

Part I  
Key Concepts and Questions

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# I

## Well-Being and Enhancement

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Many chapters in this volume review current and future possibilities for enhancing human physical ability, cognition, mood, and lifespan. These possibilities raise the ethical question of whether we *should* enhance normal human capacities in these ways. We are not likely to agree on answers to this question without a clear and shared understanding of the concept of enhancement. The aim of this chapter is to offer such an account of enhancement. We begin by reviewing a number of suggested accounts of enhancement, and point to their shortcomings. We identify two key senses of “enhancement”: *functional* enhancement, the enhancement of some capacity or power (e.g. vision, intelligence, health) and *human* enhancement, the enhancement of a human being’s life. The latter notion, we suggest, is the notion of enhancement most relevant to ethical debate. We argue that it is best understood in welfarist terms. We will then illustrate this welfarist approach to enhancement by applying it to the case of cognitive enhancement.

### Definitions of Enhancement

Although there is much debate about the ethical implications of new technologies, only a few authors have attempted to provide an explicit definition of enhancement. Often discussion focuses on a particular application such as muscle strength, memory or lifespan, or a definition of enhancement is implicitly assumed. However, without an adequate shared understanding of what is meant by “enhancement,” we are not likely to resolve these debates and reach sound ethical conclusions.

#### The sociological pragmatic approach

In the literature there is a great deal of uncertainty and confusion about the term “enhancement.” Erik Parens (1998) states that:

... some participants think the term *enhancement* is so freighted with erroneous assumptions and so ripe for abuse that we ought not even to use it. My sense is that if we didn’t use enhancement, we would end up with another term with similar problems.

He then continues by using the term as a focus for a discussion of the goals of medicine and society. A similar pragmatic approach is taken by Paul Root Wolpe (2002) who also states that enhancement is a slippery socially constructed concept: “Yet, ultimately, any exclusive enhancement definition must fail, in part because concepts such as disease, normalcy, and health are significantly culturally and historically bound, and thus the result of negotiated values.” Likewise, he then turns to discuss issues of reimbursement, public policy, and normative behavior. James Canton (2002) stresses the relativism inherent in such an approach:

The future may hold different definitions of human enhancement that affect culture, intelligence, memory, physical performance, even longevity. Different cultures will define human performance based on their social and political values. It is for our nation to define these values and chart the future of human performance.

This approach is broadly social and pragmatic: Enhancement captures a certain historically and culturally specific value-laden domain of discourse related to human performance rather than having a substantive transcultural independent meaning. The sociological pragmatic approach describes how particular social groups delineate and value (or disvalue) various technological advances. It is less helpful when we want to ask whether these valuations are valid. This account merely tells us that, for example, some cultures or groups value intelligence more than others.

#### The ideological approach

Another superficially similar approach is to avoid defining the term at all. This move is made both by proponents and opponents of enhancement. Typically a list of technologies or enhancement goals are stated and the field is defined or marked by them (Kass, 2003; Naam 2005). For example, the President’s Council on Bioethics delineates the domain of discourse, after stating the problems of definition and the smooth blending between therapy and enhancement, as one related to human desires and goals. As stated by Kass: “The human meaning and moral assessment must be tackled directly; they are unlikely to be settled by the term ‘enhancement,’ any more than they are by the nature of the technological intervention itself.”

This approach differs from the sociological pragmatic approach by aiming directly at deep values, invoking concepts of metaphysics or spirituality. It is an ideological approach: A set of often controversial values are applied to a range of possible technological advances, and these are directly classified as morally wholesome or problematic. Thus the ideological approach offers a range of specific and contentious value claims but no general conceptual framework for thinking about enhancement.

#### The “not-medicine” approach: treatment vs. enhancement

Another influential approach has been to define enhancement in terms of going beyond health-restoring treatment or health. Eric T. Juengst (1998) defines it as: “The term *enhancement* is usually used in bioethics to characterize interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health.”

Edmund D. Pellegrino (2004) uses a similar definition just for the purpose of arguing against enhancement on the grounds that it goes beyond medicine as a healing enterprise:

... my operating definition of enhancement will be grounded in its general etymological meaning, i.e., to increase, intensify, raise up, exalt, heighten, or magnify. Each of these terms carries the connotation of going “beyond” what exists at some moment, whether it is a certain state of affairs, a bodily function or trait, or a general limitation built into human nature ... For this discussion, enhancement will signify an intervention that goes beyond the ends of medicine as they traditionally have been held.

One problem with this approach is that the definition of medicine and treatment itself is contested. Even a maximally inclusive definition such as medicine being the “science and art of diagnosing, treating, curing, and preventing disease, relieving pain, and improving and preserving health” (McKechnie, 1961) still leaves us to define disease and health, equally complex terms (Smith, 2002). For example, Robert Freitas Jr. (1999) reviews nine disease concepts (disease relativism, statistical disease, disease idealism, functional failure, and so forth), and if enhancement is defined as going beyond preventing disease/improving health, this will give us nine different enhancement concepts. The not-medicine approach is thus indeterminate. Indeed, there is some doubt whether it is even possible to draw a consistent and useful distinction between treatment and enhancement.

It is worth mentioning, however, one influential view of disease – Christopher Boorse’s (1975) “species-typical functioning” account. By determining the natural functional organization of members of a species it is possible to create a normal function model, which should be, according to Daniels (2000), the standard of functioning a society has an obligation to help reach. This model has been employed influentially by Norman Daniels in addressing enhancement (Sabin & Daniels, 1994). On this view, disease is defined as:

**Normal species-functioning conception of disease:** Any state of a person’s biology or psychology which reduces species-typical normal functioning below some statistically defined level.

And enhancement can be thus defined as improvement in human functioning that goes beyond what is needed for medical treatment:

**Normal species-functioning definition of enhancement:** Any change in the biology or psychology of a person which increases species-typical normal functioning above some statistically defined level.

For example, low intelligence is defined as intellectual disability and treated as a disease when Intelligence Quotient (IQ) falls below 70. On this species-functioning or naturalistic conception of disease and enhancement, raising someone’s IQ from 60 to 70 is treating a disease and raising someone’s IQ from 70 to 80 is enhancement.

On a normal distribution of function, about 2.5% of the population will have a disease. Improvements in function of the other 97.5% counts as enhancement. For example, the bottom 2.5% of hearing counts as deafness. The other 97.5% of people are counted as

having “normal hearing” even though those at the bottom of that distribution will have impairments in hearing almost identical to those classified as “deaf.” But they fell on the wrong side of the statistical line to be eligible for “medical treatment.” Improving their hearing, even if they hear very little at all, would, on this view, be an enhancement.

### The functional approach

A related fourth approach is the functional approach. Rather than avoiding defining enhancement or mainly seeing it as not-medicine, it is defined in terms of enhanced functions of various kinds (whether cognitive function generally or vision or hearing more narrowly).

The archetypal example of this approach is Douglas C. Engelbart’s (1962) *Augmenting Human Intellect*: “By ‘augmenting human intellect’ we mean increasing the capability of a man to approach a complex problem situation, to gain comprehension to suit his particular needs, and to derive solutions to problems.”

Here, cognitive enhancement is defined simply in terms of improved general information-processing abilities. The difference from the Daniels’ approach is that no weight need be given to some level of normal, species-typical functioning which would determine whether some manipulation is to count as treatment or enhancement. On this view, any increase in IQ or hearing could count as an enhancement.

## The Welfarist Account of Human Enhancement

### Enhancement of what?

Enhancement is, indeed, a wide concept. In the broadest sense, it means “increase” or “improvement.” For example, a doctor may *enhance* his patient’s chance of survival by giving the patient a drug. Or a doctor may enhance the functioning of a person’s immune system or memory – enhancement in the functional sense. These are no doubt enhancements of a sort – enhancements in an attributive sense. But enhancing a permanently unconscious person’s chance of surviving might not be good for the person. It might not constitute *human* enhancement. It might not enhance intrinsic good – or good in a predicative sense.

As the example of life extension shows, these two senses of enhancement can come apart. Consider memory. Genetic memory enhancement has been demonstrated in rats and mice. In normal animals during maturation expression of the NR2B subunit of the NMDA receptor is gradually replaced with expression of the NR2A subunit, something that may be linked to less brain plasticity in adult animals. Tang *et al.* (1999) modified mice to overexpress NR2B. The NR2B mice (commonly known as the “Doogie” mouse) demonstrated improved memory performance, both in terms of acquisition and retention. This included unlearning of fear conditioning, which is believed to be due to learning a secondary memory (Falls, Miserendino, & Davis 1992). The modification also made them more sensitive to certain forms of pain, showing a potentially nontrivial trade-off (Wei *et al.*, 2002). It is possible that even though memory is improved, their lives are worse.

The term human enhancement is itself ambiguous. It might mean enhancement of functioning as a member of the species *homo sapiens*. This would be a functional definition. But when we are considering human enhancement, we are considering improvement of the person's life. The improvement is some change in state of the person – biological or psychological – which is good. Which changes are good depends on the value we are seeking to promote or maximize. In the context of human enhancement, the value immediately in question is the goodness of a person's life, that is, his or her well-being.

### The welfarist definition

These reflections suggest a fifth possible definition of human enhancement:

**Welfarist definition of human enhancement:** Any change in the biology or psychology of a person which increases the chances of leading a good life in the relevant set of circumstances.

In line with the welfarist definition of enhancement, we can classify states of a person as *enhancing* or *advantageous states* or *abilities*:

Any state of a person's biology or psychology which increases the chance of leading a good life in the relevant set of circumstances.

And similarly define contrary *disadvantageous states* or *disabilities*:

Any state of a person's biology or psychology which decreases the chance of leading a good life in the relevant set of circumstances (Kahane & Savulescu, 2009).

This account of enhancement makes no use of the distinction between medical treatment and enhancement. On this view, any increase in IQ could count as enhancement – so long as it tends to increase a person's well-being. But, contrary both to the species-functioning and functional approaches, in contexts where increase in IQ is not beneficial to some person, such increase would not count as an enhancement, even if it raises the person to (or well beyond) the level of normal functioning, that is, even if it were a functional enhancement.

Unlike the sociological pragmatic and functional approaches, the welfarist account is inherently normative. It ties enhancement to the value of well-being. Unlike the ideological approach, however, it offers a general framework for thinking about enhancement. It offers more than a mere list of value claims. It singles out well-being as one dimension of value that is constitutive of genuine human enhancement. But it leaves open substantive and contentious questions about the nature of well-being, and important empirical questions about the impact of some treatment on well-being. Moreover, whereas the ideological approach only offers us all-things-considered value judgments about various treatments, the welfarist approach distinguishes ways in which some treatment might benefit a person from other relevant values, such as justice. It thus allows us to say that although some treatment is an enhancement (i.e. contributes to individuals' well-being), it might nevertheless be bad overall, because its employment in the current social context will lead to far greater injustice.

On the welfarist account, common medical treatments are enhancements, or more precisely, a subclass of enhancements, and diseases are best seen as a subclass of disabilities or disadvantageous states.

Folk usage of the term enhancement supports this account (Pellegrino in fact gestures towards this definition in his account). According to the *Oxford English Dictionary*:

**Enhancement**

The action or process of enhancement: the fact of being enhanced

**Enhance**

to raise in degree, heighten, intensify (qualities, states, powers, etc.)

to raise (prices, value)

to raise or increase in price, value, importance, attractiveness, etc.

(Formerly used *simply*, = “to increase in price or value”; *esp.* to raise the intrinsic value of (coin). Also (*rarely*) = “to increase in attractiveness”, to beautify, improve.)

The spirit of all these definitions is that to enhance is *to increase value*. In the context of human enhancement, to enhance is to increase the value of a person’s life. This notion is best captured by the welfarist account. Henceforth, we will refer to human enhancement simply as enhancement for brevity’s sake.

### Subclasses of enhancements

Enhancements include different kinds of improvements:

1. Medical treatment of disease.
2. Increasing natural human potential – Increasing a person’s own natural endowments of capabilities within the range typical of the species *homo sapiens*, e.g. raising a person’s IQ from 100 to 140.
3. Superhuman enhancements (sometimes called posthuman or transhuman) – Increasing a person’s capabilities beyond the range typical for the species *homo sapiens*, e.g. giving humans bat sonar or the capacity to read minds.

By accepting the welfarist definition of enhancement, the question of when should we enhance becomes: when should we increase human well-being?

One of the advantages of a welfarist account of enhancement is that it reframes existing debates in a more productive manner. The ideological approach is really a debate about what constitutes a good life and resistance to enhancement is often not really resistance to enhancement *per se*, but resistance to accepting an overly narrow or mistaken conception of human well-being.

## Applying the Welfarist Account: The Case of Cognitive Ability

### Expected value

An intervention constitutes an enhancement when it is expected to increase the chances of a person leading a good life. It is important to recognize that something expected to



increase the chances of leading a good life may, in a probabilistic world, not result in a good life. Those born with the greatest gifts and talents may squander them while those born to great biological and social hardship may overcome enormous obstacles to lead the best of lives.

The term “expected” thus does not mean “will.” It is a technical term taken from decision theory. The expected value of an outcome is the value of that outcome multiplied by the probability of it occurring. In the debate around enhancement, the outcome of value is a person’s life and how well it goes.

This approach derives from decision theory. The standard way of making decisions under uncertainty is to choose that option which maximizes expected value. While this may not be the way we make decisions all the time in ordinary life, it is one standard norm of rationality for how an ideal agent who has no computational limitations should make decisions. In general terms, the expected value of adopting any course of action can be given by:

$$Pr(\text{good outcome given that course taken}) \times V(\text{good outcome}) + Pr(\text{other outcomes given that course taken}) \times V(\text{other outcomes}).$$

We often use this approach in a rough and ready way in everyday decisions. Consider a person trying to decide whether to buy a house or rent. The decision will usually be made by weighing the pros and cons, how bad these are and how likely they are. She needs to know how far each residence is likely to be from work, schools, friends and amenities. She needs to know how big the house and land of each are likely to be, and the quality of each. And of course she needs to know the cost of each both in the short term and long term, and how this will affect her financial position overall.

This approach can be formalized. The golfer Tiger Woods is reputed to have had laser surgery to give him better than 20/20 vision. Imagine someone like Woods, a professional golfer wanting to win the British Open, but who is also knowledgeable about decision theory. He is trying to decide whether to have laser surgery to give 20/20 vision. The following figures are purely hypothetical.

Assume that without surgery, his life will go very well and he will win many golf tournaments. If 1 is the perfect life, his life overall will be of value 0.96. If he has laser surgery, he will win slightly more tournaments. His life will be slightly better (0.97). However, there is a risk (1/1000) that the surgery will damage his eyesight and he will win slightly fewer tournaments and his life will go slightly less well (0.95):

$$\begin{aligned} &\text{The expected value of life without surgery is } 0.96 \\ &\text{The expected value of life with surgery} = V(\text{life, given successful surgery}) \\ &\quad \times Pr(\text{surgery successful}) + V(\text{life, given unsuccessful surgery}) \\ &\quad \times Pr(\text{surgery unsuccessful}) \\ &= 0.97 \times 999/1000 + 0.95 \times 1/1000 \\ &= 0.96998 \end{aligned}$$

Even though the benefits of surgery are small, it is rational to have the surgery given its risks are also very small. As the probability of harm rises, or it becomes more serious, there is less reason to opt for surgery.

### Dimensions of well-being

Whether, on the welfarist account, something counts as a human enhancement depends on how we understand the notion of well-being. There are various theories of well-being: hedonistic, desire-fulfillment, objective list theories (Griffin, 1986; Parfit, 1984). According to hedonistic theories, what matters is the quality of our experiences, for example, that we experience pleasure. According to desire-fulfillment theories, what matters is the degree to which our desires are satisfied. According to objective list theories, certain activities are good for people, such as achieving worthwhile things, possessing dignity, having children and raising them, gaining knowledge of the world, developing talents, appreciating beautiful things, and so on.

As an example, consider cognitive enhancement, such as improvement of memory. Improving memory is, by definition, a form of functional enhancement. But is cognitive enhancement also a human enhancement? The answer to the question lies in the answer to the question: Is cognitive enhancement likely to lead to a better life, to a life with more well-being?

It is clear enough how enhancing human cognition is likely to increase human well-being. First, cognitive capacities are the required for deployment of any kind of instrumental rationality – the capacity to reliably identify means to one’s ends and projects. Better cognition means better access to information about one’s surroundings and about one’s own biology and psychology, as well as better abilities to use this information in rational planning. Persons need to exercise instrumental rationality in order to obtain pleasure and avoid pain, in order to fulfill their desires, and in order to realize objective goods. So cognitive enhancement should promote well-being on all major theories of well-being.

Second, on some views of well-being certain cognitive capacities are necessary conditions for a good life. For example, on a Millian view of pleasure, forms of pleasure that do not involve the exercise of sophisticated cognitive abilities have less value. Persons with greater cognitive capacities will have access to higher hence more valuable pleasures. Human beings with cognitive capacities far beyond those available to existing people may thus have access to far higher pleasures than those accessible to existing humans. Similarly, Mill placed great value on the power of “vivid imagination” to decide which of two pleasures is more valuable, when we are unable to experience both. Such imaginative powers require complex cognition involving memory, logical inference, and other higher order faculties.

Similar remarks apply to objective theories that emphasize the value of knowledge and achievement. Persons with low cognitive capacities will, on objective views, be able to achieve only moderate levels of well-being even if they lead healthy and happy lives. Only cognitive enhancement will offer them access to the greater objective goods which require sophisticated cognition. The same will be true to a lesser extent of most human beings with normal cognitive capacities. Most people cannot fully grasp the intricacies of quantum mechanics or enjoy complete appreciation of the highest aesthetic achievements of human culture. Some great objective goods are now accessible only to a few.

Although improvement of cognitive ability is a major form of enhancement in all of these ways, it is partly an empirical question whether human beings with great cognitive capacities actually successfully use them to promote their well-being. It is a common

view that great intelligence, for example, can be an obstacle to happiness. The empirical data currently available to test this claim is limited, and is typically limited to the relation between intelligence and subjective well-being. But although intelligence is a central cognitive capacity, it does not exhaust cognition. And subjective well-being is the whole of well-being only on hedonistic theories, although it is a significant component of well-being on all plausible views. Furthermore, the existing empirical evidence may tell us only about the subjective well-being of highly intelligent people in a world populated and controlled by people with lesser intelligence. Nevertheless, this evidence is of some interest. It suggests that while general intelligence does not directly predict happiness, it is nevertheless a protective factor against mental and health problems. Thus even if higher intelligence does not directly make a person happier, it does contribute to her having a longer and healthier life. As such it is a significant contribution to a person's overall well-being even on the narrowest hedonistic theory.

### All-purpose goods

General intelligence is only one aspect of cognition. Many other biological and psychological characteristics can also profoundly affect how well our lives go. In the 1960s Walter Mischel conducted impulse control experiments where four-year-old children were left in a room with one marshmallow, after being told that if they did not eat the marshmallow, they could later have two. Some children would eat it as soon as the researcher left, others would use a variety of strategies to help control their behavior and ignore the temptation of the single marshmallow. A decade later, the children were re-interviewed and found that those who were better at delaying gratification had more friends, better academic performance, and more motivation to succeed. Whether the child had grabbed for the marshmallow had a much stronger bearing on their SAT scores than did their IQ (Mischel, Shoda & Peake, 1988). Impulse control has also been linked to socioeconomic control and avoiding conflict with the law.

Shyness too can greatly restrict a life. A newspaper story described a woman who blushed violet every time she went into a social situation. This led her to a hermitic, miserable existence. She eventually had the autonomic nerves to her face surgically cut. This revolutionized her life and had a greater effect on her well-being than the treatment of many diseases (Drott, Claes, & Rex, 2002).

Following Rawls, Buchanan and colleagues have discussed the value of "all-purpose goods" (Buchanan *et al.*, 2002). These are traits that are valuable regardless of which kind of life a person chooses to live – valuable on all plausible conceptions of well-being. They give us greater all-round capacities to experience a vast array of lives. Examples include memory, self-discipline, patience, empathy, a sense of humor, optimism, and just having a sunny temperament. All of these characteristics – and perhaps many of the moral virtues – may have some biological and psychological basis capable of manipulation with technology. Intelligence is a clear example of an all-purpose good.

### Cognitive disability

Many cognitive deficits are obstacles to a good life. They are disabilities in our stipulated welfarist sense. Correcting such disabilities is one central aim of cognitive

enhancement. Indeed we argue that even normal human cognition can constitute a disability – an obstacle to well-being – in the current social context.

In the case of low intelligence, what ultimately matters is not whether low normal intelligence is called a disability but whether it is bad and should be avoided if possible. The answer to this question turns, in significant part, on the expected value of a life with low intelligence compared to life with high intelligence. One way to answer this question is to ask: Should a person with low intelligence attempt to have his or her intelligence increased? Or, should a person with high intelligence attempt to have intelligence reduced? This is like the question: Should a normally sighted person attempt to achieve better than 20/20 vision?

Some disability advocates deny that the profound cognitive impairment that characterizes Down syndrome is a genuine disability – that it is any kind of misfortune or makes life worse. Such a view is implied by remarks like the following (Hogan, 2006):

People with Down's syndrome are entirely capable of having what we would understand to be a good quality of life, defined by achieving satisfactory personal goals, making a wide range of friends, holding down a job, contributing to the well-being of others and by and large making some sense of the environment that surrounds them.

Parents of children with Down syndrome often deny that their lives are in any interesting way worse than those of people with normal cognitive capacities or that it makes good sense to compare their respective well-being.

Whether Down syndrome is a disability depends on many variables including the value of more intelligent life, the chance of the intervention working, its risks, the value of a less intelligent life and the risks and benefits of any other courses of action. The value of a more intelligent life (like a life with better than 20/20 vision) depends on how that intelligence enables one to realize various possible good lives, and the probabilities of achieving these.

Elsewhere, two of us have developed a welfarist definition of disability (Kahane & Savulescu, 2009; Savulescu & Kahane 2009):

**Disability:** Any state of a person's biology or psychology which decreases the chance of leading a good life in the relevant set of circumstances.

Is low intelligence a disability in this sense? As we have argued earlier, low intelligence is likely to mean that one is less effective at achieving one's ends (instrumental rationality) and less likely to achieve various objective goods. It is also likely to compromise health and happiness in various ways. It is likely to a form of disability in this broad welfarist sense, even if not a disease.

Is it possible that there is something unique, and valuable, in a life that realizes less good? Even if intellectual disability affords a unique perspective on the world, it seems false that this perspective is equally desirable. This perspective entails numerous difficulties and hurdles to attaining many of the goods which uncontroversially are a part of the good life: to gain knowledge and understanding of the world and others, be capable of forming a wide variety of friendships and relationships, having, raising and caring for a family, achieving independence, etc.

A “normal intelligence” is defined as IQ which is within two standard deviations of the mean of 100. The standard deviation is 15 points—that is, an IQ between 70 and 130, which accounts for 95% of all people. Intellectual disability is defined statistically as that IQ which is below two standard deviations from the mean, which accounts for 2.5% of the population. It is subdivided into:

Mild	50 – 70
Moderate	35 – 49
Severe	Below 34

However, this definition of when low intelligence constitutes a disease or disability is entirely arbitrary. One needs an IQ of about 90 to complete a tax return in the United States, which means that more than 15% of normal people in the United States will not be able to complete a tax return, severely hampering their employment opportunities. With an IQ of 120, you have enough cognitive ability to enter university and to have virtually any job you choose. In a technologically advanced society, those with low but normal IQ may be severely disadvantaged and have a restricted range of options. We could redefine significant intellectual disability as any IQ below 120. If we were concerned to give everyone a substantial chance of the best life, we could say that those with an IQ of less than 120 have a significant intellectual disability because their IQ holds them back from full participation in a technologically advanced society with complex social institutions and global conflicts.

These claims are controversial and contestable. But consider this hypothetical example. Imagine that you have a child with normal intelligence, say an IQ of 110. A man knocks at your door one day. He says he is the health inspector. He suspects you have old lead water pipes. You ask what the consequences are: “It’s not life-threatening. But it may reduce your child’s IQ by a few points. I would recommend that you change them.”

Should you be concerned if your child’s IQ were to drop from 110 to 105? Perhaps such a small change would have minimal affect on the child’s well-being. But if it were likely to have some effect, you should be concerned. You should remove the lead pipes.

### Disability is ubiquitous and even those with normal IQ are disabled

One might argue that there is no such thing as a better or best life. This, as we have argued, is false. All of us will have some cognitive strengths and weakness. Those with great mathematical intelligence may have lower emotional intelligence. And our cognitive abilities deteriorate normally over time. Memory deteriorates after the age of 40. In this way all of us will have some cognitive disabilities in our lives, though these will vary in degree from one individual to another, and from time to time. In this way, *all of us are disabled in some ways* which make it more difficult to lead a very good life. *Enhancement is an issue of vital concern to all of us.*

Another objection is that it is impossible to achieve the best life. This is virtually always the case because, among other things, we lack complete information and the ability to process such information. But it is a feature of all decision making in a less than

ideal world. We are never sure that we have performed the act which has the best consequences, or bought the best house or the best TV or helped our friends as much as we could, even if we wanted to. This is an objection to any theory which aims to bring about a certain state of affairs in a probabilistic world. It applies whenever we try to do our best or merely even try to affect the world. Though we can rarely if ever do our best, we can try. We cannot be certain of the effects of our actions – we can only rationally estimate them.

It is important to recall that on our definition of disability, we all suffer from disabilities which are conditions inherent to our nature (biological, psychological or other) which either reduce the value of our lives or which make it more difficult to realize (in the sense that that they reduce the chances that we will achieve) a good life. Poor concentration, poor memory, poor visuospatial skills, poor emotional intelligence are just like asthma, a lame foot, pigheadedness and weakness of will. They are all disabilities on this definition.

Such an approach allows us to explain why we treat disease and classify those with an IQ as suffering from a disease, and the extent to which we believe a diseased person should be treated. The extent of the claim that a diseased person has to be treated depends on the extent to which that disease is a disability. Some diseases have so little impact on a person's life that such diseased people have very little claim to treatment. A symptomless disease which had no impact on the length or quality of a person's life would be irrelevant. The IQ is set at 70 for disability simply because this picks out the 2.5% of the population who are worst off.

Thus on our view medical treatment is a subclass of enhancement or improvement. In general, disease has significant impact on our well-being. Medical treatment makes a greater improvement in well-being than most other enhancements. For this reason medical treatment should generally have greater priority than other enhancements. But it leaves open whether there might be nonmedical enhancements that have a much greater influence on well-being than medical treatment and so have greater priority. Imagine we could raise the IQ of everyone who had an IQ of between 70–80 by 10 points. This would not count as medical treatment. However, this might (depending on which theory of justice you accepted) have greater priority than raising the IQ of a few people with an IQ of 60 by 10 points, even though the latter is medical treatment.

### Biopsychosocial correction of disability

Our biology evolves slowly, over thousands if not millions of years. Our social life has radically changed over the last 100 years. Doctors are keen to tell us that our biology is not suited to our current high fat, low fiber diet and sedentary lifestyle. But our biology and psychology are probably more globally out of synchrony with our way of life. It is not merely that we are prone to “lifestyle disease,” it is that we are prone, to some degree, to lifestyle unhappiness. And our cognitive abilities are hardly adapted to the massive technological and social changes which have happened in a blink of human history.

Whenever there is a mismatch between biology, psychology, and social/natural environment resulting in a bad life, we have a choice. We can alter our biology, our psychology, or our environment. This is occurring in medical practice when doctors

advise diets which are low in fat, high in fiber, high in antioxidants, lower our cholesterol, and which basically mimic the diet to which our bodies are basically designed to tolerate. The most extreme example of this is the Stone Age diet which attempts to replicate the diet of primitive man. But another approach is not to change our environment (in this case diet) but to change our biology through drugs. The polypill is designed to allow the body to tolerate a modern diet by lowering chemically for example our cholesterol and/or blood pressure.

When it comes to questions of enhancement, we can enhance our biological and psychological capacities to suit our natural and social environment, or we can attempt to alter our environment to suit our unenhanced selves. Our own view is that all routes must be considered. In some cases, it is reasonable and practicable to alter the environment. So giving people with current intellectual disabilities a fair and equal opportunity might be preferable to cognitive enhancement, if it were cheaper, more effective, or had beneficial externalities. But in at least some cases, it is going to be difficult to change the modern environment to allow all possible people to flourish. For example, it may be most effective to choose children with more melanin pigment in their skin to protect them from the sun in areas of high ozone layer damage, rather than attempting to close the hole in the ozone layer in that area or enforcing sunscreen, coverage of the skin, and fear of the sun.

The consequences of low intelligence can be lethal. Low intelligence is correlated with the development of disease and with lethal accidents. Improving cognition, in the way the world is likely to be, may be a matter of life and death.

## **Summary: The Case in Favor of Enhancement**

### How do we decide?

There are four possible ways in which our psychology and biology will be decided (Savulescu, 2009).

1. Nature or God
2. “Experts” – philosophers, bioethicists, psychologists, scientists
3. “Authorities” – government, doctors
4. By people themselves – liberty and autonomy

It is a basic principle of liberal states the state should be “neutral” between different conceptions of the good life. This means that we allow individuals to lead the life that they believe is best for themselves – respect for their personal autonomy or capacity for self-rule. The sole ground for interference is when that individual choice may harm others. Advice, persuasion, information, and dialogue are permissible. But coercion and infringement of liberty are impermissible.

There are limits to what a liberal state should provide:

1. Harm to others – The intervention (like some manipulation that increases uncontrollable aggressiveness) should not result in significant harm, whether direct or indirect, for example, by causing some unfair competitive advantage.

2. Distributive justice – The interventions should be distributed according to principles of justice.

John Stuart Mill argued that when our actions only affect ourselves, we should be free to construct and act on our own conception of what is the best life for us. Mill was not a libertarian. He did not believe that such freedom was solely valuable for its own sake. He believed freedom was important for people to discover for themselves what kind of life is best for themselves. It is only through “experiments in living” that people discover what works for them, and others can see the richness and variety of lives that can be good. Mill strongly praised “originality” and variety in choice as being essential to discovering which lives are best for human beings (Savulescu, 2002). Such experiments and originality require cognitive skills and creativity, insight, and many other skills.

## Conclusion

What is enhancement? According to a

**Welfarist definition of human enhancement:** Any change in the biology or psychology of a person which increases the chances of leading a good life in the relevant set of circumstances.

When should we bring about some modification of biological or psychological alteration of a person which is a putative enhancement? On a welfarist account, whether we should intervene depends on:

1. The account of well-being we employ.
2. Whether the modification is expected to increase the chances of the person in question leading a good life in the circumstances likely to be obtained.
3. Whether there are reasons to prefer modifications of the natural or social environment.
4. Whether the modification will harm others or create or exacerbate injustice.

Questions about enhancement are questions in value theory about the account of well-being we should employ. They are questions in science about what brings about well-being. And they are questions about the limits of the pursuit of self-interest or beneficence.

In this chapter, we applied the welfarist approach to the example of cognitive ability. We argued that cognitive enhancement is likely to be a form of human enhancement. Cognition plays a central role in our well-being as members of the species *homo sapiens*. In addition, it may provide significant social and economic benefits. These are all strong reasons to support cognitive enhancement. In many cases, cognitive enhancement will have to be done early in life to have maximum benefit. Parents will have to make choices for their children. Thus, as technology advances, parents will have a duty to enhance their children.

While we have focused on cognitive enhancement, our arguments, and the welfarist account of enhancement, can also be easily applied to potential examples of mood or



physical enhancements. What aspects of our biology and psychology we should alter will depend, in major part, on their contribution to a good life.

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