussion of this aspect falls beyond the scope of this paper. See Savulescu et al. (2004), where they convincingly claim that: as for the first requirement, we must not necessarily stick to the Ancient Greek view of sport, according to which only natural talent and strength has to be measured and praised in sport performance; as for the balance with other reasons, given that professional sport cannot be cleaned up (even if we wanted), a regulated use of drugs should be allowed in it, in order to achieve the best protection of athletes health (more control would be possible).

However, these conditions seem to be met in the case of the use of some pharmacological enhancers in some educational activities. Technology has in the past decades dramatically changed intellectual activities. Digital search tools and word processing have represented massive performance enhancers for research, teaching, and study, as they have allowed substantially greater productivity by reducing the time for research, the costs of revision and the speed of editing written texts. Under the fine-grained approach, academics, teachers and students today are therefore clearly engaged in a different kind of research, teaching and study activity than thirty years ago. Something similar may happen if substances, such as methylphenidate (Ritalin), were able to substantially change productivity in research, teaching, and study⁹. How should then the use of pharmacological enhancers be regulated in the intellectual field? According to our framework, the answer to this question depends on the particular nature of the intellectual activity in question. Whereas cognitive enhancement may *not* raise particular conceptual and moral concerns in the case of scientific or academic research (as these can be seen as prominently goal-directed activities)¹⁰, we think that in regards to some educational activities the use of cognitive enhancement *does* raise moral concerns that may constitute ground for forbidding their use. If among the relevant goals pursued by a school/course/class/exam is, for instance, that of teaching how to exert certain intellectual efforts without recurring to any “external” support, or how to cope with certain psychological and motivational challenges without recurring to medicines, or maybe to educate pupils to arrange their work schedules without doing last-minute rushes of study; and if - according to a hypothetical scenario - pharmacological substances would to some relevant extent relieve the students from exerting those efforts and learning the psychological strategies and acquiring the required motivational and organizational capacities; if this is the case, then the use of cognitive enhancement would be *conceptually* problematic, as it would turn the activity into something different. In addition, if we have reasons to value the non-enhanced version of the activity (because, for instance, we think that acquiring those abilities is part of our conception of a good education), then we have a *moral* argument against the use of enhancers in this context.

9 It is controversial whether and to what extent current pharmacological cognitive enhancement is efficacious. For a survey on the scientific literature see Goold & Maslen (2014)

10 Though the case of academic research is very interesting, we are not discussing this here for reasons of space.

In this sense, the normative reasoning on the use of pharmacological cognitive enhancers in various educational activities is arguably similar to that regulating the use of *non*-pharmacological enhancers like books, the Internet or calculators. Should students be allowed, for instance, to open books or access the Internet or using calculators during an exam? We think that the answer to this question depends on what the point of that particular exam (and course) is. If the exam (and the course) aims to test (and foster) the students' ability to *memorize* certain notions or to carry our calculations by hand, then probably students should not be allowed to keep books and internet connections open or to use calculators during the exam (and they should also be encouraged to do the same at least in some steps of their study at home).

Notice that even though it applies mainly to young students, this argument against the use of cognitive enhancers is not directly dependent on the young age of those to whom it applies. In fact, the main point is not that by not being (fully) autonomous agents they may not be left the choice if and when to use medical substances. The point is rather that the *nature of activities* in question may exclude the use of such enhancers. In this sense, the argument may also possibly apply to adults involved in similar activities, even though, as a matter of fact, the kind of educational activity above envisaged is more likely to concern young people.

Also, the moral considerations that do the work in our argument do *not* rest on a concern for fairness or worries that enhancement amounts to cheating. Admittedly, concerns for fairness *may* also be present in some of the circumstances that we presented, i.e. when the acquisition of some limited benefit depends on the results of a given educational activity or exam, and the exam can thus also be seen as a competition for the distribution of those benefits. But this is not the relevant consideration here. In fact, the consideration that we identify would be present and morally relevant also in clearly non-competitive educational activities, such as quizzes taken in introductory college courses. Here, as there is no relevant competitive element, the moral wrongness of enhancing would mainly derive from enhanced agents not realizing the (valuable) point of the activity.

3. When Enhancement Is Permissible

In this section, we turn to a discussion of cases where cognitive enhancement may be morally permissible, that is cases in which individuals must be left free

to decide whether to enhance or not. We think that there are two possible scenarios in which cognitive enhancement is permissible. The first involves all those practice-oriented activities that are not appreciably morally significant. Here, the fact that an agent is now engaged in an enhanced as opposed to an unenhanced activity has no relevant personal or social consequences. Thus, even if the use of cognitive enhancers results in a change in the nature of the activity in which an agent is engaged, there is no moral reason to forbid this change. In such cases, agents should be permitted to utilize cognitive enhancement technologies if they wish. The second way in which cognitive enhancement can be permissible involves strongly goal-directed activities. Here, the benefits of better *results* achieved in the enhanced version of the activity counts as a decisive moral reason for allowing cognitive enhancement.

The first way to identify an activity wherein cognitive enhancement may be permissible is to establish that the enhanced activity in question is morally innocuous. A paradigm class of morally innocuous activities is non-competitive hobbies or pastimes. Such activities are typical practice-oriented activities – the point of engaging in a hobby is given by doing certain things in a certain way. The point of collecting isn't merely to amass a collection. Rather, what makes someone a collector are her various acts of collecting. Although it may be difficult to trace all downstream morally relevant effects of engaging in these activities, there are clearly certain cognitively demanding hobbies that seem in themselves to have no social effects. In such a case, we wouldn't expect the fact that someone engaged in a different, enhanced version of the activity to have any moral significance. Consider an avid Sudoku player who has grown bored with solving puzzles unenhanced and who is interested in seeing how much more quickly she can come to the solution while in an enhanced state. As long as she is not entering into Sudoku competitions or otherwise benefiting from her performances, her activity seems so insulated from the social sphere as to render it a completely morally innocuous enhanced activity. To be sure, since Sudoku playing is a practice-oriented activity, the point of which is using one's wits to solve a puzzle as quickly as one can, according to a fine-grained description of the action, a cognitively enhanced Sudoku player is engaged in a different activity. In this respect she is similar to a cognitively enhanced student. And, we acknowledge that the fact that the enhanced Sudoku player changes the nature of a practice-oriented activity provides at least some reason to suppose both that she is doing something *conceptually* wrong and, thus, that she may have a reason to abstain from enhancing herself. The difference,

though, between the enhanced student and the enhanced Sudoku player, lies in the moral significance of the unenhanced form of the activities. In the case of the Sudoku player, there appears to be no significant *moral* reason not to allow her the freedom to engage in the cognitively enhanced version of her hobby - nothing of moral significance hangs on her solving Sudoku puzzles while unenhanced.¹¹ This conclusion is buttressed by the fact that there is an independent value in allowing agents considerable liberty to make their life choices. We respect the value of freedom by allowing others to engage in any morally innocuous, enhanced activity they want.

The second way to identify activities where cognitive enhancement may be permitted is simply to attend to strongly goal-directed activities. In this class of cases, the permission to use enhancers doesn't rest on the moral innocuousness of the enhanced version of the activity. Rather it relies on the fact that enhancement fosters the external goal of the activity. Consider agents who have professional obligations to undertake difficult and temporally extended actions or series of actions in a way that benefits or protects other agents under their care or supervision. Prominent examples of such professionals are surgeons and airplane pilots. In both cases, the relevant agents can be understood to be engaging in goal-directed activities. The goal of medical practice in general is typically taken to be the relief of suffering and the cure or treatment of disease, and the goal of civil aviation is to get passengers to their destinations safely and without incident. Given that these professions have such explicit goals, the activities that physicians and pilots are engaged in are not threatened by the use of cognitive enhancers in the way that enhancement technologies threaten sport or educational activities that are practice-oriented. Consider that a surgeon who took a cognitive enhancer before undertaking a long and complex surgery would still be uncontroversially engaged in the activity of 'performing a surgery'. The surgeon is still working toward the goal of her activity. Moreover, the fact that the surgeon utilized some cognitive enhancement technology in order to reduce the likelihood of mistakes does not seem to pose an immediate threat to the traditions, or the "spirit" of the practice. Indeed, one way of understanding the history of medicine is as a series of challenges and changes to traditional medical practice that occur as new techniques and technologies are developed. When cardiologists began to employ MRI technology in order to detect vascular

¹¹ We are assuming that the Sudoku player is not participating in competitions or otherwise benefiting from her performances. She's just solving them alone.

problems, they did not cease to practice cardiology, nor did they cease to practice it well. Rather, they not only continued to be engaged in the same goal-directed activity but, by adopting a technology that was more sensitive to the presence of heart problems than existing technologies, they were arguably engaged in a more virtuous instance of this activity. Similarly, cognitive enhancement technology might also allow surgeons to engage in their activities in a way that better fits with the goals and thus the essence of surgery. In this sense, a surgeon who chooses to enhance does not cease to be performing surgery – the nature of her goal-directed activity remains unaffected. There appear to be good reasons to forbid the use of enhancement in this activity.

The same can be said about civil airline pilots. They are also engaged in an activity that has a specific goal, namely that of transporting the passengers safely to their destination. A pilot is expected to use whatever tools or technologies allow her effectively to meet this goal. Consider a long-haul pilot who knows that she can stay more alert for longer periods of time if she takes a cognitive enhancer like modafinil. Because her activity as a pilot is goal-directed, the fact that she engages in an enhanced version of activity does not entail that she is not engaged in the activity of transporting passengers safely. There is a certain similarity between pilots who utilize new radar or navigation technologies and those who choose to utilize some safe, effective cognitive enhancer that is known to reduce the likelihood of fatigue-related mistakes. In each case the new technology offers a different mechanism for securing the goal of providing safe flights and thus to realize the essence of the activity.

The surgeons and pilots we have been discussing are engaged in clearly and strongly goal-directed activities. These goals might be promoted by utilizing cognitive enhancers. Importantly, the realization of these goals is morally significant, and thus it makes sense to judge it morally permissible.

One might object that things are not so simple. By using enhancers, surgeons and pilots may exert competitive pressure on their colleagues to enhance themselves as well even if they would prefer not to. This pressure and the associated loss of freedom count as a moral reasons *against* permitting cognitive enhancement in such professions. Although it is true that this reason has to be factored in the balance, it does not seem to be a decisive one. That we already tend to think that social benefit-based reasons to allow enhancement in professions are stronger than competitive-pressure-based reasons *against* enhancement is shown by the ready acceptance of other more common and widespread ways to gain competitive advantage in professions, (e.g. using

expensive technological devices or having longer working hours). We thus conclude that it would be permissible to allow high-responsibility professionals like surgeons and pilots to use safe and effective enhancement technologies. In the next section we suggest, however, that it may actually be *obligatory* for surgeons and pilots, under special circumstances, to enhance themselves.

4. When Enhancement Is Obligatory

In this section, we introduce and refine a moral principle from which it seems to follow that certain people engaged in particularly high-stakes professions like surgeons and pilots might even have an *obligation* to enhance (Vincent, 2011). After briefly considering some possible objections to the principle, we tentatively conclude that despite these objections, there may be certain cases where cognitive enhancement would be obligatory.

The moral principle that may underlie an obligation for certain professionals to enhance themselves is what we call the Easy and Safe Beneficence principle or ESB.

ESB: If an agent can perform a certain easy, safe, and permissible action A that will allow her to reduce or eliminate suffering for those depending on the agent, then she should A.

There are three things to note about ESB. The first is its close relation to the principle of beneficence that is common currency in professional ethics. ESB is not meant to differ markedly from the principle of beneficence in terms of demandingness or context of application. Second, the easiness of the required action A is explicitly included in order to rule out cases where the beneficent action would be overly costly in terms of effort or self-sacrifice. Indeed, many are probably inclined to think that caretakers should go to significant lengths to protect those under their care. In this respect, ESB is a rather modest principle. The required action here should not be intuitively overly demanding. Third, the safety of the required action is intended to rule out cases where a beneficent action puts the agent at considerable risk of harm. Again, many are no doubt inclined to think that caretakers may frequently be expected to take on rather significant risks to their own well being, but ESB is much more modest. Though we do not have space to discuss the ESB principle at length, we will assume that it is no less plausible than the standard principle of beneficence. Indeed, given that it only requires beneficent actions that are easy and safe, it is likely more plausible than the more general principle. The

questions for the remainder of this section are whether ESB can withstand scrutiny and, if so, whether the existence and use of cognitive enhancement technology could establish an obligation for certain surgeons or pilots to use it. There are several ways one might object to ESB. First, one might note that easy and safe action A may not be the only way of reducing or eliminating suffering to the degree that A does. If in a given situation there were some mechanism for combating fatigue and subsequent fatigue-related errors that did not involve cognitive enhancement, and if this alternative mechanism was itself easy and safe, then ESB would be false. The mere fact that some easy, safe, and permissible action confers benefit is not sufficient for establishing the obligation to perform that action when another (especially better) alternative exists. For example, a surgeon might arrange to have someone take over once fatigue has set in and there is an increased risk of error. And, a pilot might arrange a similar hand-over after a certain period of time. In short, ESB might not entail a duty to enhance because enhancement might simply not be necessary for realizing the reductions in suffering.

Second, ESB might be objectionable on grounds that the action that it requires might be contrary to what might be called Williamsian reasons that involve the agent's personal values or life-projects. In his writings about the virtue of integrity, Bernard Williams famously claimed that such considerations could function as limitations on what morality can require of us. He warns of alienation that agents might suffer if they were required to perform certain actions merely in order to realize some benefit to others (Williams, 1973). On this account, if taking cognitive enhancers were something that ran counter to the deeply-held values of a certain surgeon or pilot, then it would be false that she should take them, despite their benefits. Perhaps such agents take extreme pride in being able to perform their professional duties with their faculties unaltered or unassisted, much in the way that certain mountaineers prefer to forego supplemental oxygen when ascending the world's highest peaks. If surgeons or pilots genuinely identified with this kind of practice-orientation, then there would be integrity-based reasons to think that they could not be obligated to enhance.

Finally, one might object that even if ESB is defensible on philosophical grounds, it simply doesn't apply in the kind of cases under consideration given that cognitive enhancement technologies are not known to be effective in reducing the sort of fatigue-related mistakes that pose a threat to patients and passengers. Though there is evidence that certain fatigue-related loss in

cognitive capacities can be forestalled by using certain pharmacological enhancers, some studies have disputed this (McCabe, Teter, and Boyd, 2004). In addition, they are not universally effective, and they haven't been shown to improve the loss of psycho-motor performance caused by fatigue (Sugden et al., 2012).

In the face of the first objection, ESB must be reformulated. We must stipulate that ESB would only generate an obligation to enhance, when there is no alternative course of action that would realize the beneficial effects. Indeed it is easy to imagine cases where there are no such alternatives. There simply may not be anyone who can take over once fatigue sets in.

The third objection is well-taken. Though it does not directly call ESB into question, it does point to an important difference between new technologies, such as MRI machines and autopilot programs, which have established track records of offering the promised improvements. Many cognitive enhancement drugs, such as modafinil, have not undergone such extensive testing, and so the relevant professionals cannot be sure of the benefits. In addition, even if cognitive enhancement is shown to reduce fatigue related errors in the relevant professionals, the drugs may not affect individuals in the same way. It may be unsafe for some to take it, and it may have either diminished or, worse, no fatigue-diminishing effects. For this reason we will make a concession and a clarifying assumption. The concession is that *at the present time* there is not enough evidence to sustain the claim that ESB entails that surgeons and pilots should undergo cognitive enhancement. The assumption that we will work with is that there is some cognitive enhancement technology that *is* known to be both safe and effective for most if not all of the relevant professionals.

The second objection is not so easily dealt with. In order to assess whether it constitutes a legitimate challenge to the claim that surgeons and pilots have an obligation to take safe and effective enhancements in order to achieve benefits that are unattainable through any other means, we must assess the strength of the integrity-based reasons that agents may have to refrain. It is helpful to compare this response to cognitive enhancement to examples of similar resistance that is based on either on conscientious objections or bald appeal to tradition. As an example of the former, many physicians refuse to perform abortions or offer reproductive counseling on grounds that they conflict with their religious beliefs.¹² As an example of the latter, note that

12 For a helpful discussion of this topic, see Savulescu (2006).

physicians were notoriously resistant to accepting aseptic techniques that were clearly supported by the latest science at that time (Cawande, 2012). It is possible that recalcitrant surgeons realized that there was something to be said for the new methods, but nonetheless took it to be permissible to stick with traditional practice. Thus, resistance to cognitive enhancement may be based either religious or moral beliefs, or it could also amount to the claim that ‘this is not how it’s done!’. In the latter case, we think ESB is on solid ground. By definition, new technologies differ from standard practice, and it would be folly to suspect that the moral reasons *to* enhance are outweighed simply by considerations having to do with the value of tradition. If the goals of the relevant activity would be better achieved through cognitive enhancement, as we are assuming for the sake of argument that they would be, then one might actually argue that the surgeon who refuses to enhance is acting impermissibly. Just as we look back at stubborn attempts to keep traditional practice alive with justified consternation, we should be wary of taking too seriously any attempt to preserve the status quo for its own sake.

Regarding resistance to the ESB principle and thus to the obligation to cognitively enhance that is grounded on deeper moral or religious objections, there are several things to say. The first is that, as with standard cases of conscientious objection, there may be an obligation to refer the patient to another physician who would be willing to realize the benefits of the enhancement technology (Savulescu, 2006, p. 296). Second, it is important to explore what exactly underlies the objection. Two obvious things come to mind, namely that cognitive enhancement technologies function by affecting the physician’s body. More specifically, they affect their brain thus the mental states of the professional. Because of this unique mechanism of action, it is understandable that some professionals might think it problematic to be expected to alter their own physical and mental states as a means of realizing some benefit to those under their care. If this consideration is what underlies any resistance to cognitive enhancement, then we think that the best reply is to note that the two professions we are currently considering are already quite physically and mentally demanding. We wonder whether there is a difference in kind between expecting surgeons to endure the taxing physical and psychological work involved in long surgeries or flights and the expectation that they alter their bodies and minds with an enhancement technology. In addition, the mere fact that the mechanism of realizing the benefit involves changes to the agent’s physiological states seems far from decisive. Although it

is a fanciful case, imagine there was some way of drastically reducing the likelihood of fatigue-related error by having the surgeon or pilot periodically run on a treadmill (perhaps because the resulting increased blood flow was shown to have fatigue-mitigating effects in the short term). We doubt that many would deny that the relevant professionals should be obligated to do so. Of course, there may be some other integrity-based reason for thinking that certain professionals would have no obligation to cognitively enhance. However, the objections we have considered, which we take to be the most plausible, fail to pose serious problems for ESB. We thus tentatively conclude that there very well could be moral obligations for certain individuals in certain circumstances to cognitively enhance.

Conclusion

According to our nature-of-activity approach, there is no simple answer to the question on the normative treatment of cognitive enhancement. Our reasoning has showed that cognitive enhancement is morally *impermissible* in some practice-oriented activities, such as some educational activities, when it is the case both that cognitive enhancement would negatively affect the *point* of those activities (i.e. learning *through a certain kind of effort*) and that we have good reasons to value that point. However, cognitive enhancement should be *allowed* in two groups of cases, namely in practice-oriented activities (e.g. non-competitive Sudoku), on which little of moral value or social import hangs, and in some prominently goal-directed activities, such as high-responsibility professions, the goal of which has significant moral or social value. According to our approach, there are also special circumstances in which the use of efficacious and relatively safe cognitive enhancers may even be *obligatory*, typically emergency situation involving high-responsibility professionals.

We think that our reasoning may have an interest that goes beyond the ethics of cognitive enhancement, as the arguments that we put forward may also be applied - maybe with some modification - to other kinds of human enhancement. We thus hold that the structure and methodology we follow may constitute a template for a fruitful ethical discussion in this and in related areas.

REFERENCES

- Gawande, A. (2012). Two Hundred Years of Surgery. *New England Journal of Medicine*, 366(18), 1716–1723.
- Goold, I. & Maslen, H. (2014). Must the Surgeon Take the Pill? Negligence Duty in the Context of Cognitive Enhancement. *The Modern Law Review*, 77(1), 60–86.
- MacIntyre, A. (1985). *After Virtue*. 2nd ed. London: Duckworth.
- McCabe, S.E., Knight, J., Teter, C.J. & Wechsler, H. (2005). Non-medical Use of Prescription Stimulants Among US College Students: Prevalence and Correlates from a National Survey. *Addiction*, 100(1), 96–106.
- McCabe, S.E., Teter, C.J. & Boyd, C.J. (2004). The Use, Misuse and Diversion of Prescription Stimulants Among Middle and High School Students. *Substance Use & Misuse*, 39(7), 1095–1116.
- Murray, T.H. (2008). Sports Enhancement. In Crowley, M. (ed.). *From Birth to Death and Bench to Clinic: The Hastings Center Bioethics Briefing Book for Journalists, Policymakers, and Campaigns*. New York: The Hastings Center, 153–158.
- President’s Council on Bioethics. (2003). *Beyond Therapy*. https://bioethicsarchive.georgetown.edu/pcbe/reports/beyondtherapy/beyond_therapy_final_webcorrected.pdf (Accessed March 1, 2014)
- Rawls, J. (1955). Two Concepts of Rules. *The Philosophical Review*, 64(1), 3–32.
- Repantis, D., Schlattmann, P., Laisney, O. & Heuser, I. (2010). Modafinil and Methylphenidate for Neuroenhancement in Healthy Individuals: A Systematic Review. *Pharmacological Research*, 62(3), 187–206.
- Santoni de Sio, F., Faulmüller, N., Savulescu, J. & Vincent, N.A. (forthcoming). Why Less Praise For Enhanced Performance? Moving Beyond Responsibility-shifting, Authenticity, and Cheating to a Nature of Activities Approach. In Jotterand, F. & Dubljevic, V. (eds.), *Cognitive Enhancement: Ethical and Policy Implications in International Perspectives*. Oxford: Oxford University Press.

- Savulescu, J., Foddy, B. & Clayton, M. (2004). Why We Should Allow Performance Enhancing Drugs in Sport. *British Journal of Sports Medicine*, 38(6), 666–670.
- Savulescu, J. (2006). Conscientious Objection in Medicine. *BMJ: British Medical Journal*, 332 (7536), 294–297.
- Schermer, M. (2008). On the Argument That Enhancement Is ‘cheating’. *Journal of Medical Ethics*, 34(2), 85–88.
- Searle, J. (1995). *The Construction of Social Reality*. New York: Free Press.
- Sugden, C., Housden, C., Aggarwal, R., Sahakian, B. & Darzi, A. (2012). Effect of Pharmacological Enhancement on the Cognitive and Clinical Psychomotor Performance of Sleep-deprived Doctors: a Randomized Controlled Trial. *Annals of Surgery*, 25 (2), 222–227.
- Vincent, N.A. (2011). The Challenges Posed to Private Law by Emerging Cognitive Enhancement Technologies. *The Law of the Future and the Future of Law*, 511–521.
- Whitehouse, P., Juengst, E., Mehlman, M. & Murray, T. (1997). Enhancing Cognition in the Intellectually Intact. *Hastings Center Report*, 27(3), 14–22.
- Williams, B. A. O. (1973). *A Critique of Utilitarianism*. In Smart, J. J. C. & Williams, B. A. O. (eds.), *Utilitarianism - For and Against*. Cambridge: Cambridge University Press.
- Weyandt, L., Marraccini, M., Gudmundsdottir, B.G., Zavras, B.M., Turcotte, K., Munro, B. & Amoroso, A. (2013). Misuse of Prescription Stimulants among College Students: A Review of the Literature and Implications for Morphological and Cognitive Effects on Brain Functioning. *Experimental and Clinical Psychopharmacology*, 21(5), 385–407.

