The Ethics of Cognitive Enhancement

Is it wrong to take ‘smart drugs’?

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1. INTRODUCTION

In this paper I will discuss some moral concerns regarding the use of cognitive enhancing drugs. The overall thesis I will defend is that despite some potential for negative effects on individuals and society cognitive enhancement is not immoral in most contexts.

Attempts to enhance one’s abilities have been an essential part of the evolution of the human race. From the use of simple tools to increase the strength or precision of one’s hand, through writing as a memory aid to airplanes, computers and the internet human beings are rarely satisfied with their natural capacities and look for their enhancement. Modern medicine provides us with numerous therapeutic agents and techniques, some of which can be used by healthy individuals to alter their ‘natural’ characteristics.

Pharmacological cognitive enhancement (CE) is a relatively recent addition to this arsenal. Enhancement of cognitive faculties includes the improvement of attention, memory retention and problem solving. There exist pharmacological agents that are claimed (some based on more or less thorough research) to promote these faculties in healthy, ‘normal’ people. To name just a few well known and widely used examples: methylphenidate (Ritalin®), donepezil (Aricept®) and modafinil (Provigil®).

1Farah, 2002; Farah et al., 2004; Sahakian and Morein-Zamir, 2007
2Normann and Berger, 2008; de Jongh et al., 2008
Ethical issues raised by cognitive enhancement are complex and in this paper I will limit my discussion to the use of CE by adults and focus on three major areas of objections pertaining to CE: whether using cognitive enhancement is cheating; whether CE is a threat to justice and equality; and finally, to what extent we should look to pharmacology to provide solutions in this ethical debate (in particular the questions of efficacy and safety). In the following discussion I will try to separate these three areas as much as possible (fully aware that in reality this separation is impossible) in order to be able properly to dissect individual objections. In sections 3 and 4 I will therefore ignore the fact that all drugs have side-effects and associated risks, which will be the topic of section 5; in section 3 I will refrain from considering the impact our views may have on the society as a whole and discuss these issues in section 4.

Before I get to the discussion of cognitive enhancement proper I will briefly mention the current debate about a problem highly relevant to this paper, namely the distinction between enhancement and treatment.

2. ENHANCEMENT OR TREATMENT?

The problem of treatment vs. enhancement has two parts. First we need to find out whether the distinction can be made at all and then assess whether it really has any moral relevance.

Savulescu (2006) lists five different ways of defining enhancement: sociologically pragmatic, ideological, functional, ‘welfarist’, and one explicitly called ‘treatment vs. enhancement’. In his preferred ‘welfarist’ view treatments become a subset of enhancements sensu lato. This move highlights the family semblances between the two but at the same time obscures the differences. In the following discussion I will use the term enhancements sensu stricto as different from treatments.

This distinction is tightly linked to the distinction between disease and health. As with many ‘common sense’ concepts an exact theoretical definition of disease and health is not one easily provided. An influential attempt by Boorse (1975, 1976, 1977) linked health to a statistically normal function for a given species and this model has been used by others in
ethical debates\textsuperscript{3}. The fundamental value of Boorse’s model as a basis for moral deliberation is its claimed non-normativity, i.e. independence of value judgments.

I cannot provide here a detailed analysis of the distinction between enhancement and treatment but unlike Savulescu (2006) I will maintain that it \textit{must} be meaningful because it is tied to the distinction between health and disease—if we get rid of one we must get rid of the other (unless we define health as perfection and anything imperfect as disease in need of treatment). Where exactly lies the boundary is another question. Boorse’s account, however appealing, is not without problems: its non-normativity is disputed\textsuperscript{4} and there are cases where this approach identifies as diseases conditions we do not consider as such, e.g. homosexuality\textsuperscript{5}. Therefore, for the time being, I will use a somewhat arbitrary but practically relevant distinction: disease is what is defined as such by the current medical practice as expressed in diagnostic manuals and guidelines. Using this definition some cognitive defects will fall into the category of diseases (e.g. severe mental retardation in phenylketonuria) and will require treatment, others will not (e.g. not being able to remember a long telephone number) and yet others will be somewhere in the middle (e.g. attention span and behavioural problems in schoolchildren).

The second part of the problem is the moral relevance of the distinction: if we agree that treatments are not only morally unobjectionable but often obligatory, where does this leave enhancements?

Let me illustrate the problem using a much cited example, the use of human growth hormone (h\textit{GH}) to augment body growth in children\textsuperscript{6}. There exist a number of diseases, which can reduce the growth of a child and since a short stature is recognised as being disadvantageous to individuals in our society, in addition to treating the underlying disease we also administer h\textit{GH} to ensure normal adult body height in the affected individual. In many cases the administration of h\textit{GH} does not treat the disease but one of its effects. So far nothing controversial. A problem arises, however, if a healthy child of healthy but very short parents requests a similar treatment—its expected height is the same as that of an individual

\textsuperscript{3}Daniels, 1985, 2000, \textsuperscript{4}Bunzl, 1980, \textsuperscript{5}Kingma, 2007, \textsuperscript{6}Allen and Fost, 2004
diagnosed with a disease and the healthy child can be expected to suffer from short stature to the same extent as the ill child. A discussion from a clinical point of view can be found in Lee (2006).

The extensive discussion of this problem in Buchanan et al. (2000) starts with the assumption that the provision of treatments is generally perceived as obligatory and focusses on the question whether all/some enhancements should be exempt from this obligation. The hGH case shows that sometimes the moral conclusions drawn from the treatment/enhancement distinction can be highly arbitrary and we may feel that we ought to provide a drug to alleviate suffering even in the absence of a disease (and vice versa: we may not feel obliged to provide treatments for some diseases).

Going back to my temporary definition of disease we can see that it is not (unlike Boorse’s non-normative model) in a one-way relationship with its moral implications. The decision to call a condition a disease is not only the reason why we (generally) feel obliged to treat it but also vice versa: if we feel a condition should be treated we are likely to classify it as a disease. This hermeneutic relationship is not helpful if we seek clear-cut theoretical definitions but illustrates that unless we decide that we as a society are obliged to help every individual to achieve perfection (as appears to be Savulescu’s ideal) there will always be some enhancements, whose ethical status remains outside the constraints of social obligation. In the following discussion I will assume that a distinction between treatments and enhancements can be drawn and that it has a moral relevance while being aware that the boundaries are fuzzy.

3. INTUITIVE OBJECTION—CHEATING

Many people’s intuitive objection to any kind of artificial enhancement is that it is in fact cheating, receiving something for nothing and possibly gaining an unfair advantage. The classic paradigm for this objection is doping in sports. Taking anabolic steroids or erythropoietin provides the ‘dishonest’ athlete with an advantage over his/her honest colleagues. Such an unfair advantage is a clear ethical problem—but one easily overcome if we allow everyone to use whatever enhancement means they wish.

7Buchanan et al., 2000, p. 115
Despite this ‘solution’ many people would point out that using doping in sports is morally wrong even if everybody were doing it. Why is this so and does this objection apply to cognitive enhancement too?

First it is important to clarify the two meanings of ‘cheating’ used in the previous paragraph. As discussed by Schermer (2008) cheating is often invoked when somebody breaks the rules in order to gain an advantage (e.g. illegal doping in sports) but the concept of cheating is not limited to situations where explicit rules exist. The implicit rules involved in the second kind of cheating are much harder to dissect and differ not only from situation to situation but also (to some extent) from person to person. It is the second type of cheating I will be considering in this section.

Whether or not enhancements (cognitive or other) constitute cheating has been addressed in the literature from several different points of view. Schermer (2008) sees broad parallels between enhancements in sports and in education and concludes that in both areas the use of enhancements may or may not constitute cheating depending on rules, distributive justice and internal goods present in the specific activities. In the following discussion I aim to show that competitive sports are sufficiently different to most ‘real life’ situations and parallels between doping and cognitive enhancement are rarely justified.

Let us start with doping in sports. There is no doubt that doping alone does not make Olympic champions and a lot of effort is needed with or without illegal drugs. However, the level of excellence reached with doping is perceived as requiring less effort than a similar level attained by honest means. This devalues the achievement tainted with doping and is the reason for an intuitive rejection of this kind of enhancement. However, if a steroid-taking firefighter saved a child from a burning house by means of his supernormal strength, would people object in the same way?

What we see here is a distinction between two kinds of reference frameworks, in which abilities (or excellence) are evaluated. In competitive sports we are interested in the ability alone—an athlete often does not even have to come first to win our admiration and not all victors will be admired (for example if all opponents had to scratch due to illness). In other words, in this context what matters is the ability and not what ends it is used for. The other kind of framework is its polar opposite: we only care about an ability as a means for a relevant end (strong firefighter).
The reason for this difference is clear: excelling in an athletic competition has a negligible external moral value and all its moral relevance is internal, best approximated by the amount of effort that went into achieving the excellence. On the other hand, in almost all ‘real life’ situations we are more interested in the end and the means used are judged in relation to it. The effort that went into achieving an end is rarely relevant: most people do not care if an architect uses computer software instead of drawing plans by hand.

How does this contextual distinction affect our moral perception of cognitive enhancement? It is clear that any kind of pharmacological/biotechnological enhancement of cognitive faculties will be rejected as cheating whenever the ability to think or recall facts is the sole end we are interested in: Jeopardy, spelling bee and the like. On the other hand, it would make little sense to judge as immoral a scientist or a physician if they use cognitive enhancement drugs in order to do their job better in the same way as it would be ridiculous to prevent engineers from using calculators and insist that they calculate everything in their heads.

The argument that pharmacological cognitive enhancement is wrong because it constitutes cheating thus depends on the context. Outside situations analogous to quiz-like competitions I believe it is untenable. Borderline contexts (e.g. exams) need to be assessed on a case-to-case basis with respect to their purpose.

4. THREAT TO JUSTICE/EQUALITY?

While we may agree that a doctor using modafinil to keep alert on a night shift is not cheating his ability to treat patients more efficiently than his drug-free colleagues could provide him with a competitive advantage leading to faster professional advancement and other benefits. This example shows that enhancing any generally desirable ability in an individual is likely to improve his/her chances of getting a better job, making more money, finding a better partner, etc. The impact of any non-trivial artificial enhancement technology (including CE) on our modern meritocratic society will be complicated by the following: access to this technology is likely to be unequal, those who have this access will rise on the social ladder and their access to further enhancement technologies will become even more
extensive thereby creating in effect a positive feedback cycle, where “to those who have more will be given” (Mk 4:25). Such a runaway escalation of privileges of a select few is perceived by most people as unjust. Is CE wrong because it creates injustice and inequality?

4.1. WHAT JUSTICE?

To rephrase the question posed in the previous paragraph we can ask: if CE is not inherently immoral how can it be distributed in the society in a fair way? Any answer to this question will obviously depend on what we mean by ‘fair’ and hence on which theory of distributive justice we choose.

Savulescu (2006) chooses ‘sufficientarianism’ and claims that justice in this context requires that everybody have “a right to a fair go”, meaning that “…each person has a legitimate claim to some enhancement or medical intervention when that intervention provides that person with reasonable chance of reasonable extension of a reasonable life and/or a reasonable improvement in its quality”. This concept of justice requires as wide availability of enhancing technologies as possible. Savulescu acknowledges the reality of limited resources and suggests the prioritisation of those in greatest need of enhancement.

A more thorough discussion of a similar view can be found in Buchanan et al. (2000), who base their discussion of genetic enhancement on a ‘Fair Equality of Opportunity’ theory of justice, originally introduced by Rawls (1971) and extended in the context of health care provision by Daniels (1985, pp. 10ff). According to this theory, individuals have a right to a fair equal opportunity and any obstacles to this right are unjust.

What is ‘fair equality of opportunity’? As discussed by Buchanan et al. (2000, pp. 65f) this is open to interpretation. Traditional accounts (social structuralist) would relate fair equality to talents and abilities of an individual and focus on obstacles created by society thus leaving out ‘natural’ differences between individuals.

‘Brute luck’ theorists claim that distributive justice should cover everything for which an individual cannot be held responsible such as obstacles to fair equal opportunity created by unequal starting conditions

\[^8\]Dworkin, 1981
(‘social or genetic lottery’). If we accept the ‘brute luck’ version of this theory of distributive justice, what does it imply for cognitive enhancement?

4.2. does CE remove or create obstacles to fair equal opportunity?

On the one hand, pharmacological cognitive enhancement could help remove some obstacles posed by the ‘genetic lottery’. Some existing preparations appear to exhibit an inverted U-shape efficacy curve⁹, which means that they are more effective in individuals with lower performance. However this may be, we can easily imagine a regulation network, in which only people below or at a certain level of cognitive abilities have access (or free access) to CE¹⁰. This would be one way of fulfilling the principles of the ‘brute luck’ theory of justice and in this context CE would be clearly beneficial.

The other side of the coin is the case when CE is available purely on a commercial basis, when good social standing leads to a better access to enhancements followed by a further rise on the social ladder with further increase in opportunities. Since individuals with lower marketable skills are likely to end up having an impaired access to CE (possibly through no fault of theirs), such a case would create unfair obstacles to their opportunity as described above. This scenario is only plausible under two assumptions: a) the access to CE is unequal and significantly dependent on social standing (wealth) of an individual and b) the enhancement effect is significant enough to enable any such escalation. Currently available CE drugs show modest, if any enhancing effects (vide infra) and the possibility of a feedback enhancement loop described above seems remote. However, with any new technology or with a future accumulation of many modestly but synergistically effective preparations this threat needs to be re-evaluated. Another point of caution is raised by situations where even a small increase in cognitive abilities may lead to a significant competitive advantage (e.g. pass/fail tests).

⁹de Jongh et al., 2008; Glannon, 2008 ¹⁰Bostrom and Sandberg, 2007
4.3. PARALLELS WITH EDUCATION

Since it seems that CE drugs are here to stay and can alleviate and potentiate inequality we should look at other such mechanisms already existing in our societies and how we cope with them and try to derive conclusions from such familiar cases for the novel area of CE. One well known example of an ‘enhancement’ leading to a rise on the social ladder and thus providing easier access to further enhancements is education\footnote{In this discussion of education as a model for our dealing with cognitive enhancing drugs I do not wish to imply that the two are essentially similar. I do, however, believe that the social mechanisms created by them have similar features and we could therefore use the familiar case as a template for the unfamiliar one.}. The positive effect of education on social status is indisputable and so is the fact that access to quality education tends to be unequal. Even disregarding the effect of money (in the form of private education), if an individual attends a high quality primary school she is more likely to get into a better high school, which further amplifies her chances for good university education, etc. This positive feedback loop then often continues into the next generation(s).

How do we deal with this self-amplifying inequality? Many governments try to improve the standard of public education and decrease the difference money or social status can make in the access to quality education; however, the idea that the state can provide the best possible education for everyone is clearly unrealistic (for the same reason as providing all available medical technology to everyone). Similar to pharmacological enhancements a ban on private education is unreasonable.

In the case of education we seem to tolerate the inherent inequality because another interest competes with the requirement for equality: education in itself is a good not limited to the ones who possess it, educated people (in general) tend to benefit the society as a whole. This means that the society as a whole has an interest in both supporting gifted students to achieve the highest possible level of education and at the same time help disadvantaged individuals to acquire a level of education necessary to compete in the labour market.

In a similar way to education, CE could, in principle, help both the good to be even better and the disadvantaged (by social or genetic lottery)
to become competitive (with all the caveats expressed in section 5). Since cognitive abilities are very similar to education in that both are valuable for the society as a whole it appears irrational to try to ban their use based on objections from distributive justice.

4.4. Threat of Social Coercion

In section 3 I mentioned the case of a steroid-taking firefighter who saves a life thanks to his artificially enhanced strength. I concluded that this use of steroids in this specific case is not morally suspect (unlike in sports) because the end served by the enhancement is ultimately what matters. The situation to which I would like to draw your attention now is what if the firefighter were not taking steroids and failed to save the child’s life because he lacked the necessary strength—and we can assume with some certainty that had he used steroids he would have succeeded. A similar picture can be painted of a surgeon who was too tired to notice a slipping ligature on a patient’s artery, which later led to fatal internal bleeding and which could have been prevented if the doctor had taken an appropriate pill before the operation\textsuperscript{12}.

The point I am driving towards is that individuals in certain professions (and by hypothetical extension all people) may be expected or even forced to take cognitive (and other) enhancing drugs in order to perform their jobs better\textsuperscript{13}. While this vision may horrify many people, provided a complete absence of any side effects (which is our idealised assumption in this section) it is hard to see how such a requirement for taking enhancing drugs is any different from a requirement of appropriate education or a ban on drinking at work. A counter argument invoking the autonomy to choose what to do and not do with one’s body\textsuperscript{14} falls flat in this case as for example having to go to medical school in order to be able to practice medicine could be seen as coercive too. Of course, a significantly different picture appears if we take into account possible side effects of drugs (\textit{vide infra}).

\textsuperscript{12}Warren et al., 2008 \hspace{1em} \textsuperscript{13}Glannon, 2008; Appel, 2008 \hspace{1em} \textsuperscript{14}Appel, 2008
4.5. Cognitive Abilities as Positional and Non-Positional Goods

Another issue I want to briefly mention is the fact that the value we attach to one’s abilities and the competitive advantage provided by them is relative to abilities of other people. This means that an individual is likely to be more successful if her abilities are better that those of her competitors—or significantly different. In a market economy (or a similar system) one can make money if his skill is either better than others’ or if he possesses a skill that no one else does. How would this arrangement be affected by cognitive enhancement?

One foreseeable impact is the shifting of the average. If more people take enhancing drugs the average level of cognitive abilities will shift upwards thus decreasing any competitive advantage (and potentiating competitive disadvantage of those without access to these drugs). The fact that relative ability is what gives one an advantage over others, it is more than likely to drive people to higher doses and more effective drugs (see below discussion of addiction). This fact has implications for our previous discussion of distributive justice: unless provisions are made to enable the disadvantaged to access CE the starting inequalities will not only not be removed but actually amplified.

On the other hand, cognitive abilities also have a non-positional value. ‘Smarter’ people generally benefit society as a whole, including those who find themselves in a competitive disadvantage with respect to them. This fact can be used as an argument against allowing only disadvantaged individuals to use CE. How to find the exact balance between these two principles is an interesting question but one beyond the scope of this paper. However, once again the similarity to education could be used to search for the answer.

4.6. Summary

The area of justice, equality and social impacts is a complex one a not every issue could have been discussed here in a detail it deserves. My overall conclusion is that cognitive enhancement drugs do not represent a qualitatively new phenomenon, which we could not cope with as a society. Therefore I do not believe CE is morally wrong from a social point of view.
provided appropriate social mechanisms are set up in order to maximise its beneficial effects and mitigate its negative impacts.

5. **BIG ISSUES—SAFETY AND EFFICACY**

Despite the philosophically interesting issues discussed in the previous sections I believe that the main objection against the use of pharmacological cognitive enhancements lies in their incompletely understood mechanism of effect and safety profile.

The effects of the three drugs mentioned in the introduction as examples of CE (methylphenidate, donepezil and modafinil) have been studied from the molecular level to clinical trials. All three drugs have been approved by major regulatory authorities for the treatment of specific disorders in humans (ADHD, Alzheimer’s disease and narcolepsy and related disorders respectively). We know that methylphenidate increases dopamine and noradrenaline transmission\(^{15}\), donepezil inhibits the degradation of acetylcholine\(^{16}\) and modafinil seems to affect the histamine system\(^{17}\) and it is generally understood that these mechanisms are responsible for the therapeutic effect of these drugs.

A somewhat different picture appears if we move from the treatment of more or less well defined symptoms of diseases to healthy individuals seeking enhancement of their cognitive abilities. The first issue to come up is the risk/benefit ratio in these cases. A study of adverse effects of drugs is an essential part of the regulatory process and we can therefore assume that in the case of approved pharmaceuticals we know a fair amount about the ‘risk’ part of the equation (more about this later). However, what about the benefit? Do these drugs really improve performance in normal subject and if so, what kind of performance?

The literature regarding the effect of cognitive enhancement drugs in healthy individuals is relatively sparse and while some studies showed mild to moderate beneficial effect on specific subsets of cognitive (and

\(^{15}\)Wilens, 2008 \(^{16}\)Yoo et al., 2007
\(^{17}\)Ishizuka et al., 2008
other) abilities, there are others that show insignificant or even negative effects.

When any significant beneficial effect is in doubt only a complete absence of adverse effect may prevent us from claiming that the provision of these ineffective preparations is unethical. Even scientifically ‘ineffective’ drugs can have a significant placebo effect, which for some ‘patients’ may be a reason enough to part with substantial sums of money in exchange for placebo tablets. However, in the presence of a non-trivial risk of side effects a careful weighing of this risk versus potential benefit should be pre-requisite to taking these drugs.

In the current legal scheme this risk/benefit evaluation should be performed by qualified physicians in collaboration with the patient; after all, most of the available cognitive enhancing drugs are officially prescription only and should only be prescribed to patients suffering from specific disorders. In reality, however, all these drugs are freely available for anyone willing to pay the money and the risk assessment is done, if at all, by individuals who may not possess or understand all the necessary information.

In addition to the problem of balancing known side effects with expected benefits I feel that a potentially much more serious problem is often overlooked, namely the possibility of unknown side effects or that the effects we now see as beneficial may not be so. Our knowledge of the functioning of the human brain is still rudimentary and no one can foresee what effect an enhancement of one cognitive ability will have on all the others. Of course, this problem is amenable to further scientific research and one day we may have a fuller grasp of how cognitive enhancing drugs affect the brain as a whole and possibly even how they influence an individual’s behaviour in complex social environment. At the moment, however, we do not possess this knowledge and thus should approach these drugs with utmost caution.

Another obvious safety concern is the potential for addiction. Methylphenidate has been found to exhibit some addiction potential, while

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18Camp-Bruno and Herting, 1994; Turner et al., 2003a; Cooper et al., 2005; Grön et al., 2005; Marchant et al., 2009
19Elliott et al., 1997; Turner et al., 2003b; Beglinger et al., 2004
20Sahakian and Morein-Zamir, 2007
21Rush et al., 2001
Modafinil appears safe\textsuperscript{22} and donepezil has not been tested. These studies, however, were only short-term and looked for cocaine-like symptoms of dependence as measured by increased self-administration or reported pleasurable feelings. However, even CE do not produce classic drug dependence it is hard to imagine that people, who regularly take enhancing drugs would not to develop psychological or ‘social’ dependence: it is far too easy to get used to being better than normal and very hard to go back to being just normal. Other people may also expect us to perform at a certain level and this would create enormous pressure to continue taking enhancing drugs even ‘against our will’ (\textit{vide supra}). The threat of psychological or ‘social’ addiction to cognitive enhancing drugs is rarely mentioned but in my opinion it is one of the most serious objections.

Even if enhancing drugs without any side effects were developed (thereby voiding all the remaining safety issues) the problem of addiction would persist in the form of continuous anxiety caused by the possibility of losing access to the drug.

The safety issues discussed in this section can be broadly divided into two groups: those solvable by further scientific research (namely the question “what exactly do these drugs do to our brains and is this what we want?”) and those that cannot be unequivocally resolved by science (“are the risks worth the benefits” and the problem of addiction). The latter can only be decided on an individual basis and in the case of adults such a decision will depend on their goals in life and their ‘practical wisdom’.

\textbf{6. CONCLUDING REMARKS}

In this paper I discussed some objections raised against CE. I believe that the most serious concern lies in the lack of reliable data regarding the safety and efficacy of CE (especially long-term) and its addiction potential.

\textbf{References}


\textsuperscript{22}Jasinski, 2000


