

HUMAN ENHANCEMENT – A Discussion Document

Introduction

This discussion paper on *Human Enhancement* has been prepared by the Working Group on Bioethics and Biotechnology (WG), established by the Church and Society Commission (CSC) of the Conference of European Churches (CEC). The CEC is the regional ecumenical organization which links in fellowship some 125 Anglican, Baptist, Lutheran, Methodist, Orthodox, Reformed, Old Catholic and Pentecostal churches and several associated organizations in all the countries on the European continent. The CSC facilitates these churches and organizations to relate to the institutions of the European Union, the Council of Europe and the OCSE. Since 1997 the CEC has the status of observer in the CDBI (the Steering Committee on Bioethics) of the Council of Europe. In this context, the terms of reference of the WG include: following and monitoring the work of the Council of Europe and the European Union on issues relating to bioethics and biotechnology, and formulating contributions to and comments on the activities of the European institutions in this field. The WG consists of specialists in areas such as the so called life sciences, theology, ethics and law, representatives of a broad scala of member churches of the CEC. Address of the secretariat is that of the CSC: 8, rue du Fossé-des-Treize, F - 67000 Strasbourg (T: +33388152760, F: +33388152761, E: csc@cec-kek.fr).

By the very nature of the subject, this paper represents work in progress, as we seek to understand the field and explore its implications. It is presented for discussion, rather than being a statement of definitive policy recommendations. But it seeks to enrich the secular debate with theological insights, and to open discussion of the subject in the churches.

This document has been presented during the CEC Lyon Assembly in July 2009, through a special Hearing attended by several dozens of delegates. A very lively discussion followed which showed how much the topic was high on more and more people's mind. Copies were circulated for further consultation and comments from CEC's constituency. In Lyon and since then, the CSC only received congratulations and encouragements for having produced it.

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Contents

Introduction

Executive Summary

1. Introduction: Modified Humans?

2. What do we mean by enhancement?

3. How do we know what is an enhancement, starting from ourselves?

4. Theological Reflections

5. Ethical Implications

References

Executive Summary

Since time immemorial, human beings have sought to improve the human condition by technologies which changed the world around us, but we did not attempt to change *ourselves*. But across a range of scientific disciplines, discoveries and developments now make the idea of significantly modifying the human body no longer mere science fiction. ‘Human enhancement’ is about trying to make changes to minds and bodies - characteristics, abilities, emotions and capacities - beyond what we regard today as normal. Much of this is far future. Nearly all the claims are speculative and exaggerated. Much may never be feasible. But sufficient is realistic for the enhanced human performance to become a topic of serious debate. It raises deep theological and ethical issues about our humanity, our societies and our human destiny, which churches and societies need to debate, for which we offer this report.

We are not primarily discussing future medical advances, but changes in five areas:

- chemicals for physical enhancement
- chemicals to enhance performance, mood or cognition,
- functional implants within the body, like computer chips integrated in the brain,
- changes to body cells and systems, and (less feasibly) to human genes,
- extending human lifespan, which is often included but is a special case.

Such changes might be small, a bit faster or smarter perhaps, but they could be quite radical. Apart from cosmetic surgery, sport, and recreational drugs, humans have so far remained within our biological limits. To enhance our capabilities, we created external tools, like spectacles. But why remain limited by biology, some are now arguing? Why not modify our eyes to increase our vision, and even have infrared vision to help us drive at night more safely? But would we use the enhanced sight to drive faster instead of driving more safely? This example illustrates that many claimed enhancements are ambiguous, as to whether they would make us ‘better’ humans. Can we also be both subject and object of our own design? If, as we believe, God has shaped humans through the evolutionary processes, we have serious doubts that we know with enough certainty how to improve on God’s ‘design’ of ourselves? Can humans understand the complexity of body and mind to be sure that any ‘enhancement’ would be for the better, seen as a whole?

A small but vociferous movement, known as transhumanism, promotes human enhancement in the belief that humans must take our evolution into our own hands to go far beyond our current biological limitations. This technological transformation of humanity has a quasi-religious character, and as such we regard it as erroneous and misleading. The expression ‘playing God’, perhaps has a real meaning here. We agree with a human aspiration to better ourselves, but technology cannot provide salvation from the deeper moral, spiritual and social

problems of human nature. Moreover enhancement is not an inevitable course that humanity is embarked on, like an unstoppable juggernaut. Faced with the technical possibilities, the question facing us is to decide *what* course to take, what to explore and what not to pursue.

But if we had humbler aspirations than making superhumans, what might God expect humans to do with God-given creativity and inventiveness? Should we leave well alone; or are some things permissible? With so few realistic examples, a definitive answer would be premature, and we do not rule it out. But as we weigh possibilities against Christian wider ethical values, most of us are sceptical, but a few are more optimistic.

We have serious doubts that we know enough to design ourselves better. In retrospect, would we say it really made us better, or worse, or little different, or maybe it made one thing better but something else worse? There are also major risks in radical interventions in the human body. We make a first order distinction between improvements for medical reasons and human enhancements unrelated to any medical condition. In medical interventions, a risk may be offset by hope of relieving suffering, like treating a serious illness; enhancement has no comparable ethical 'good' to balance its risks. There are 'grey areas' of course which must be examined on their merits. There is also a risk in proceeding faster than we understand, impelled by the hubris of some scientists, or from commercial, political or military pressures.

The concept of human enhancement is individualistic and seems to be inherently unjust in an already divided and unjust world. It might have a stronger case if it was directed towards improving the lot of the have not's of the world, but its rhetoric rather points the opposite way. Enhancements should be the subject of societal decisions, in the first instance. The implications are too serious to be treated just as matters of personal preference, for example, in unintended social engineering from the use of chemical cognitive performance enhancers.

The discourse about enhancement moreover seems misplaced because it misses the point about what needs changing in our humanity. Our Christian view is that the human being is an indivisible unity of body, mind and spirit. Whilst we affirm the importance of the body, our deepest problems are less in any physical limitations we may have, than in our moral, relational or spiritual failings. What is wrong with the human condition is not a lack of strength, longevity, intelligence, beauty, athleticism, art, science or even education, but in the moral and spiritual shortcomings of humanity, individually and collectively, as the world's ongoing conflicts show. Our humanity is not to be defined merely by how well or badly our bodies or minds function. It is more to do with making good things from what we are, than with aspiring to be something else. From the view of Christian anthropology, no matter how much we enhanced ourselves, inherent human failings would remain because they lie beyond technical fixes, but require solutions of a different sort entirely.

We consider what impulses might lead us to make enhancements to ourselves. It might be nice think more quickly, or not to get tired so easily, but would we be more *satisfied*, compared with not having been enhanced? We had achieved a goal, or beat our rival in an exam or sports competition, but only with the aid of an added 'something', did *we* really achieve it? Perhaps the most compelling satisfactions would be something like the sense of making a finer work of art or craft, just for the sake of it, or for the sake of helping someone else. Ironically, these are the least to do with enhancing *myself*, the most to do with loving my neighbour or loving God.

Enhancement seems a misleading hope, because it can never be fulfilled. The internal logic of enhancement is its own undoing, because one would have no reason to be satisfied. No matter what enhancements one made to oneself, there would always be more. It becomes a treadmill which has no place to stop, and thus no satisfaction. Our Christian theology teaches us that we are created by God for relationship with God, and can never ultimately be satisfied with merely created things, even with ourselves. Good as these may be in many ways, they still leave us wanting what only God can meet.

1. Introduction: Modifying Humans?

Since time immemorial, human beings have been altering the world around us. For example, we have modified landscapes and water, extracted metals and materials from rocks and plants, modified them into new forms, harnessed resources of energy. We have altered ecosystems, and other species, sometimes very greatly. But until recently the idea of modifying ourselves would have seemed a strange question. Over the past few years it has become a topic of increasing and serious debate in both scientific and ethical circles. This is because the coming together of recent advances in many fields of science now suggests that the possibility of making radical future changes to humans is no longer to be dismissed as mere science fiction. At the moment it's largely speculative. What would really be possible is unclear, but it raises some very deep issues, with which the wider church needs to engage, at an early stage, not in retrospect. As a European church bioethics working group in this report we wish to offer some preliminary insights on what looks like being a long debate.

The potential of human enhancement, as it is generally called, came to prominence in 2002 with a report the US National Research Council on the convergence of a range of technologies at a very small scale (known as NBIC: *N*ano, *B*io- and *I*nformation technologies, and *C*ognitive sciences). The report set out to make the case that techniques which are becoming feasible at a laboratory level could eventually offer humans the power to make unprecedented interventions in the human body, leading to enhanced human performance in a wide variety of aspects.ⁱ This stimulated a debate which continues. A conference in Oxford in 2006 called "Tomorrow's People", for example, explored whether humans could be made stronger, smarter, longer-lived, happier and fairer.ⁱⁱ Much of the talk is about things technically in the far future; many of them may be impossible. Its aims have also been questioned. An official EC expert group examined these issues in response to the US study, and was more critical, stressing the importance of submitting enhancement goals to wider European social scrutiny.ⁱⁱⁱ We need to start considering the ethical, social and spiritual dimensions, not only of future possibilities, but also what is driving some to advocate them with increasing force.

At the same time, a movement has emerged which sees such changes to humanity as not only desirable but essential, notably a small, amorphous but vociferous network of people generally known as transhumanists.^{iv} Their vision for the transformation of humanity through technology has, it seems to us, a quasi-religious character. Their beliefs and assumed values pose a direct challenge to ways in which the human person, technological intervention and even religion is generally understood in European and North American societies. The *cognoscenti* of this movement believe that humans are destined to go beyond our current biological limitations and are promoting this agenda at the highest levels. One of the editors of the above US report is a prominent transhumanist.

Relatively few scientific researchers subscribe to these radical ideas. But in highly technical research borderlines are fuzzy. They can easily be crossed without much, if any, public

scrutiny. For example, sophisticated scientific tools developed for medicine could, some say, be used to alter and enhance ‘normal’ human functions. The influential position of a few may drive forward developments which might conflict with wider European values.^v A point often made in the past is that our humanity should not be redefined by a techno-logic, driven primarily by economics or technical feasibility. Other recent European studies have found enough indications of this phenomenon to suggest that we need to begin a societal debate on human enhancements,^{vi} but that it should not be dominated by the speculations of a few.^{vii} Surveys and studies of European public attitudes are so far quite limited, but preliminary indications suggest that a majority express doubt or negative reactions, but a few are excited at the prospect of potential improvements to themselves and the human race.

If human enhancement technologies could improve minds and bodies, at a very superficial level one might say, ‘Well, what is wrong with that?’ Isn’t it part of being human to use our technological skills to enhance our lives? But on closer examination, the notion of making modifications to the human body *itself* raises some of the most profound philosophical, theological and moral questions in the field of technology. For example, what are the limits of our humanness, if any? Is enhancement to be embraced with enthusiasm, or seen as a threat to our humanity, to be opposed at all costs? Is it an alternative ‘religion’ which is simply misguided, because it profoundly misunderstands our humanity? Is it something which is up to the individual to decide, or is it unjust, provoking a deep division between have’s and have not’s? Can we make distinctions, so that we limit some technological possibilities while accepting others? Lastly, being realistic as opposed to merely speculative, would even a fraction of what is promised indeed be beneficial and improve humankind?

In this paper we examine some of these, drawing upon our rich theological traditions, and their insights into human nature and its strengths and faults, into human use of science and technology, and into the ultimate questions of human destiny and eternity. We note that the debate is portrayed by some transhumanists as between progressives and ‘bioconservatives’, and that Christians are usually placed squarely in the latter category. To frame the issues in this stereotyped way already presumes certain moral and value presuppositions. We do not view these matters so simply, as this report will show. We call upon our churches to engage with these questions and to play a leading role in the emerging European discussion of them. The EC has various research programmes on this subject, from which it is receiving information and discussion.^{viii ix} To add to this debate, we wish to set out some features of a Christian perspective on these issues.

2. What do we mean by enhancement?

a) Some Potential Examples

The term ‘human enhancement’ can be used in different ways, so we first outline what we mean by it and what we do not. In one sense, we have always been enhancing the human condition through agriculture, nutrition, energy, engineering, mobility, education and so on. We are not talking primarily about these, nor interventions in the body for medical reasons. By human enhancement, we mean ways to make functional changes to human characteristics, abilities, emotions and capacities, beyond what we regard today as normal, using advances in biology, chemistry, physics, materials, information technology and the mind sciences. A few things are already done, like cosmetic surgery for breast enhancement. But most of what are

discussed as potential enhancements are ideas whose realisation is in the future, some relatively close, but mostly far off, and some probably never.

We give some examples simply to illustrate what might be possible in five areas:

- chemicals for physical enhancement,
- chemicals to enhance performance, mood or cognition,
- functional implants and IT interfaces,
- changes to body cells and systems, and (less feasibly) human genes,
- extending human lifespan, which is often included but is a special case.

Chemicals for Physical Enhancement: Human growth hormone has been given to help children whose growth is unusually impaired to reach a more normal height. This would usually be regarded as a medical intervention. But to use growth hormone to enable a child in the normal range of height distribution to grow significantly higher, perhaps aiming for future excellence at basketball, would be seen as an enhancement. Chemical enhancements are used controversially to enhance performance in some sports, for example, erythropoietin to increase red blood cell levels and anabolic steroids for muscles.

Chemicals for Cognitive Enhancement: The use of drugs to alter mood in healthy people is familiar, as are the dangers of addiction and side-effects. Selective serotonin uptake inhibitors, e.g. *Prozac*, may have less adverse effects as anti-depressants. Some claim they could make healthy people more energized. Chemicals can alter cognitive performance to some extent. Amphetamine-based stimulants, like *Ritalin*, are used to treat children diagnosed with attention deficit hyperactivity (ADHD), but also controversially to enhance concentration in preparing for exams. *Modafinil* has been used to enable people to do without sleep for significant periods.^x These are examples of cognitive enhancement beyond normal medicine, but feasibility, efficacy, habituation, risks or cultural values have limited their widespread use. An increasing understanding of brain function may enable more specific manipulation of brain chemistry, but radical enhancements like memory or creativity are more doubtful.

Brain implants: Brain implants for neurological illness might also be adapted for non-medical purposes. The continuous electrical stimulation of specific locations of the brain, using inserted micro-electrodes, has proved remarkably effective in treating severe tremors of Parkinson's disease, for example. Stimulation can also induce mood changes and overcome compulsive disorders. In theory, this could be used to alter and select mood according to personal preference. With today's implanted electrodes, risks would be prohibitive, but in future it may be possible to achieve similar effects if magnetic nanoscale particles could be directed to the precise sites in the brain.

Functional implants: Scientists have connected silicon computer chips to certain nerve cells (e.g. neurons) to a limited degree under experimental conditions. The best progress is in sensory organs and motor function. Cochlear implants have recreated a degree of lost hearing. Retinal implants and chips to operate prosthetic limbs by thought both offer future medical potential. In principle, such interventions could be adapted to create new human capacities. A retinal computer chip linked to a tiny video camera, restoring some vision to blind people, might be extended to normally-sighted people infrared vision, to help driving a car in fog. But the claimed 'successes' in these fields may reflect not our great technological strides so much as how smart our brain is at processing our fairly primitive experiments. A full, two-way

integration of all 20 billion neurons in our brain with a computer is extremely remote, not only in scale, but even in the concept.

Cells and Genetics: Enhancements based on engineering human genes are much less likely than those involving chemicals and information technology. It continues to prove difficult to turn the promise of gene therapy into reliable clinical practice, even with relatively simple genetic defects. The prospect of being able to manipulate reliably the complex array of genes which form the basis of human characteristics and behaviour is presently regarded as remote, and perhaps impossible, especially given the additional complexity of environmental factors and epigenetics.

Life extension: A special case is extension of the human lifespan. Averaged over the whole European population, people are indeed living longer, but the oldest age to which anyone attains has not increased greatly. Some speculate that we could, however, extend the normal human maximum lifespan perhaps to 200 years, perhaps even much longer. This presupposes that scientists would find ways to intervene in the whole range of ageing processes, which few experts see as currently realistic. The result of research into the degenerative diseases and the ageing process will be that more people will live into extreme old age. What is less clear is to what extent this would necessarily avoid the progressive decline in the body's functions and serious degradation in the quality of life. We have discussed this issue briefly in our 2007 report on Ageing.^{xi}

b) Speculation and Reality

Enhancements are a mixture of some small real developments and a great deal of speculation, motivated by the desires and values of a few who are pressing for all this to happen. But we should beware believing too much about the unlikely and radical. This is not an inevitable course that humanity is embarked on, like an unstoppable juggernaut.^{xii} We should not naively believe in technological determinism. The question facing us is to decide *what* course to take, faced with these possibilities, what to explore and what to decide not to pursue. This paper seeks to develop some values by which to judge our course.

c) Some Important Distinctions

Having given some examples of the sorts of things that might be possible, we now need to make some distinctions to help us think about these issues.

External or Internal to the human body: Enhancements are often envisaged as making internal modifications to the body, as distinct from external tools which we can use but then put down again. Thus, a computer is an external tool with which our brains normally interact via the keyboard, screen, loudspeaker, etc. A brain chip would be implanted internally, and would link activity in our brain directly to a computer or some other device intended to enhance our capacities.

Transient or Permanent: The chemical enhancements described above are transient effects. To make the effect regular or continuous requires repeated doses of the chemical. While the effect is reversible, it may also lead to dependence. Implants and modifications in the body would be permanent and difficult to reverse. While major genetic modifications to enhance the body seem unlikely, if germline genetic changes to our reproductive cells were ever possible, the change would not only be permanent, but also carry into future generations.

Small increments or Radical changes: For centuries we have used technologies to improve the human condition within the biological limits that define our humanity. One idea of enhancement envisages ‘upgrading’ our existing features by small changes - a bit faster or smarter, perhaps? More radical visions aspire to exceed our biological limits altogether, to make a change what it is to be human, perhaps literally ‘incorporating’ functions from other species or engineered systems.

Medical and Non-Medical: An important question is whether we should make a distinction between medical intervention and human enhancement. Article xx of the European Convention on Human Rights and Biomedicine makes this distinction in allowing sex selection to avoid a gender linked genetic disease but not just for personal preference.^{xiii} Transhumanism rejects any distinction, because we restrict therapy to restoring “normal function”. What we consider ‘normal’ should now be superseded by the new possibilities which our technological skills open up, far beyond present limitations. Common sense, however, suggests that there is an important difference between doing something because someone is ill, to make them ‘better’, and taking a healthy person and ‘improving’ them, as in the growth hormone example above. Cosmetic surgery may be done medically, such as surgical treatment of a hare lip, but a face lift to make one look young again, would be seen as a change made for personal preference, not for medical reasons.

We are well aware that this distinction is not always sharp, and may shift as perceptions change about what are considered medical conditions. There are borderline cases, such as the surgical treatment of the physical features of Down’s syndrome. There may be complex psychological factors in cosmetic surgery. If electrode stimulation for Parkinson’s disease could control mood or eating disorders, would this be considered medical or an enhancement? But the field of medicine has had to address similar questions before.

To a first approximation we should continue to make the common sense distinction between medical intervention and enhancement, and weigh up ‘grey areas’ case by case. The distinction is can be ethically very significant in assessing what actions are justified. Compassionate desire to address human suffering provides a strong general ethical motivation for medicine, but not for enhancement as such. Similarly, risks which might be taken in seeking to save a dying person may be unacceptable for enhancing a healthy one.

In our ethical discussion of human enhancement, we will restrict ourselves to enhancements that have no relation to medical treatment or the prevention of disease. Improvements to the human immune system or to release anti-cancer agents in the body would be treated as medical, but extension of memory or personal mood changing agents would usually be ‘enhancement’.

Disability, Ability and Superability: Remarkable strides have been made, and are in prospect, of aids for a disabled person. As we saw above, preliminary experiments suggest it may eventually be possible to enable sophisticated thought control of a prosthetic limb or even to regenerate severed spinal nerves using stem cell and nanotechnologies. By availing him or herself of such devices, does it matter if a disabled person is enabled to perform tasks which exceed the capabilities of an ‘able-bodied’ person? Why not! Some athletes in the Paralympic Games already go faster than in a ‘conventional’ race. We have some sympathy with the view that if our societies do not sufficiently address the social and practical status of disabled people, they should be free to avail themselves of whatever technology they want to

use.^{xiv} But should able-bodied people be allowed to avail themselves of the same technologies and become, perhaps, super-able? This suggests a deeper issue. Is enhancement exaggerating ability above more basic human values?

3. How do we know what is an enhancement?

The first question to ask is a philosophical problem but it also reveals a very practical issue. Can any human truly speak of enhancing themselves? On what basis could we assess objectively any claim that a functional change is an enhancement, when we are both subject and object? Is it rational for a human to claim that he or she knows enough about the vast complexity of the human body and mind, of consciousness, emotion, and so on, to know the effects which our changes would have on the whole, and to assert unequivocally that they are changes for the better? There is no baseline concept from which to measure a human improvement, other than each individual's personal intuition about it.

The notion of 'well-being' is suggested by proponents of enhancement technologies as a criterion, but we have no socially agreed standard to judge what would make people's lives go best. Landeweerd highlights this by reference to the ambiguity of conditions such as autism. An autistic person may show contrasting characteristics, some which the concept of human well-being would view as strongly negative and some strongly positive. Yet the person themselves both are intrinsic to their being.^{xv}

But the question has a theological dimension. For Christians, God would be in a position to judge what was, or was not, an enhancement, as creator and external observer of humans, and who had shared the experience of being human for a time. If, as we believe, God has made humans in a certain way, on what basis would we consider that we knew how to improve on God's 'design' of ourselves? Would this not be hubris, a case perhaps where negative meaning of the over-used expression 'playing God' conveys some truth? Whilst the study of the sciences has been described as seeking to 'think God's thoughts after him',^{xvi} to imagine that we know how to improve on God's thoughts about ourselves might well seem an unwarranted extrapolation. But what *would* God expect humans to do with the technological potential to adapt aspects of our physical and mental functions? We now consider the theological case in more detail.

4. Theological Reflections on the idea of Human Enhancement

In this chapter we first explore the general theological perspective of these questions. In Chapter 5 we will discuss some more practical ethical implications of human enhancement. There are two questions to bear in mind as we do this. One is the notion of enhancement as a technologically mediated human 'salvation', the ideology of transhumanism seen in religious terms. A second is whether making enhancements to ourselves could be theologically valid, perhaps in some more limited sense, if it can be separated from the ideology of transhumanism? What would be the important theological and ethical criteria on which to judge it?

a) Humans in God's Image

The starting point for the understanding of human beings is the foundational text of the book of Genesis which declares that God created humans 'in God's image'. When we speak of

“creation”, however, this should not be read simplistically.^{xvii} The notion of creation embraces a continuous evolutionary unfolding of the natural order, of which God is both author and sustainer. Christian faith is not a rival scientific theory, but a meaningful way of looking at the world beyond science, which offers a complementary dimension to that of science. From the timeless wisdom of our scriptures and traditions, we seek to derive ethical insights, which we offer for the guidance, encouragement or restraint to the application of science. In this understanding, we human beings are not autonomous products of chance, free to do as we please in all things. We have a creator, on whom we and all things finally depend for our existence, and to whom we are related in being the bearers of God’s image.

The image of God is a complex and much debated concept. One aspect is that God gives us the characteristics of the human condition, but also sets limits for it. Thus, we are created with ‘god-like’ aspects, amongst which we would list the centrality of love, our profound relationality (by which we are only complete as humans in relationship with other humans), our sense of compassion, justice, fairness, of right and wrong, our ability to reason and abstract, to imagine, to create, to invent, and so on. Christians believe that the image of God is seen in its fullest light in Jesus Christ as God made human. Our human vocation is to follow and emulate this ‘image’, expressed as the aspiration to become Christ-like, yet remaining ourselves. This puts enhancement in a particular context, to which we shall return later in this chapter.

Another aspect of the image of God is that the human body, mind and spirit form an indivisible whole. We reject a dualism in some Christian thought that separates the spiritual from bodily, because we believe that in Jesus Christ, God became human, lived, died and rose again, and that we will share in his bodily resurrection. But the image of God in humans is also spoiled, in so far as we have sought autonomy, away from God. In the terminology of the Bible, we are ‘fallen’ from the spiritual and moral good life for which we were created to live. This means that what we do may be evil, as well as good. Even what we seek to do for the best reasons, including science and technology, may be tainted with a poison in our human nature.

b) Human Inventiveness, Science, Technology and Medicine

One implication of bearing God’s image is that we are made creative. Here we would especially affirm scientific inquiry, technological innovation and medical endeavour, as reflections of the image of God in us. The desire to understand ourselves and the world around us, and to intervene in the light of that knowledge - what remedies to devise, how best to steward what we are called to look after, what new things to create - these are God-given.

Humans have thus sought to make improvements to our human condition in many ways. Historically, these have taken us from creating tools, harnessing external forces and systems, making changes to our context, through to more fundamental understandings of the laws, processes and systems that underlie the animate and the inanimate, and so to the ability to manipulate not only the material world but the very ‘stuff’ which we ourselves are made of. The challenge of enhancement technologies is whether these God-given capabilities should extend to making radical changes to our very selves. To what extent are we free to make alterations with the creation around us and even to ourselves?

Medical scientific endeavour, to improve the human condition in healing what goes wrong with us physically and mentally, has long been seen as a desirable calling for Christians to

pursue. It is an adjunct to the age-old ministries of the Church in the care of the sick, the weak and the poor. In principle, we could support many kinds of ‘enhancements’ of this kind, to develop better means for the body to combat disease, to detect in advance of symptoms, to be less subject of the more distressing degradations of extreme ageing, and so on. But in this report we wish to examine enhancements that would go far beyond the medical context.

While encouraging our scientific creativity, there are eventually limits. The notion of humans as the image of God embodies a fundamental distinction. God is eternal and unlimited, but humans are created and finite. In a Christian perspective, human enhancement should not mean that humans try to escape their finitude, in pursuing a modern ‘elixir of life’ for example. Not everything is possible for science to solve, human ingenuity to engineer, or medicine to cure. In this light, many claims for human enhancement seem so naively optimistic as to be unreal, or expressing a wish-fulfilment that science fiction dreams might be realised. Some of it may be possible but much of it will not.

Our Christian heritage teaches us to be sceptical of romantic notions of unrestrained human improvement and scientific progress, not only because of finitude but also our moral failings. In the Genesis accounts, human vocation is expressed in being created in the image of God, whereas the ‘original’ sin is phrased as an attempt ‘to become like God’. They may be seen as the bright and the dark side of human existence, both in our intentions as well as our actions. The borderlines between good and evil can be crossed all too easily.

The optimistic predictions of future science in Francis Bacon’s 17th century ‘Novum Atlantis’ serve as a warning for the prospectus of human enhancement.^{xviii} In his imaginary scientific institute, Salomon’s House, Bacon portrays a situation where ‘all manner of changes’ are made perfectly without error or corruption. Overclaiming about the promise of technologies is not new! History shows that, while he was right about many technical innovations that have been developed, much has also gone wrong in unethical application, for Bacon did not account sufficiently for human folly and fallenness in his projections. Suppose I could have an infrared vision chip. Would I use it to drive more safely at night or in bad weather? Or would I use the new ability to drive much faster than before, but just as dangerously? This dilemma undermines the claim that for many supposed enhancements, not because the function did not work, but how we chose to use it. That’s human nature.

We do not know as much as we sometimes think, and human nature sadly inclines us to misuse our God-given talents as well as to use them well. When applied to attempting to improve humans, these theological insights may therefore lead us to have some grave reservations in practice.

As we observed in an early report on cloning technologies,^{xix} we are conscious that not every technological development is necessarily acceptable. The more powerful the methods we use, the more we need to consider not only what is technically possible, but what is happening to us as people if we say "yes" to every possibility which science may enable. In enhancement, the drive to "see if we can do it" is not a sufficient reason. To be mature in developing technology, humanity must learn where to say "no", as well as "yes".

As humankind has begun to realise the power of intervention in the wider creation, it has realised belatedly the need to use that power in balance with the environmental, social and ethical aspects of life, and with a realistic understanding of human nature. The Bible also teaches a holistic view of human life, fulfilled in relationship. Respect for the human person

and for our relationships with each other and with the rest of God's creation may therefore be more important criteria than mere progress, or economic well being, or even medical advance, in themselves. Good though these things can be, they are not absolutes. We therefore need to critique the impulses which drive technologies and which set the priorities.

c) The Human Body

The prospect of human enhancement raises questions about our image of the body, and what sort of humans we want to be. In the literature propounding human enhancement, one gets the idea that the body is reduced to an instrument, a covering, or even a machine, which can and should be upgraded by all sorts of artificial interventions. The aim is to look better, to feel better, or to function better. The inference is that only if I am the best do I have value. The media and advertising promote images of the body which can induce stress and burden, if one's body does not look good or function well. Whether or not we use some cosmetic intervention to smooth the wrinkles of our skin, for example, our human worth does not lie in our success at postponing the effects of ageing, or the fleeting perfection portrayed on a TV screen.

A biblical view of the body shows different ideals and priorities. Every human being, especially the weak and the poor, is precious in God's eyes, uniquely valuable regardless of the perfection or imperfection of his or her body. God gives every person gifts and capacities which makes each one distinctively themselves. Whether great or small, the divine calling to all humanity is to present these capacities back to God as a joyful living expression of gratitude.^{xx} God is not more interested in 'superman', but with 'everyman', and with the unique response each can make. To enhance our capacities may be of private interest but is limited and vulnerable. Our cultural ideals of beauty, strength and ability, run the risk of becoming goals of an elusive perfection which, even if achieved, can suddenly slip through our fingers and is gone. The issue is not to make our bodies more functionally efficient, but what we do with what we have.

Moreover, the care we take of our bodies is not for our own sake, but because we bear God's image, our bodies (sometimes called 'temples' of the Holy Spirit) and are called to a life of service to God and love for our neighbour. Our very bodies have a spiritual as well as a physical dimension. This puts a very different context to a focus of enhancing myself for myself. Enhancement aspirations tend either to deny or dismiss the failures, under-dogs and the fact of irresolvable suffering? Who speaks for the have-nots which human societies have so often produced in response to any new technical development, as the counter-example to those who benefit?

d) What is wrong with Humans?

Before going further, we need to ask an important question about what is seen to be 'wrong' with humanity at present that we should *need* to be enhanced. The rhetoric of some advocates of human enhancement uses expressions like how 'puny' and inadequate humans are. Such assertions are value-laden with the presuppositions of the 'teleology' of transhumanist belief in inevitable end point of human functional transformation. There is an irony in this view compared with the earlier glorification of humanity in the Enlightenment. What has now become so wrong with us? Why is it so *bad* to have only the intelligence or strength that we currently have, or that we cannot fly like a bird, or possess infrared sensors like a bat?

Christians we have a radical insight of a different kind. We do not see the supposed puniness of the human condition as a disease to be treated. Our finite bodily nature is something to be celebrated, in Paul Ricoeur's term, a *finitude heureuse*. So we should not deplore that we are not God, nor infinite like God. As we observed above, what is wrong with humans is not, *a priori* our physical capacities but our profound spiritual and moral failings. It can be underlined by the story of the tower of Babel, in Genesis 11, where humans are trying to build their own way to heaven, and escape from the finitude of creation. The attempt ends up in a tragedy. We may have all the technology we devise, but never escape this deeper problem. Even if one does not share Christian faith, one may accept the wisdom of this old tradition and accept the warning to proceed carefully with respect to goals of human enhancement.

e) Christ-likeness: a different goal of our humanness

Just as Christian theology has a radical analysis of what is wrong with humans, it also has a radically different idea of what is necessary to improve the human condition. For Christians, the supreme example and goal of humanity is found in Jesus Christ. His own name for himself, 'the Son of Man' (literally 'the human being'), expresses this humanity, but he is at the same time the *logos*, the Word, the ultimate revelation of God expressed in a human life.^{xxi} His way of life was marked out by humility, love and mercy as well as in his timeless teaching, to the ultimate extent of accepting suffering and death. In doing so he expressed God's complete identification with the human predicament, in order to save humanity from its fallenness. The paradox is that, as the fulfilment of humanity, he came not as a man of exceptional physique, power, or wealth, but a king who came humbly like a servant.^{xxii} In the words of an ancient Hebrew prophet, "He had no beauty that we should desire him. He was a man of sorrows and acquainted with grief".^{xxiii} Another biblical writer observed, "It was fitting that God, for whom and through everything exists, should make the author of salvation perfect through suffering".^{xxiv}

Christ presents a very different view of ideals of human perfection, and of how that may be attained, from the functionally enhanced superman or woman of the transhumanist movement. At this point we mention the concept of *theosis* in the Orthodox traditions of Christianity. This is the idea that God and humanity progressively achieve a union in communion with Jesus Christ. It is not that humans become "god", in a pantheistic sense. Rather, as God shares himself with the human race in Christ, we are called to conform to all that God is, in knowledge, righteousness and holiness. The distinction remains between God as creator and humans as created, but it is blurred, like a mirror perfectly reflecting the source of the image. The journey to this *theosis* involves all the sacraments, practices and virtues of Christian living, while God works within us by grace and energy of the Holy Spirit. It is indeed a form of enhancement, but of a very different character to what could be achieved by merely technical changes to our bodies and minds.

We consider that human improvement or perfection cannot merely be equated to optimal bodily function, physical health and enhanced capacities. The perfection for which a Christian strives is of a very different order from our Western pre-occupation with the demands of maximal performance and efficiency, or its exaggerated view of physical beauty. Its goals are expressed in terms of the 'imitation' of Christ, of Christ being 'formed in us', or union with Christ.^{xxv} This involves a deep affirmation and celebration of life, of the human body, and all the good things God has provided, including human creativity and technical ingenuity. But at the same time it embraces the suffering and pain of the world and our human mortality, and,

following Christ, seeks to heal and to right wrongs. Ultimately, it is not limited merely to what may be achieved and suffered in this life but looks forward to resurrection.

The bodily resurrection of Jesus Christ lies at the heart of the Christian message - that death has been overcome, not by overriding the ageing processes of the body, but by a transformation *through* death into eternal life. It is a spiritual transformation, but it is expressed in a transformed and risen body. Because the physical and spiritual dimensions are inseparable, to separate our physical bodies for improvement is as mistaken as seeing the goal of human life as merely a spiritual heaven. This perspective transcends whatever we experience in our lot on this earth - whether good, bad or indifferent. It offers a perspective of hope beyond suffering, and of a 'perfection' of a quite different type to bodily function. Some Christian traditions emphasise the call to humans to seek union with Christ, *theosis*, beginning in this life and fulfilled in the resurrection, when we the created are like a mirror reflecting the source of its image, the Creator.

f) Should we enhance ourselves? – An Interim Theological Conclusion

These reflections lead us to reject the ideology of transhumanism, which has tended to overshadow the emerging discussions about human functional enhancement. In so far as it seeks a kind of *technological* salvation without God, the transhumanist project is, in our terms, quasi-religious. It could be understood as just a new version of an old sin - the age-old human aspiration to do without God. It might indeed be the ultimate Tower of Babel project, a form of *hubris*, as a rebellion against the human condition as such, presuming that *we* know better than the creator how we should be. It makes the wrong diagnosis on both what is goal of humans and what is wrong with us, and comes up with false solutions.

But does that imply the rejection of any form of human enhancement? Given humans made in God's image will always seek to find out and to use what they find, we would not say in principle "No, never!" But if it comes to claims to enhance human functions and capacities, we would want to ask some very searching questions, which often preclude going ahead. In the next chapter we explore some of these questions.

5. Some Ethical Reflections on Human Enhancement

Introductory Questions

Our first ethical questions challenge a tendency to an individualistic, 'me-centred' perspective of human enhancement, and ask about its social impacts. Would my personal benefit mean that someone else loses out? Who would be the winners and who would be the inevitable losers? What would be its social consequences especially for the poor, disabled, and disadvantaged of the global community, not merely the advantages of a few rich members of American, European or other industrial societies? What are the risks, uncertainties and the unintended consequences, to offset the assumed benefits? Faced with the panoply of local and global issues and problems and suffering to be addressed, would our human gifts, ingenuity, and our limited resources and finances be better spent on other goals and tasks than enhancing ourselves?

Lastly, we return to questions of the individual. Put simply, why should one seek to be enhanced? What is one trying to achieve, realistically? This simple question turns out to be

very hard to answer, once it is examined closely. Expressing it in personal terms, would I make myself better or worse? How would I know? Would I become more dependent on some technology, but less free to be human? Am I chasing a goal which I can never actually attain?

Some of these questions could be asked about any new technology, but the context gives them a special force. The Bible also teaches a holistic view of human life, fulfilled in relationship. Respect for the human person and for our relationships with each other and with the rest of God's creation may therefore be more important criteria than individual capacities, progress, or economic well being, or medical advance in themselves. Good though these things can be, they are not absolutes. In this wider context, we now present some ethical observations on human enhancement. They are not our final answers, but as starters for what will be a long societal discussion, and some signposts for where we think some of the main ethical questions and problems will lie.

a) Justice and Equity

A basic problem with the notion of human enhancement is that its individualism and pursuit of functional excellence have an inevitable tendency to cause division and injustice in an already divided and unjust world. The offered enhancements are unlikely to be so straightforward and cheap as to be readily available for all. So far as can be judged from the examples examined so far, the artefacts and systems of radical enhancement are not things likely to have the near universal availability of a television or a mobile phone. Many would probably be for a self-selected elite, on the basis of ability to pay, or of being in a place and culture with access to the technologies and their infrastructure. The likelihood is that enhancements might offer advantages and privileges for a few, but not for the majority. Enhancements in sport may already serve as a warning of what might happen if to artificial performance enhancements became available in wider culture. In some sports, two sub-cultures have emerged - enhanced elite professional athletes and ordinary non-enhanced sportsmen and women who perform at a much lower level of attainment. In so far as this would be a window on the future, it is one as Christians we would not be prepared to countenance.

Proponents of enhancement argue that new technologies usually create new winners and losers - so why object in this case? - and that benefits often trickle down so that everyone is better off in the end. Ethically, such reasoning not good enough for the kind of advantages being talked about by proponents of radical human enhancements. If we supposed that the rhetoric of radical enhancement of the human person *itself* became realised, unlikely though this is, it would be a strange view of justice indeed to promote such radical advantages for the benefit of just a few, with the rest left behind in the new human race. Perhaps it is its implicit ethic of competition that morally undermines the enhancement project more than any other.

b) Social Engineering – Intended and Unintended

The concept of radical human enhancements might be more believable if its proponents declared that they would do no applications for those already rich and advantaged, but would work only to offer improvements to enable people at the bottom of the heap to enjoy the privileges of the proponents. But that does not seem to be the agenda. Indeed, the opposite might be more likely. It is a relative short conceptual step to resurrecting 20th century eugenic agendas, which accepted others in society only if they were seen as functionally 'fit'. Radical life extension would raise some major problems of this sort.

Another social consequence arises out of the context for personal enhancement which takes competition as an assumed ethical good. If performance enhancements become available for some competitive activity like school or university exams, say a cognitive enhancing drug, this has a ‘ratchetting’ effect - like a cogwheel driven ever one step further round but which cannot be turned back – because of the fear of losing out. Peer pressure and the fear of falling behind might lead people to use the enhancement against their values or better judgement, by competitive social pressure. Once generally adopted, the marginal or ‘magical’ advantage of the drug would then cease to be of any competitive value, because everyone used it. Yet no one would now dare *not* to use it, for fear of falling behind the new norm. The result is that no one has benefitted but everyone becomes dependent. The only net winner seems to be the drug company. This has been described as a race to the bottom, ethically.^{xxvi}

c) Commerce and Regulation

The ambiguity of use of Ritalin, and commercial interest in using brain electrode stimulation to address over-eating rather than Parkinson’s disease, illustrate the multiple use of scientific breakthroughs. Medical researchers may pursue both aims with dual funding. Much of the ideas of enhancement are far from economic, but once the commercial interests become dominant, regulating the directions of technology will become very important socially, and also very difficult. What is a personal issue and what is societal? In view of all that is at stake in the issues we have identified, we suggest that, in the first instance, enhancement technologies should not be regarded merely a matter of personal preference but a matter of social discussion and decision making.

d) Risk

The last point is also important regarding risk. There are serious risks entailed in making radical changes to human functions, whether the changes are permanent or reversible. Many of the future changes might involve invasive techniques or significant neural, cellular or chemical changes in the body. In a medical context, such risks may be weighed against the potential benefit of treating a terminal patient or someone in chronic distress. But if the person is not ill and simply believes the procedure will enhance them, the risk has to be close to zero, because there is no counterbalancing for present and future suffering were no action to be taken. This is especially important if the enhancement involves future generations, such as inherited modifications or altering the human germline.

Another risk is to upsetting the *homeostasis* of the human organism, our tendency to maintain an internal equilibrium between various biophysical functions in spite of variations in external conditions. If we interfere radically in one of the many aspects of this subtle equilibrium, what does that mean for the organism as a whole? Some sports enhancements have had tragic results, in both acute and chronic effects on the athlete’s body. The complexity now revealed in the human genome underlines the uncertainties involved in our understanding of gene function in an integrated system. Too narrow an understanding of genes, or proteins, or neurons, or other cells and parts of the human system, makes the sort of manipulations that enhancement might envisage fraught with high levels of uncertainty and thus of risk.

This also raises the risk of scientific hubris. We do not know as much as we sometimes think. From past experience, optimism for the new possibilities can enchant the technologists, and commercial, military or political pressures drive them faster than they had really understood

the science, or before anyone had thought through the unintended consequences. With some areas of technology, we might ‘get away with it’; for enhancing humans, the stakes are too high. Some manipulations of the human person would need to be of exceptional reliability not just of the device itself, but also the amazing human ability to mess things up organizationally. If we cannot design shower units without getting water on the floor, or reliable software to buy train tickets on-line, what makes us think we should redesign ourselves?

e) Priorities and Opportunity Costs

There are also question of priorities. Faced with poverty, hunger, disease, and the consequences of climate change, the importance of personal functional enhancements or extending human lifespan would seem low indeed. Is it a waste of resources diverted (mostly for the sake of the rich and privileged) away from more pressing global needs?

f) Human Aspirations, Satisfaction and Dissatisfaction

We are familiar with cosmetic surgery, but let us assume that we could make other relatively small changes that someone might believe would improve some bodily function. To be able to do without much sleep to finish that report this week. To live to 120 years as normal. To alter our mood a little when we’re tired from a day’s hard work. To link the sense of smell to a database that tells someone if there is a dangerous chemical or drugs or a bomb. For a Scottish hill farmer to see much further, and tell whether a sheep has fallen on its back and cannot get up. For greater endurance in a sport or something really specific like a rock climber with ‘sticky’ hands to be able to tackle still harder rock faces.

Are we better humans for having cosmetic surgery today, or perhaps becoming smarter, faster, longer lived tomorrow? Would we agree, in retrospect, that the enhancement had been genuine, or did it make little difference, or maybe made one thing better but something else worse? What is motivating us? There seem to be several impulses.

- Practical: to overcome the sense of one’s own limitation, in some activity – not to get tired so easily, or to think more quickly, to run faster, or whatever;
- Competitive: to win the race against one’s rival next time;
- Aesthetic: that one might do a good job better – make better music or a tastier dinner, be a sharper mathematician, or a more skilled woodworker or scientist;
- Altruistic: to serve or help someone else better.

For all of these, would we be satisfied, compared with not having been enhanced? If one at last beat one’s rival, because one used better drugs than him, not because one was a better runner? That one had achieved a goal, but only with the aid of some added kick? Perhaps the most compelling satisfactions would be something like the sense of making a finer work of art or craft, just for the sake of it, or for the sake of someone else. Ironically, these are the least to do with enhancing *myself*, and the most to do with loving my neighbour or loving God.

We would also raise a profound question about what dissatisfaction we are really addressing, and whether the very logic of enhancement is eventually a treadmill of dissatisfaction. Suppose one went through some procedure to be enhanced in some function, logically there is no reason to be satisfied with it, because whatever new enhanced state one achieved, would be so much less than what could be still achieved if one was only enhanced one more. And so on, at each stage. Thus even if one had some completely novel capacity, one ought always be

frustrated with it. In this sense, human enhancement becomes a counsel of despair, because by definition it can never be fulfilled, or rather it cannot be fulfilled in this way. Is our success as humans more about making the most of what we are, than seeking always to be changing it into something else?

Many Christian writers have alluded to the fact that our very human aspirations and drives can never ultimately be satisfied humanly, because in one way or another they are surrogates for our desire for God, that being made in God's image has made us for. As Augustine put it, "You have made us for yourself, and our heart is restless until it rests in you."^{xxvii}

6. Conclusions

1. Before we draw our conclusions from this discussion, we need first to clear the air about transhumanism and its advocates, which has rather distorted the debate about enhancement so far. We make an unashamedly theological conclusion. In so far as it seeks a kind of *technological* salvation without God, we regard the transhumanist project as a quasi-religious but erroneous endeavour. It is a false hope which will not work, yet it has the potential to mislead people. It correctly identifies human aspiration to better ourselves from our present situation, but wrongly diagnoses both the problem and the solution. We believe that technology will not change the problems of human nature, nor remove our dependence on God, or the goal of our humanity of harmony in union with God.

2. If these technologies can be dissociated from the ideological framing in which they have often been presented, should we object to making more limited enhancements of the human body? If we do not look to become superhumans and if we duly recognise our human failings, would enhancements of body or mind reflect our God-given creativity and inventiveness? A definitive answer would be premature, when there are so few realistic examples, and so much is still speculation. But we have noted enough problems, both from the broader issues and the examples we have considered, for a lot of us to be sceptical at this point, but some are more optimistic.

3. Our cultures may promote ideas of what ranks as improvement, but we have serious doubts that we know how to design ourselves better, in any objective sense. Improvement is a familiar concept in the field of medicine and healthcare, where we can identify things that have gone *wrong* with the body or mind, and want to put them *right*. But, how would anyone claim to know, on any reliable basis, what would be *better* than the current design?

4. We would see an inherent difference between tools, in the broadest sense of the term, which we use to attempt to make our life better, and making enhancing modifications to the human body itself. We would also make a first order distinction between medical interventions and human enhancements unrelated to medical treatment and prevention. The existence of 'grey areas' does not invalidate the distinction; they must be examined on their merits.

5. Thus, in principle, we could support many kinds of 'enhancements' for example, to develop better means for the body to combat disease, to detect in advance of symptoms, to be less subject of the more distressing degradations of extreme ageing, and so on. But in this report we wish to examine enhancements that would go far beyond the medical context.

6. The concept of human enhancement tends to be presented individualistically and seems to be inherently unjust in an already divided and unjust world. It might have a stronger case if it was directed towards improving the lot of the have-nots of the world. But the rhetoric of human enhancement rather points the opposite way.

7. There are serious risks in many aspects of intervention in the human body, for which enhancement has no balancing good like a hope of treating terminal illness. There are also risks, from hubris of some scientists, or from commercial, political or military pressures, to proceed faster than we understand.

8. Enhancements should be the subject of decision making at a societal level, in the first instance. The implications are too serious to be treated just as matters of personal preference, for example, in the unintended social engineering that could result from individual use of chemical cognitive performance enhancers.

9. Our humanity is not to be defined by how well or badly our bodies or minds function. It is more to do with making good things from what we are than aspiring to be something else.

10. The discourse about enhancement moreover seems to us misplaced, because it misses the point about what most needs changing in our humanity. Our deepest problems are less in any physical limitations we may have, than in our moral, relational or spiritual failings, as the world's ongoing conflicts show. What is wrong with the human condition is not a lack of strength, longevity, intelligence, beauty, athleticism, art, science or even education, but in the moral and spiritual shortcomings of humanity, individually and collectively. From the point of view of a Christian anthropology, no matter how much we enhanced ourselves, our inherent human failings would remain because they lie beyond technical fixes, but rather require solutions of a different sort entirely.

11. Enhancement is a misleading hope because it can never be fulfilled. The internal logic of enhancement is its own undoing, because one would have no reason to be satisfied whatever enhancements one made to oneself. Enhancement becomes eternal treadmill which has no place to stop, and thus no satisfaction. Our Christian theology teaches us that we are created by God for relationship with God, and can never be satisfied with merely created things, even with ourselves. Good as these may be in many ways, they still leave us wanting what only God can meet.

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