Feeling 'better than well'

Can our experiences with psychoactive drugs help us to meet the challenges of novel neuroenhancement methods?

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In recent years, neuroscience has provided detailed insight into the human brain's inner workings. This gives promise to the development of drugs that will improve our ability to treat people with mental disorders (Andreasen, 2001; Stahl, 2002) and help people to overcome addiction to nicotine, alcohol and other drugs (Cami & Farre, 2003; Koob, 2000; World Health Organization, 2004). Another, potentially less welcome, by-product of this research—at least according to some critics—is 'neuro-enhancement'. This term includes the use of drugs and other interventions to modify brain processes with the aim of enhancing memory, mood and attention in people who are not impaired by illness or disorder (Elliott, 2003; Kramer, 1993; Parens, 1998, 2002). Because they fear that these products will find a welcoming and potentially huge market, some neuroscientists and ethicists have expressed concerns about the non-medical use of neuroscience research. Although many of these worries seem new, it is worth remembering that humans have used drugs to enhance their psychological functioning since our ancestors discovered the mind-altering effects of plant-derived preparations. When discussing the ethical implications and potential pitfalls of neuroenhancement, we can therefore learn from the long history of human experience with psychoactive drugs.

Critics of neurological interventions outside the medical setting, such as Francis Fukuyama (2002), Carl Elliott (2003) and the US President's Council on Bioethics (2003), contend that neuroenhancement is already with us. They

claim that there is widespread use of selective serotonin reuptake inhibitor (SSRI) antidepressants such as Prozac® to modify mood and personality in non-depressed people, and that the stimulant methylphenidate (Ritalin®) is used widely to improve attention and school performance in normal children. Although most critics accept the legitimate use of these drugs to treat depression and attention disorders, they argue that the fuzziness of diagnostic criteria means that drugs are increasingly being used for enhancement purposes. These uses are harbingers, they predict, of even more extensive neuropharmacological augmentation of psychological functioning.

And the next wave of drugs in the pharmaceutical industry pipelines will extend even further beyond mood and attentiveness. One obvious candidate, because of the increasing age of the 'baby boomer' generation, is memory. Drugs that are now being developed to treat memory loss in Alzheimer's patients could also be used to enhance memory function in healthy people. In addition, given the huge potential market for memory enhancers, therapeutics may be developed specifically for this purpose (Farah *et al*, 2004). Other drugs might attenuate

unpleasant and traumatic memories (President's Council on Bioethics, 2003) or enhance 'executive function'—our ability to allocate our attention to difficult tasks in a sustained and efficient way (Farah *et al*, 2004; Hall, 2003).

The possibility that these drugs are used for enhancement and not for treating disorders has raised a variety of ethical concerns. Some ethicists worry about the consequences both for individuals who use these technologies and for those who do not but who may nonetheless be affected indirectly. Proponents of deontology—the study of moral obligation—express even more fundamental objections. They are concerned about whether people who use these technologies can give truly informed consent to their use, what effects these technologies will have on our understanding of 'human nature' and ourselves as individuals, and how we as a society will deal with human performance that is enhanced by pharmaceuticals.

First, there are good reasons to question the safety of neuroenhancement.

In fact, the frequent occurrence of adverse reactions to many therapeutics provides ample evidence that medical interventions not only cure but also harm. This is acceptable when drugs are used to treat serious diseases, if the side effect is less serious than the illness or disability being treated. But the trade-off between side effects and improvements may be less clear if healthy people use pharmaceutical enhancements to improve their mental performance. In addition, it may also be difficult to measure these side effects, particularly if they affect mood or behaviour

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or if they appear only after prolonged and extensive use. Some critics invoke the evolutionary argument that any gains in human ability that are achieved technologically will involve trade-offs with other capacities that are selected for by our ancestral environment: that is, optimizing some abilities will inevitably be at a cost to others and to our overall performance (Farah, 2002). Proponents of neurological enhancement concede that there may be adverse side effects, but argue that these can be identified early and managed by monitoring technologies and advising potential users of their risks (Caplan, 2002; Stock, 2002).

Safety is understandably the focus of debate, but it may be just as difficult to assess efficacy. Placebo effects will probably complicate the assessment of enhancement technologies as they do the assessment of other therapeutics. Efficacy evaluations that are based on short-term studies may not be able to identify whether adaptations in the human brain to neuropharmaceutical enhancements will eventually diminish their effectiveness. These difficulties in assessing the efficacy and safety of neuroenhancement drugs and technologies undoubtedly mean that many questionable products with unproven claims will find their way to the market. Our experience with purported 'natural' forms of enhancement in the form of nutraceuticals, functional foods and dietary supplements shows that protecting consumers from new technologies with doubtful efficacy will be a challenge. But this is not an insurmountable hurdle if we apply an adapted form of the regulatory apparatus for pharmaceuticals to neurological enhancements (Farah *et al*, 2004).

Whereas customers are still free to choose whether or not to use dietary supplements, critics claim that the time may come when they are no longer free to reject neuroenhancement. In fact, a major concern is that the widespread use of enhancement technologies will raise the standards of what counts as 'normal' (Farah, 2002; Parens, 2002). Unlimited and unregulated use could coerce unwilling citizens into using enhancement technologies to compete effectively for education and employment opportunities (Farah, 2002). Such a scenario is not too far-fetched; critics point to the

increasing abuse of performance-enhancing drugs in elite sports and the use of stimulants by school-aged children (Fukuyama, 2002; President's Council on Bioethics, 2003). They are also concerned that widespread neuroenhancement could lead to further discrimination against the disabled and people who reject enhancement (Parens, 2002). So far, evidence for these claims is only anecdotal (President's Council on Bioethics, 2003), but the quality of public debate could certainly improve with more and better data on the prevalence of these phenomena and the effectiveness of social norms and regulations in ameliorating their effects.

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More speculatively, overtly coerced enhancement could occur in schools; for example, if underperforming children were pressured to undergo treatment or cognitive enhancement. The same could happen in the workplace, if employers made preparedness to be enhanced a requirement of employment, or in prisons if enhancement was seen as a remedy for poor cognitive performance. It remains to be seen how realistic these concerns are and whether existing anti-discrimination laws and other legislation would protect citizens from overt coercion. A commonly proposed remedy—to ban enhancement technologies completely—would replace one form of coercive control with another. Indeed, a ban is arguably much more coercive than any gently persuasive 'bandwagon' effects that may arise from widespread use of neuroenhancement: those who do not want to be enhanced could use criminal law to prevent others from doing so (Caplan, 2002). Caplan (2002) also argues that if this line of reasoning was accepted in other areas of social policy, we would have to ban private schools, academic coaching for college entry exams and cosmetic surgery.

Others have argued that the widespread use of enhancement technologies could amplify existing social inequalities because the high price of new technologies would prevent the poor from using

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them (Farah, 2002; Fukuyama, 2002; Parens, 2002). This argument prompts two related responses from the defenders of enhancement: first, they counter that it is more a criticism of existing social hierarchies than a compelling objection to enhancement *per se* (Caplan, 2002, 2003); and second, they argue that the problem can be overcome by addressing inequities in access to the new technologies. For example, we could make all forms of enhancement freely available to everyone by publicly subsidizing their costs. Many developed societies do this with medical treatments, including those that are arguably forms of enhancement, such as *in vitro* fertilization and contraception (Parens, 2002). Alternatively, we could leave it to the free market to provide affordable access to enhancement, as increased efficiency in the production and delivery of the technology under market competition reduce prices (Lachmann, 2001; Stock, 2002).

There are also many less well-formulated objections that stem from a general unease about the use of neuropharmaceuticals to enhance human functioning. These often derive their language and arguments from Judaeo-Christian theological traditions, although they are not only confined to people who share this view, but also resonate with others (President's Council on Bioethics, 2003). Many of these arguments can be described as 'moral intuitions' (Haidt, 2001)—strongly held but often unsupported convictions that neuroenhancement is somehow 'contrary to human nature'.

These concerns are mainly about the implications of neuroenhancement for our understanding of 'human nature', our concept of what is a 'person' and our sense of 'personal identity'. Will people who undergo neuroenhancement remain fully human? In what sense will they still be themselves? Some opponents of neuroenhancement claim that human nature will change in ways that undermine the human liberty and equality of rights that

are necessary conditions for a free society (Fukuyama, 2002; President's Council on Bioethics, 2003). It is perhaps surprising then that many who embrace existing forms of enhancement—such as cosmetic surgery, dialect and accent correction, or the voluntary amputation of healthy limbs—use the language of identity to express their satisfaction with the results, arguing that they now feel “truly themselves”, that is, truly the person that they always wanted to be (Elliott, 2003).

Another widely shared intuition is that it is morally wrong to use pharmacological shortcuts to achieve social goals. According to this view, enhanced functioning achieved by pharmacological means is ‘cheating’. This has been legislated into bans on performance-enhancing drugs in sports in many developed countries and internationally by the Olympic Committee (President's Council on Bioethics, 2003). It remains to be seen whether this attitude will inform the predominant societal response to neuropharmaceutical enhancement of cognition, memory and mood.

The ethical issues raised by neuroenhancement are often discussed as if they were completely novel, but humans have long appreciated the mind-altering effects of natural substances. Furthermore, many existing psychoactive drugs—such as alcohol, caffeine, nicotine, heroin, cocaine, cannabis and 3,4-methylenedioxymethamphetamine (MDMA)—were first used for medical purposes, which then enabled others to test their use in improving mood and performance. Nicotine was initially introduced to Europe as a herbal remedy for a variety of illnesses before becoming popular as a social stimulant (Goodman, 1994). Morphine was widely used as an analgesic and cocaine as a local anaesthetic in the late nineteenth and early twentieth centuries before both became popular for their euphoriant, relaxant and stimulant effects (Courtwright, 1982). Cannabis and the hallucinogen lysergic acid diethylamide (LSD) were also used

for medicinal purposes before they were advocated in the 1970s for ‘mind expansion’ (Stevens, 1987). More recently, young adults have been using MDMA or ‘ecstasy’—originally developed as an adjunct to psychotherapy—as a social facilitator and dance party energizer (Cohen, 1998).

Our experiences with these psychoactive drugs enables us to make some broad predictions about the probable effects of newer forms of neuroenhancement on users and society, in the short and medium term. They might also serve as a helpful guide for assessing the effectiveness of regulations for these technologies, particularly the many attempts made over the past century to regulate the use of psychoactive substances through international treaties, legislation, regulation and criminal law (Courtwright, 2001). The following hypotheses, drawn from historical experience with psychoactive drug use, provide a more detailed look at this analogy with existing drugs.

First, the use of all psychoactive drugs entails risks to some users (Goldstein, 1994; Kleiman, 1992). These include acute effects at recommended doses, of which the adverse effects of medications are the most familiar. There is also the risk of overdosing and the adverse effects of

chronic drug use—daily or near daily use of a drug over years or decades—which may take a long time to be discovered (Goldstein, 1994; Hall, 1999). All of these effects depend on how these drugs are used and how many people use them. Particularly important here is the availability of neuropharmacological drugs to young adults, the more adventurous of whom are likely to use drugs for unapproved purposes in multiples of the recommended therapeutic dose (Kleiman, 1992).

Second, we can clearly anticipate that the chronic use of neuropharmacological enhancers that affect mood, cognitive performance and personal well-being will lead to addiction (Goldstein, 1994; Kleiman, 1992). This arises from the pharmacological misappropriation of neurological mechanisms that were selected for by evolution to reward behaviour required for individual and species survival, such as eating, drinking and copulating (Hill & Newlin, 2002).

Third, the pattern of use of psychoactive substances among young adults often shows characteristics of an epidemic, with an initial dramatic rise in use that is often followed by an equally dramatic decline (Kleiman, 1992; Musto, 1999). Use and abuse tends to increase steeply during the early phase of ‘epidemic’ enthusiasm for a new drug: new users share their positive experiences with their peers and encourage them to try these drugs (Kleiman, 1992). If a drug has no serious acute adverse effects, it takes some time before long-term adverse effects are noticed, and even longer before information about these harms reaches current and potential users. When casualties eventually become apparent, drug enthusiasm declines steeply as the number of new recruits drops and existing users desist from using (Kleiman, 1992). The same pattern occurs with the therapeutic use of new prescription neuropharmaceuticals, as was evident during the rapid expansion of antidepressant use in many developed societies during the 1990s; we will probably see a decline in their use as soon as the professional and

popular media pick up on their adverse effects (Healy, 2004). We can expect the same phenomena to affect the societal embrace of newly emerging neuropharmaceuticals when used for enhancement.

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Fourth, the moderate use of some drugs may be beneficial. For instance, alcohol causes harm when used in intoxicating doses but in small quantities can prolong life and improve the mental and physical health of middle-aged adults in developed societies (Babor *et al*, 2003). The moderate short-term use of enhancement technologies for specific purposes may similarly benefit individuals and possibly society. The challenge will be to maximize the benefits while minimizing the harms, by developing social rules and norms to regulate their use (Kleiman, 1992).

In addition, there is the option of laws and other regulations to restrict the use of neuroenhancements so as to avoid negative effects. Again, the history of illicit drug use can serve as a guide here. Our experience with the regulation of addictive psychoactive substances suggests that prohibition will certainly reduce but will not eliminate the abuse of enhancement technologies, while also producing some predictable side effects. One is the creation of a black market if there is an unmet demand from a substantial subset of the population who reject the rationale for a ban (Melman, 2003)—as is the case, for example, for cannabis (Hall & Pacula, 2003). In addition, history shows time and again that criminals are the most likely to benefit from any outright prohibition (Melman, 2003). Another side effect is the inevitable delay in recognizing the harms caused by enhancements and in developing social norms that safely regulate their use (Stock, 2002). It should be noted that prohibition is a maximally coercive and paternalistic policy that should require strong justification in free societies with a preference for minimally regulated markets in most areas of commerce (Stock, 2002). However, exceptions have been

made for newer commodities that affect human mental function such as, most recently, MDMA and other so-called ‘designer drugs’. Conservative politicians thereby often combine an enthusiasm for free markets in most goods and services—including those traditionally provided by the state—with the use of criminal laws and draconian penalties to prevent the use of newer psychoactive drugs, while opposing restrictions on alcohol and tobacco as unreasonable incursions by the ‘nanny state’.

Some advocates of enhancement therefore argue that a free market is best suited to deal with any problems that may be caused by the use of enhancement technologies (Stock, 2002). Bans and regulations, as they view it, will not stop the development of these technologies. Enhancements are marketable by-products of cutting-edge research and they will inevitably be developed in other societies that do not share the same ethical views as the USA and Europe. Prohibition only exacerbates the problems of access and safety and ensures unequal access to these technologies because the rich will be most able to evade bans by purchasing products elsewhere.

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Experience with psychoactive drugs shows that we need not make a regulatory choice between outright prohibition and a free market (Kleiman, 1992). Nicotine and alcohol demonstrate that a heavily regulated market can enable use while reducing harm by the imposition of government taxes that raise prices and thus discourage use. The revenue generated by such taxes can then be used to fund interventions that reduce harm (Babor *et al*, 2003). Restrictions on sales and access by minors—if enforced—can also help to reduce abuse, as would regulations that restrict the use of enhancement technologies in circumstances that might endanger third parties, for instance by prohibiting driving, work or school while under the influence of drugs that affect mental function (World Health Organization, 1998).

Another option that has already been mentioned is to regulate neuropharmaceuticals similarly to pharmaceuticals, by requiring preclinical studies, randomized controlled trials and post-market surveillance to assess their safety and efficacy and to protect consumers against doubtful claims (Farah *et al*, 2004). This could be accompanied by a system that licenses the providers of enhancement products (Melman, 2003). The medical profession would be the gatekeepers and would be involved in assessing the safety and efficacy of enhancements. A challenge for this proposal will be to ensure the independence and credibility of the regulators and medical profession to prevent financial ties with the emerging enhancement industry that undermine independence. Some have argued that this has occurred in the case of the pharmaceutical industry and psychiatrists involved in treating depression (Healy, 2004).

What is clear is that neurological enhancements will be with us whether we like it or not. The potential market is too large to be ignored by pharmaceutical companies and even if many people reject them initially, there are many others who are eager to boost their mental performance. We therefore have to come up with sensible policies and regulations to ensure the widest benefit before neuropharmaceuticals find their way into a largely unregulated free market or a black market. Our experience with other psychoactive drugs has shown that a strictly prohibitive stance makes little sense as people will nevertheless get access to such drugs and treatments. What is needed, first and foremost, is a sensible and open debate on the potential benefits and harms of neuroenhancement. This could lead to regulatory policies that would ensure their access to those who are interested and would help to prevent, or at least ease, some of the inevitable negative side effects that come with any new technology.

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