

Enhancement, Biomedical

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Biomedical technologies can increasingly be used not only to combat disease, but also to augment the capacities or traits of normal, healthy people – a practice commonly referred to as *biomedical enhancement*. Perhaps the best-established examples of biomedical enhancement are cosmetic surgery and doping in sports. But most recent scientific attention and ethical debate focuses on extending lifespan, lifting mood, and augmenting cognitive capacities.

Biomedical enhancements can be contrasted, on the one hand, with non-biomedical enhancements and, on the other hand, with biomedical therapies. Non-biomedical enhancements aim to augment the capacities or traits of normal, healthy individuals, but not through the use of biomedical technology. Instead, they may employ institutions (such as schools) or external technologies (such as computers). Biomedical therapies employ biomedical technologies, but, unlike enhancements, they aim to treat disease. They are the staple of mainstream Western medicine.

Non-biomedical enhancement and biomedical therapy are widely accepted as typically ethically permissible, and often ethically desirable. The same is not true of biomedical enhancement, which has become the subject of lively ethical debate. At one end of the spectrum, *transhumanists* hold that we should sometimes use biomedical enhancements to radically transform ourselves, even if this means that we will no longer qualify as human. At the other, some *bioconservatives* hold that there are always strong and presumptively decisive reasons against undergoing biomedical enhancement.

1. The Nature of Biomedical Enhancement

The plausibility of these ethical positions depends on precisely which interventions qualify as biomedical enhancements. This has also been a locus of controversy. Enhancements are typically understood to be interventions that

- (a) aim at (succeed in) augmenting human capacities or traits, either by amplifying existing capacities/traits, or by adding new ones; and,
- (b) are not, or not merely, therapeutic.

Biomedical enhancements meet the further criterion that they

- (c) centrally involve the use of biomedical technologies, such as pharmaceuticals or surgical techniques.

There are, however, significant differences in how these elements are spelled out, and what further criteria are added. For example, while enhancement is almost always understood in a directional way, so that it involves the augmentation (rather than attenuation) of capacities or traits, there is disagreement as to whether it should also be understood in an *evaluative* way. Some take enhancement to be necessarily good in some respect, typically good for the person who engages in it (Harris 2007: 2, 9). Others allow that enhancements may lack any value (Buchanan 2011; 23-4). For example, they may consist in the augmentation of neutral or wholly bad capacities, such as the capacity for evil. Evaluative accounts of enhancement perhaps fit better with everyday usage of the

concept, but non-evaluative accounts have the advantage that they neatly separate descriptive and ethical questions.

There is also disagreement about how to formulate the exclusion of therapeutic interventions – element (b) above. One approach is to focus on the initial state of the person undergoing the intervention; enhancements can then be understood as interventions that augment capacities *from* a normal, healthy or disease-free state. However, many would include as enhancements interventions that augment capacities from a subnormal or diseased condition but go beyond merely alleviating that condition (Segall 2010: 124). (An example: South African amputee and paralympian Oscar Pistorius uses prosthetic legs that not only restore his ability to run but arguably allow him to run faster than before.) This suggests that we should focus also or instead on the *end-point* of the intervention. One approach is to require that enhancements leave a person with a level of capacity that exceeds the level minimally required for normality or freedom from disease. Narrower definitions require that enhancements leave the enhanced individual with an *abnormally high* level of capacity, or a level of capacity higher than any that could have been achieved without biomedical intervention.

A further issue is what to say about interventions that aim merely to alleviate some subnormal condition or disease, but accidentally do more than this, or that aim to augment capacities beyond the minimally normal or disease-free level, but fail to do so. Is it the *intended*, *expected* or *actual* end-point of an intervention that distinguishes enhancement from therapy?

In addition to excluding therapeutic interventions, some authors have also wanted to exclude from the category of enhancement standard examples of preventive medicine, such as vaccination. Vaccinations could be construed as enhancements of the immune system. But this poses a problem for those who universally object to biomedical enhancement, since vaccination is not normally regarded as morally objectionable. One

(admittedly *ad hoc*) solution to this problem might be to stipulate that enhancements not be *primarily intended* to prevent disease or preserve normal functioning.

2. Varieties of Biomedical Enhancement

Biomedical enhancements are typically classified according to their target – the capacity or trait that they (aim to) amplify or introduce – or their mode of operation. Widely discussed *targets* of biomedical enhancement include physical appearance, sporting and musical abilities, memory, attention, intelligence, positive mood, and, in recent discussion, moral capacities. Life extension, where this is achieved by slowing normal ageing processes, is also often classified as an enhancement. *Modes* of biomedical enhancement already in use include pharmacological and surgical intervention, and reproductive selection following pre-implantation or pre-natal genetic testing. Commonly discussed possible future modes include genetic modification (somatic or germline), brain-machine interfacing, and deep brain stimulation. Of these modes, all but reproductive selection involve altering the capacities or traits of existing individuals. Reproductive selection consists instead in determining which of alternative possible individuals to bring into existence. It is not always included under the banner of enhancement, and indeed is sometimes set in opposition to it. Reproductive selection raises a number of ethical issues that are not usually raised by (other forms of) biomedical enhancement (*see* NON-IDENTITY PROBLEM; WRONGFUL LIFE) and is not considered further in this entry (*but see* EUGENICS; GENETIC TESTING; REPRODUCTIVE TECHNOLOGY).

3. The Ethics of Biomedical Enhancement: Introduction

The appeal of biomedical enhancement is not difficult to see; in many cases biomedical enhancements might confer significant benefits on those who use them. For example, like education, biomedical cognitive enhancements might significantly widen the career options of those who use them. However, against such prudential benefits, a number of ethical (prudential and moral) concerns have been raised, and these have become the focus of ethical discussion. In some cases, the concerns have been presented merely as issues to bear in mind, or as reasons to abstain from certain varieties of biomedical enhancement. In others, they have been offered in support of strong and general conclusions. For example, Michael Sandel (2007: 92-5) presents himself as offering an “argument against enhancement”, not further qualified, and Francis Fukuyama (2002: 172) urges that we protect “the full range of our complex, evolved natures against attempts at self-modification”.

These strong conclusions have seldom been clearly specified by their advocates. Nor have defenders of enhancement always been clear about their own, opposing conclusions. Nevertheless, it is possible to identify two main loci of significant disagreement: the ethics of individuals or groups *undergoing* biomedical enhancement themselves, and the ethics of individuals, groups or institutions *promoting* or *impeding* the biomedical enhancement of others.

4. The Ethics of Undergoing Biomedical Enhancement

4.1 The Anti-Enhancement View

Participants in debate about the ethics of *undergoing* biomedical enhancement can be divided into two broad camps. Those in the first camp argue that there are always strong and presumptively decisive reasons not to engage in biomedical enhancement (Kass 2003; Sandel 2007; President's Council 2003). Call this the anti-enhancement view. Those in the second camp deny this, with some also holding that there are, in certain cases, decisive reasons *to* engage in biomedical enhancement.

Sections 4.2-4.4 outline a number of concerns about biomedical enhancement that have been (or might be) taken to support the anti-enhancement view, along the way summarizing some of the main responses offered by critics of that view.

4.2 Means-Based Concerns

An initial set of concerns about biomedical enhancement focuses on its biomedical *means*. It has been argued, for example, that biomedical enhancement is ethically problematic since

- I. The biomedical means used are *unnatural* (Kass 2003: 17-24; President's Council 2003: 290-3).

Perhaps the most obvious sense in which biomedical means are unnatural is that they are *artificial* – they are in part products of purposeful human activity. It seems doubtful whether this is of moral significance, however. Typical biomedical therapies and non-

biomedical enhancers are also artificial, yet they are not normally thought problematic. A challenge faced by proponents of this concern is to identify a plausible conception of unnaturalness such that the means of biomedical enhancement are unnatural *and this is of ethical concern*.

Another means-based concern appeals to the claim that

II. Enhancement via biomedical means is *too easy* (Kass 2003: 21; Sandel 2007: 25-6).

The thought here is that adopting a biological shortcut to a goal cheapens or perhaps wholly undermines the value of the achievement, just as, say, using a motorcycle undercuts the value of completing a marathon.

Some have sought to limit the scope of this concern by arguing that certain goals have value that is independent of the means by which they are achieved (Bostrom & Roache 2008; Goodman 2010). Examples plausibly include making a scientific breakthrough, presiding over a fair trial, and satisfying the basic needs of one's children. Perhaps, given the choice, it would be *better* to realize these goals through a challenging route rather than an easy one. But in some cases the choice may instead be between realizing the goal via a 'shortcut' and not realizing it at all. In such cases, the means-independent value of the goal may justify taking the shortcut. It thus seems doubtful whether this concern will count decisively against undergoing biomedical enhancement in *all* circumstances. Again, comparison with biomedical therapies and non-biomedical enhancements is illustrative. Taking a drug is an easy route to fighting a headache, and using a calculator is an easy route to solving a mathematical problem. Yet in many cases it is permissible to take a pain-killer or use a calculator.

4.3 Expressivist Concerns

Another set of concerns about biomedical enhancement focuses not on the means that it utilizes but rather on the attitudes, motives or character that it expresses. One such concern is that

III. Undergoing biomedical enhancement might implicitly express acceptance of unjust social norms or attitudes.

For example, some worry that undergoing cosmetic procedures in order to appear more White might express implicit acceptance of unjust racist attitudes (Little 1998). A more general worry has been raised by Michael Sandel (2007), who argues that

IV. Biomedical enhancement expresses an objectionable drive for mastery and excessive unwillingness to accept our 'given' characteristics.

Sandel takes this concern to justify (roughly) the anti-enhancement view. However, several responses have been offered to this suggestion. One questions whether the attitudes expressed by an action are relevant to the action's permissibility (Kamm 2005: 6-7; Buchanan 2011: 72). Another challenges Sandel's view that the "drive for mastery" and an unwillingness to accept "the given" are always objectionable attitudes. Leon Kass (2003: 19-20) notes that diseases are part of 'the given', yet taking an attitude of mastery and non-acceptance towards them seems entirely appropriate. Thus, more needs to be said about precisely *which aspects* of the given ought to be accepted. And it seems doubtful whether all normal, non-disease-related limitations would fall into this category. For example, one can question whether we should accept ordinary human *moral* limitations,

such as tendencies towards xenophobia and violence (Douglas 2008; Buchanan 2011: 3, 86).

A third response challenges Sandel on empirical grounds. Plausibly, decisions to engage in biomedical enhancement could express a drive for mastery only if the decision-maker actually holds such an attitude. However, in some cases, those who engage in biomedical enhancement might wish for only a modest improvement in one aspect of their psychological or physical functioning. It can be questioned whether this wish would qualify as an attitude of mastery (Buchanan 2011: 8-9, 69-80).

4.4 Consequence-Based Concerns

Perhaps the richest set of concerns about undergoing biomedical enhancement appeals to various bad consequences that could follow from doing so – bad consequences for those who enhance themselves ('the enhanced'), for those who remain unenhanced ('the unenhanced'), or for the world, impersonally conceived. It has been suggested, for example, that

- V. Biomedical enhancements may disrupt complex and poorly understood intra- and inter-organism dependencies resulting in unforeseen negative side-effects.

- VI. Biomedical enhancements may alienate the enhanced from their authentic selves (Elliott 2003). A common thought is that each of us possesses a true or authentic self which possesses an authentic narrative that must be allowed to unfold over time. The worry is that biomedical enhancements might disrupt this narrative.

VII. Biomedical enhancements by some may put the unenhanced at a (possibly unfair) competitive disadvantage. They might thereby also pressure the unenhanced to follow suit, perhaps triggering an arms race in which individuals attempt to outcompete one another by undergoing increasingly extreme and collectively harmful enhancements (Fukuyama 2002: 9-10, 97; President's Council 2003: 131-7, 283-5).

VIII. Biomedical enhancements might reduce valuable human diversity by reducing the prevalence of widely disvalued traits or unusual combinations of traits whose value we fail, due to lack of imagination, to appreciate (Kamm 2005: 13-14).

IX. Biomedical enhancements might lead to the stratification of society, thus undermining social solidarity and perhaps leading to oppression or exploitation of the most disadvantaged (President's Council 2003: 56; Sandel 2007: 89-91; Segall 2010: 133-4).

Some have sought to limit the scope of these concerns by identifying cases where the putatively bad consequences should not be expected to come about, or would not be bad. An example of the first of these strategies: some have responded to concerns about inauthenticity by arguing that undergoing a biomedically-induced transformation might, if motivated in the right way, count as part of one's authentic narrative of self-creation (DeGrazia 2000; Dees 2007), or might help bring the brute or outer self into line with the true self (Dees 2007).

Another type of response has been to point out good effects of biomedical enhancement that would plausibly outweigh the bad ones, thus putting pressure on any suggestion that consequence-based reasons against biomedical enhancement are decisive,

or presumptively so. Biomedical enhancements have often been regarded as both luxury goods, conferring at best trivial advantages on the enhanced, and ‘zero-sum’ goods, conferring no net social benefits since any competitive advantage accruing to the enhanced is offset by a competitive disadvantage for the unenhanced. But recently several authors have argued that many biomedical enhancements would in fact have very substantial net social benefits. Allen Buchanan (2011: 35-67) argues that, like non-biomedical enhancements such as education and information technology, many biomedical enhancements should be expected to significantly increase human productivity – our ability to produce things we value with the resources we have. As well as benefitting the enhanced, this is predicted to have spillover benefits for the unenhanced, for example by lowering prices, accelerating scientific progress, and assisting the mitigation of global threats such as pandemics and climate change (Bostrom & Ord 2006: 669-70; Buchanan 2011, esp. 38-49; c.f. Persson & Savulescu 2008). Others have argued that some biomedical enhancements might improve the *moral thinking* of the enhanced (Douglas 2008; Persson & Savulescu 2008), or might improve the performance of individuals performing critical social roles, such as surgeons or pilots. Again, such enhancements might confer substantial benefits on the unenhanced.

To accommodate these responses, an advocate of the anti-enhancement view might turn from identifying specific bad effects of biomedical enhancements to assessing their *total consequences*. In assessing the total consequences of an enhancement, we must rely to some extent on intuitive judgments about the likelihood and value of various possible outcomes. For many, these judgments support the anti-enhancement view, or something close to it; they indicate that we should expect net negative consequences from all, or almost all, biomedical enhancements. The veracity of these negative intuitive judgments has been questioned, however. For example, Bostrom and Ord (2006) argue that they may frequently be grounded on an illicit assumption that the *status quo*

distribution of traits across the human population is optimal, leaving no room for improvement. This assumption might in turn be grounded on a misunderstanding of evolutionary biology which sees evolution as akin to a ‘master engineer’ that has fine-tuned human organisms and societies to fit their circumstances. Proponents of biomedical enhancement have noted various reasons for doubting this metaphor; perhaps the most important being that there may be little convergence between traits that confer evolutionary fitness and traits that humans rightly value (Bostrom & Ord 2006: 666-7; Buchanan 2011: 2-8, 184-93; Powell & Buchanan 2011). This suggests that there is scope, in principle, for humans to improve on their natural endowments, though there remain open questions about our ability to identify and bring about these improvements.

Consequence-based concerns about biomedical enhancement might, however, be framed in ways that avoid any suggestion that current human traits are optimal, or approximately so. For example, they might be understood as deriving from a concern to protect existing things of value. Intuitively, one ought not to paint over a mediocre medieval fresco even if one would thereby produce a somewhat more valuable painting. One way of rationalizing this intuition appeals to the thought that some forms of value demand *protection*, rather than promotion or maximization (Cohen 2004). If this is right, then one might oppose biomedical enhancements simply because they would destroy certain things whose value demands protection (existing human diversity might be an example), and regardless of whether they would thereby bring us closer to optimality. It remains to be determined whether any concern of this sort will be broad and powerful enough to justify the anti-enhancement view, however.

4.5 Arguments against the Anti-Enhancement View

Questions can be raised about the normative force and/or universality of each of the prominent concerns that might be raised in support of the anti-enhancement view. In addition, some have offered independent arguments *against* that view.

One approach has been to argue that the therapy-enhancement distinction is inappropriately sensitive to ethically irrelevant factors. Consider two persons with an IQ of 100. One previously had an IQ of 150, but then suffered a serious head injury; the other has always had an average IQ (Bostrom & Roache 2008). Conventionally, augmenting the cognitive performance of the first individual would count as a therapy, whereas in the second individual it would count as enhancement. Yet if the effects of intervention would be similar, the etiological difference between these two cases seems ethically irrelevant. And since we would probably deny that the first person has any strong reason to abstain from treatment, we should, arguably, also deny that the second person has any strong reason to abstain from enhancement.

A further problem arises concerning the distinction between *biomedical* and *non-biomedical* enhancement. Some varieties of non-biomedical enhancement, such as basic education, seem ethically unproblematic. Yet given the difficulties facing means-based concerns about biomedical enhancement, it is not clear that there is any ethically significant difference between these non-biomedical enhancements and some biomedical ones. Again, this suggests that some biomedical enhancements should be judged unproblematic (Kamm 2005: 9-10; Buchanan 2011: 35-63).

The challenge for the proponent of the anti-enhancement view is to specify biomedical enhancement in a way that (i) roughly reflects common usage and understanding of the concept, (ii) yields a morally significant difference between biomedical enhancements and intuitively unproblematic biomedical therapies, and (iii)

also yields a morally significant difference between biomedical enhancements and intuitively unproblematic non-biomedical enhancements, such as education. It remains unclear whether these desiderata can be satisfied.

4.6 Weakening the Anti-Enhancement View

Even if the view that there are always presumptively decisive reasons against undergoing biomedical enhancement cannot be sustained, it may be possible to defend a weaker but nevertheless significant conclusion. For example, it might be argued that, if an intervention counts as a biomedical enhancement, this should be regarded as a ‘red flag’ – a sign that *further ethical consideration* is called for (Daniels 2000). Or it might be held that there are strong reasons not to engage in *specified types* of biomedical enhancement. Varieties of biomedical enhancement that have come in for particularly forceful criticism include enhancement via genetic modification (Fukuyama 2002), cognitive enhancement in the absence of moral enhancement (Persson & Savulescu 2008), and species-altering or other radical biomedical enhancements (Fukuyama 2002; Segall 2010: 134). However, relatively little work has been done to precisely formulate a weaker alternative to the anti-enhancement view.

5. The Ethics of Promoting or Impeding Biomedical Enhancement

Further questions concern the ethics of promoting or impeding the biomedical enhancement of others. Conflicting views have been offered on whether and when

- medical professionals and institutions should or may provide biomedical enhancements;

- parents / employers / military commanders should or may encourage or require their children / employees / subordinates to engage in biomedical enhancement;
- the law, and other political institutions, should or may facilitate or impede the development and use of biomedical enhancement technologies.

Section 5.1 below briefly outlines two prominent views on the proper role of *political* institutions in facilitating or impeding biomedical enhancement. Section 5.2 addresses the role of mainstream *medical* institutions and professionals.

5.1 Political Institutions and Biomedical Enhancement

Though opponents of biomedical enhancement have seldom been explicit about their preferred political arrangements, some can be interpreted as favoring an approach in which biomedical enhancements, if not actively prohibited, are at least given no active support or legitimation by political institutions.

Perhaps the most fully worked out alternative to this approach has been offered by Allen Buchanan (2011: 16), who argues that, at least in liberal societies, political institutions should treat biomedical enhancement as a legitimate enterprise: they should allow individuals and organizations “considerable freedom” to develop and use biomedical enhancement technologies, devote “significant public resources” to research expected to produce them, and promote debate about – and sound policies on – their use (*see also* Harris 2007).

One argument in favor of Buchanan’s approach appeals to the claim that undergoing biomedical enhancement would often cause no harm to others. It then invokes the standard liberal assumption that harmless practices should be treated as legitimate.

It might be argued, in response, that we cannot reliably distinguish harmless biomedical enhancements from harmful ones, and that, even if we could, there would be no practical way of effectively enforcing a ban on the harmful ones. Thus, we must embrace or reject biomedical enhancements as a whole package. And, arguably, we should reject this package since, overall, biomedical enhancements are likely to do more harm than good.

This last claim is a contentious one, however. Moreover, additional, pragmatic arguments can be offered in support of Buchanan's position. One holds that adopting a cautiously permissive approach might in fact *increase* a society's ability to prevent the most problematic varieties of enhancement (Buchanan 2011: 18). Another maintains that prohibiting or delegitimizing biomedical enhancement might exacerbate some of the ethical concerns that those enhancements raise. For example, it might force the distribution and use of enhancement technologies underground, where it would be poorly monitored and thus less safe.

5.2 Mainstream Medicine and Biomedical Enhancement

Should doctors prescribe biomedical enhancements? Should public healthcare systems make them freely available? Should medical researchers, and their funders, seek to develop them?

In addressing these questions, it is relevant whether the therapy-enhancement distinction maps on to a difference in moral importance between different biomedical interventions. Suppose, as many have thought, that considerations of justice have peculiar moral force. And suppose the provision of biomedical therapies is required by justice, whereas the provision of biomedical enhancements is not. Then it might be argued that mainstream medical institutions and personnel should decline to develop or

provide biomedical enhancements; doing so would risk diverting resources from morally more important therapeutic uses. Mainstream medicine should, on this view, restrict itself to developing and providing those biomedical interventions whose provision is required by justice.

It might be doubted whether the provision of biomedical therapies is always a matter of justice. (Does justice require the provision of cures for mild headaches?) Moreover, it has been argued that justice does require the provision of certain enhancements (Segall 2010). Nevertheless, some hold that the therapy-enhancement distinction serves as a rough guide to moral importance, and that no better guide is currently available (Daniels 2000). If this is right, there may be grounds for continuing to exclude enhancements from mainstream medicine, at least until such time as a better indicator of moral importance can be found.

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See also

Allocating Scarce Medical Resources

Applied Ethics

Authenticity

Bioethics

Cheating

Ethics of Ageing

Eugenics

Genetic Testing

Neuroethics

Non-Identity Problem

Potential Persons

Psychiatric Ethics

Reproductive Technology

Wrongful Life

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