

Moral Enhancement as a Technological Imperative

D. Gareth Jones



D. Gareth Jones

The inroads of biomedical technology into what human beings are as people manifest themselves in many ways, one of which is to explore whether and to what extent people can be enhanced, that is, perform better than they would have in the absence of the technology in question. Of the various possibilities discussed, one centers on cognitive performance, improving concentration, memory and the like. It is against this background that suggestions have been made that moral behavior can be, and even should be, improved using technological avenues provided by transcranial direct current stimulation (TDCS), deep brain stimulation (DBS), serotonin, and oxytocin. The drive to augment morality using these means stems from the perception of some writers that current morality is unable to cope with the dire challenges facing humankind in the form of possible nuclear annihilation, the plight of the global poor, and the deep divisions between different cultural groups. This is the world of moral enhancement and moral technology. A theological context is sought by assessing how Jesus's teaching on the greatest commandment, namely, loving God and one's neighbor, might apply to drug treatments aimed at transforming individuals with different moral, mental, and spiritual needs. In this way, the limitations of a mechanistic view of moral technology become apparent.¹

Heather Looy's survey of the theological frontiers of psychology touches on attempts at becoming more than human.² This is one of the most provocative frontiers promulgated by those who wish to transform the dimensions of human nature. While there are many facets to this endeavor, the one that is both best known and also most extreme is that of transhumanism, with its myriad goals of not only dramatically extending human abilities and life span technologically, but also finding ways of overcoming the burden of our mortality.³ However, there are many nontranshumanists who also have vast agendas for enhancing human cognitive abilities, including some who see it as their task of advocating for the enhancement of specifically moral attitudes.⁴ The thrust, in all cases, is to accomplish these ends utilizing the latest developments in biomedical technology.

It is this that sets them apart from so much that has gone on in the past, and that is based on the malleable nature of the human body and brain.

While moral bioenhancement has appeared in the bioethics literature in very recent years, it was presaged eighty years ago in Aldous Huxley's groundbreaking novel *Brave New World*.⁵ In this, he envisaged a society in which people would carry around their morality in the form of tablets in a bottle. "Christianity without tears—that's what soma is."⁶ Far more recently, a well-known bio-

D. Gareth Jones is Emeritus Professor, Bioethics and Anatomy, University of Otago, Dunedin, New Zealand. He has served as head of the Department of Anatomy, Deputy Vice-Chancellor (Academic and International), and Director of the Bioethics Centre at that University. His books since 2001 include *Clones, Designers of the Future, Bioethics, Medical Ethics, Stem Cell Research and Cloning, Speaking for the Dead*, and two edited volumes on dialogue between medicine and theology. He is currently writing *The Peril and Promise of Medical Technology*.

Article

Moral Enhancement as a Technological Imperative

ethicist, Peter Singer, has proposed a “morality pill.” Since moral behavior is in part biochemically determined, he argues that it should be possible to engineer moral behavior with drugs. Consequently, “this pill should be taken by those who do not normally help others.”⁷ Along similar lines, another bioethicist, Julian Savulescu, has argued that if safe moral bioenhancements prove to be viable, their use should be made compulsory.⁸

The enhancement literature is plagued by confusion about the definition of the term and also in its delineation from therapy. In part, the confusion stems from different conceptions of what constitutes enhancement, the areas of overlap between therapy and enhancement (regardless of definitions), and the extent to which the one blends into the other. My stance is that there is a continuum from unambiguous therapy (removing an appendix that has ruptured) at the one end, to unambiguous enhancement (curing death and creating posthumans to live for a few hundred years) at the other. In between, one can think of the enhancement of healthy people by use of vaccines as prophylactics and the extension of abilities as in enabling people to run faster than they would otherwise run.⁹

Cognitive Enhancement

While the focus of this discussion is the enhancement of morality, the possibilities of a move in this direction have been opened up by the finding that cognitive abilities appear to be capable of being enhanced. Examples abound as drugs originally designed to treat a medical condition are employed by healthy individuals to improve their performance. For instance, up to 25% of American students use psychostimulants,¹⁰ while 5% of the working population in Germany are reported as using pharmaceutical drugs to enhance their cognitive functions. It has also been claimed that up to 80% of students in Germany would use neuroenhancers if assured there would be no adverse effects.¹¹

One of the best known of these drugs is Ritalin (methylphenidate) that stimulates the brain and increases levels of the neurotransmitter dopamine. Its use to help people stay awake and alert for longer is nontherapeutic, as opposed to its conventional use for children suffering from ADHD (attention-deficit hyperactivity disorder).¹² Another drug, modafinil, designed to assist individuals with narcolepsy, also

appears to be useful in aiding concentration, alertness, focus, short-term memory, and wakefulness.¹³ A further drug, Donepezil (Aricept) originally developed as a treatment for Alzheimer’s disease, improves recall of training when taken by healthy, but older, pilots in a flight simulator.¹⁴ Yet other drugs like propranolol, a beta-blocker, can be used to block the formation of traumatic memories, or even erase them once established.¹⁵

These secondary uses (uses for which they were not originally designed for the treatment of specific maladies) of psychoactive drugs take them out of the traditional realm of therapy into a realm that is “Beyond Therapy.”¹⁶ Two categories of issues arise when a move beyond the therapeutic is contemplated. The first is the simpler of the two, and this is the safety of the drugs being employed. The second is the nature of what is being done in ethical and theological terms.

The major query over safety pertains to whether these cognitive-enhancing drugs have side effects. The answer is that they do. The most promising drugs currently used for cognitive enhancement can be addictive. For instance, the mechanisms in the brain for learning and memory are closely connected with mechanisms implicated in addictive behavior.¹⁷ Of all the neuroenhancers, modafinil is quite definitely addictive. Consequently, there is a major distinction between technological innovations external to the body, such as cell phones or computers, and the use of drugs that intervene directly in the neurobiological basis of one’s personality.¹⁸ The difference lies respectively in the transitory nature of the former, as opposed to the more profound and longer-lasting effects of the neuroenhancers. This difference also emerges when considering deep brain stimulation (see below).

The second issue raised by the use of cognitive enhancers concerns the nature of the transformation. It may be transforming a shy person into a vivacious one, a risk-averse person into a risk taker, or an irresponsible individual into a responsible one. In each of these cases, the approach adopted lies in the severity of the former state (shyness, risk averse, and irresponsibility) and whether it is considered in need of intervention. In other words, is therapy urgently demanded? If so, one is probably dealing with cognitive therapy rather than cognitive enhancement, although the borderline between the

two may be debatable. Perhaps there is a moral obligation to exploit the technologies available in some instances, on condition that the people concerned are not harmed and experience substantial benefit. If these conditions are not met, the use of these enhancers becomes suspect.

Moral Technology

Any moves in the direction of attempting to improve morality and moral behavior using technological approaches are based on one proviso, namely, that the methods employed actually do improve morality, and that they are more effective than available conventional approaches. Any claims that they are more effective should be open to scientific scrutiny, since what is being conducted is a scientific experiment. This should apply to any new treatment, and there is no reason why moral enhancement procedures are excluded from stringent analysis and critique. In clinical practice, we do not accept the validity of new treatments based on the positive responses of patients or the unsubstantiated claims of clinicians. Publication of results, peer review of the publications, and openness to testing and retesting are seen as basic requirements. These stipulations are just as important when approaching moral bioenhancement as in any other area where current approaches are regarded as inadequate.

The scientific basis for thinking in these ways encapsulates a variety of approaches. The first of these is transcranial direct current stimulation (TDCS). It has recently emerged that TDCS can be used to improve language and mathematical abilities, memory, problem solving, attention, and even movement. In TDCS, weak electrical currents are applied for about twenty minutes to the head via electrodes placed on the scalp. The currents pass through the skull and alter spontaneous neural activity. They are thought to increase neuroplasticity, making it easier for neurons to fire and form the connections that enable learning.¹⁹ It is thought that the effects of TDCS can persist for up to twelve months.²⁰

Experiments in humans have found that following TDCS, there are changes in the local concentration of the neurotransmitters GABA and glutamate, both of which are important in synaptic mechanisms implementing learning and memory.²¹ These characteristics of TDCS make it an attractive tool for manipulating neurobehavioral plasticity, and it may be

useful in enhancing psychological functions.²² Like all technologies, TDCS will probably come with costs as well as benefits. Enhancing some capacities may lead to deterioration of others. What this means is that highly developed capacities in some cognitive domains may be accompanied by reduced functioning in others.²³

While TDCS is a form of cognitive enhancement, some use it as a launch pad into the moral realm. This is, of course, speculative but some argue that certain biochemical interactions "might stimulate our moral imagination, increase our empathy towards others, ... improve our powers of moral judgment and reasoning."²⁴ What one detects here is a tendency commonly encountered in the bioethical literature, and this is that tentative data are viewed in an unreservedly positive light. The deficiencies and possible drawbacks to a procedure are downplayed in favor of what are seen as its positive aspects, no matter how tentative some of these may be.

The second approach uses deep brain stimulation (DBS) that has been discussed principally in connection with treatment for Parkinson's disease rather than in the moral bioenhancement arena. However, it does influence general cognitive domains besides motor ones. When used in patients with Parkinson's disease, electrical signals generated in a subcutaneously placed unit are sent to electrodes implanted in the motor region of the brain. In an attempt to control motor activities, the aim of DBS is to stimulate the function of the motor regions that have been detrimentally affected by the loss of the neurons producing the neurotransmitter, dopamine.²⁵ It is used when routine treatments have become ineffective, although there may be negative side effects, including personality changes.²⁶ Worldwide, more than 80,000 patients have been provided with these implants. DBS is also used as an experimental treatment for intractable depression and obsessive compulsive disorder.²⁷ While not all patients respond to the treatment, the primary symptoms are substantially improved in many, with rare adverse effects.

A range of post-operative neuropsychiatric symptoms has been reported when DBS is used for Parkinson's disease, including depression and apathy, though most are transient and treatable.²⁸ If side effects of this nature are minor, the alleviation of the crippling motor deficiencies will be welcomed. The balance between the positives and negatives will

Article

Moral Enhancement as a Technological Imperative

weigh strongly in the positive direction, and will be assessed as clinically acceptable. The underlying assumption is that there are no noticeable effects on the patient's identity. The change is strictly therapeutic, and equates with any other form of therapy to alleviate the troubling symptoms. Overall, DBS is an example of a relatively successful neural prosthesis, and illustrates a melding of brain and machine.²⁹

It is the broader applications of DBS that may prove of interest in enhancing people's lives, whether the alleviation of chronic pain, major depression, Tourette syndrome, and even Alzheimer's disease, minimally conscious state, obsessive compulsive state, and epilepsy.³⁰ Most of these treatments are experimental and the manner in which DBS works is incompletely understood, while the neuropsychiatric side effects should not be downplayed.

The third approach is the one generally quoted in reference to the possible enhancement of moral behavior. This is the potential contribution of neurotransmitters and neuropeptides. There appear to be brain circuits active during moral judgment that are linked to pro-social emotions such as empathy, guilt, and pity.³¹ In connection with this, it is not unusual to encounter papers with titles such as "Serotonin Selectively Influences Moral Judgment and Behavior through Effects on Harm Aversion"³² and "Oxytocin Increases Trust in Humans."³³ These direct our attention to the two compounds on which most attention is paid in the moral bioenhancement literature: serotonin and oxytocin.

Serotonin is being put forward as the neural substrate of ethical decision-making.³⁴ There is evidence that serotonin selectively influences moral judgment and behavior through increasing subjects' aversion to personally harming others. Administration of a serotonin reuptake inhibitor (SSRI) modulates decision-making in moral dilemmas. Consequently, enhancing serotonin makes subjects more likely to consider that harmful actions should be forbidden. Enhancing serotonin levels changes decision-making in a test known as the "ultimatum game," in that it makes subjects less likely to reject unfair offers. Additionally, this has a stronger effect on people who self-identify as being more empathic.³⁵

This is one side of the story regarding serotonin, but there is another and this is that serotonin is associated with self-harm in those who are depressed

and inclined toward suicide. Those studying morality do so on healthy subjects, whereas patients with dysfunctional attitudes point to a different facet of serotonin's effects on behavior. For the latter patients, disruption of the serotonin system is consistently associated with nonsuicidal self-injury and suicide in adults,³⁶ and low levels may explain pessimistic dysfunctional attitudes associated with major depression.³⁷ However, there is a complex interrelationship among biological, psychological, and social systems, including in adolescents.³⁸

There seems little doubt that serotonin is influential in human social behavior, both in health and in illness. Consequently, one has to be exceedingly careful in thinking that it can be used with impunity to alter moral decision-making in healthy individuals. It is important to ensure that any social dysfunction is principally the result of neural characteristics, let alone neural abnormalities. Contributions from dysfunctions originating in the environment and in the network of relationships of which the individual is a part should never be peremptorily dismissed.

While the serotonin story is a powerful one, it is impossible to divide the brain into distinct functional compartments. Augmentation of serotonin not only affects behavior, it is also involved in cardiovascular regulation, respiration, sleep-wake cycles, appetite, pain sensitivity, and reward learning.³⁹ Even within the morality area itself, the enhancement of moral cognition may be accompanied by an increased willingness to allow cheaters to go unpunished. Not only this, there is evidence in mice that enhancing aspects of memory also results in higher sensitivity to pain.

In the case of the role of oxytocin, a neuropeptide, in moral enhancement, the literature is again highly dependent upon the results of role-play studies. For instance, the administration of an oxytocin nasal spray increases trust, in that subjects playing the role of an investor appear to be more generous in their investment to a trustee. However, it does not appear to affect an individual's willingness to accept social risks.⁴⁰ In another series of studies, it was concluded that oxytocin creates intergroup bias since it motivates in-group favoritism, an important ingredient in cooperation within groups.⁴¹ This suggests it has a role in the emergence of intergroup conflict and violence. This relationship between oxytocin and trust has created intense interest and has ele-

vated oxytocin to celebrity status, although whether all the results should be accepted as uncritically as they have remains an open question.

The Perceived Need for Moral Enhancement

Over recent years, a debate has been raging in the bioethics literature between a number of prominent bioethicists. This revolves around the following proposition by Persson and Savulescu:

We claim that human beings now have at their disposal means of wiping out life on Earth and that traditional methods of moral education are probably insufficient to achieve the moral enhancement required to ensure that this will not happen. Hence, we argue, moral bioenhancement should be sought and applied ... it is a matter of such urgency to improve humanity morally to the point that it can responsibly handle the powerful resources of modern technology that we should seek whatever means there are to effect this.⁴²

What we have here is a mixture of despair at the plight of the world brought about through the possibilities opened up by scientific and technological prowess, and at the limitations of traditional moral education and discernment. But the irony is that in order to rectify the latter, they look again to technology, this time in the guise of moral bioenhancement.

For Persson and Savulescu, further developments in cognitive enhancement will only make matters worse, since a few people or groups of people will abuse the powers made available to them. Consequently, the priority is to find a way out of the current morass, and for them this is via genetic and other biological means of improving moral status. Not only this but, as they argue in other places, this enhancement should also be perfected and then made mandatory.⁴³

This gets to the core of some of the problematic aspects of the debate: the potential perfectibility of moral enhancement technologies. While one dare not say that this will never be achieved, it is so unlikely as to be close to zero. The complexity of the brain is such that it is well nigh impossible to restrict interventions to just one emotion, let alone to one moral response. To think otherwise is neuroscientifically naive. In making a similar point, John Harris writes:

The only reliable methods of moral enhancement, either now or for the foreseeable future, are either those that have been in human and animal use for millennia, namely socialization, education and parental supervision or those high tech methods that are general in their application. By that is meant those forms of cognitive enhancement that operate across a wide range of cognitive abilities and do not target specifically "ethical" capacities.⁴⁴

And then there is the question of personal liberty; to modulate one's moral responses, if it could be done, would necessitate the imposition of the beliefs and mores of others. What becomes of freedom, even if the intention is to overcome what are generally regarded as moral evils? And what becomes of Christianity? If freedom of choice has disappeared, there is no freedom at all—a deeply disconcerting prospect for Christians but also for a liberal society. The fundamental guiding principles of contemporary bioethics, namely, autonomy and beneficence, let alone justice, look as though they would have been sacrificed to a technological imperative.

The intentions of writers like Savulescu, Douglas, and Persson⁴⁵ are, to quote their own illustration, to elevate people's responses to the plight of the global poor, or to decrease the harm being caused by a serial philanderer. With these I have much sympathy, and yet the means employed, that of some form of direct emotional modulation, is disconcerting. The second of these examples is probably dysfunctional behavior, and has to be treated as such. The first is quite different, since it illustrates a lack of empathy with the poor and disadvantaged. Altering emotions such as sympathy, psychologically or even biologically, may leave one's level of practical commitment untouched. That requires moral decision-making based on altruism and siding with the victim. It is a desire to live the good life, and in Christian terms, to live for one's neighbor, for the deprived and downtrodden, and for those unable to help themselves. There is a rational basis to moral responsibility, one that involves the whole person and many interrelated regions of the brain.

For Persson and Savulescu, there is "a widening gap between what we are practically able to do, thanks to modern technology, and what we are morally capable of doing, though we might be somewhat more capable than our ancestors were."⁴⁶ For them, the drive behind moral bioenhancement is

Article

Moral Enhancement as a Technological Imperative

improvement in the powers of reason, impelled by the moral dispositions of altruism and a sense of justice, dispositions that these writers claim have biological bases in evolution. They accept that “moral bioenhancement worthy of the name is practically impossible at present and might remain so for so long that we will not master it ...”⁴⁷ They also accept that traditional means of improving moral wisdom are also necessary. Their realism is to be welcomed, and so it is surprising to read in another place that they consider that there would be no serious crime in the world of moral technology, in part, because criminals and potential criminals would be morally improved using whatever technology was available.⁴⁸ Notwithstanding this idealism, it is extremely difficult to see in what ways people’s altruism, concern for the poor, and reduced aversion to those of other racial and cultural groups can be so readily ameliorated using technological means of any description, let alone the means likely to be available in the foreseeable future. Additionally, a high level of moral awareness by the “haves” will be necessary to avoid exploiting the “have nots.”

Inherent within this whole endeavor is an assumption that a scientific approach to improving morality is able to determine what is desirable morally, or simply what is good as opposed to what is evil. It is one thing to argue that criminals will be prevented from continuing to act out their criminality, but who determines what constitutes the scope of criminality? One imagines it will be those with power in society, and even if these happen to be scientists, in what way will their science provide a guide to altruism, to appropriate behavior on the battlefield or in business, or to resources to be devoted to the elderly? In the absence of such guidance, there will be no way of determining how technological prowess is to be utilized.

Finding a Theological Context for Neuroenhancement

In normal life, we look favorably on enhancement. We routinely enhance someone’s work or life prospects; it is far better to be provided with opportunities than to be denied them. It is far better to have an adequate diet than an inadequate one; to have good living conditions than poor ones; to live a moral life as opposed to an immoral one. Christians as much as anyone else welcome enhancement in

any of these senses. Why then may we be dubious about morally enhancing an individual or even a whole population technologically? What is it about technological intrusion that worries us, or is it only certain technological intrusions that raise concern? We freely accept numerous intrusions into the human body: vaccines, surgery, and drugs to control blood pressure, elevate mood, regulate heartbeat, and control movements. Evidently it is not these that worry us, even though some of them influence brain activity, and even though many of them are accompanied by unwanted side effects. We accept them because we believe that they will assist us to live our own lives as the people we know ourselves to be.

In delving into the moral area, consider the response given by Jesus to a lawyer who wanted to know which was the greatest commandment:

“You shall love the Lord your God with all your heart, and with all your soul, and with all your mind.” This is the greatest and first commandment. And a second is like it: “You shall love your neighbor as yourself.” On these two commandments hang all the law and the prophets.⁴⁹

Is there a place for moral technology in bringing about love like this? Is there any way in which we could envisage using technology to enable people to love God and those around them? Imagine the following individuals.

Individual P is committed to loving God and her neighbor but suffers from bipolar disorder. She cannot escape either the frenzied states or the depressive ones, although treatment is proving helpful. There are times, sometimes lasting for weeks on end, when her functioning is very restricted, and during these periods, she has little thought for her commitment as a Christian. However, on other occasions, she is energetic and excitable and is highly productive, and it is during these times that she appears to relish her commitment and is loving toward all around her. However, she is deeply troubled by the black episodes and by what she perceives as her lack of concern for others at those times, as well as her lack of interest in anything spiritual. She is treated with mood stabilizers, including lithium and sodium valproate. She is very grateful for this, and within a year her condition has improved markedly.

This is an illustration of a disabling, pathological condition that is often successfully treated using

drugs. The pharmaceuticals enable P to function relatively normally, and in this way assist her to love others and hence improve the moral framework of her life. They have assisted her to live in the way she wishes to live.

Individual Q is also committed to loving God and his neighbor but has become addicted to viewing porn on his computer. This does not touch every aspect of his life, unlike the case of the previous individual. Neither is this usually viewed as a diseased state, but it leads to serious questions considering the extent to which he loves God in every facet of his life. It also throws doubt on whether he loves all those around him when, in his thinking, he perceives some as objects to satisfy his lust. He is deeply concerned about this and does not wish to continue to be subject to this addiction. Currently, treatment involves counseling and the assistance of support groups. But what if it proves possible to utilize drugs that act on the brain reward circuits, and counteract this form of addiction? What role might there be for them against the background of Jesus's teaching?

One has to ask what it was that led Q initially into viewing porn, since if this had not occurred the addiction would not have kicked in. The moral problems commenced here. And so, even if drugs to counteract the addiction become relevant and can be advocated, there is no hint that they would have had any relevance prior to the start of the viewing. Once again, as with individual P, their role will be in treating what has become a pathological process. Useful as this might be, the moral questions lie beyond their use. The drugs do not make Q more moral; they simply help him cope with the immorality to which he has become addicted. This is far removed from the moral technology advocated by some writers.

Individual R, by contrast, has no interest in the precepts of loving God and loving one's neighbor. He lives for himself and his own welfare. His aim is to build his own empire of wealth and privilege. He gives no thought to social issues, whether poverty or climate change, or the plight of refugees or ethnic cleansing. These are never allowed to intrude into his world of riches and contentment. How are we to approach this behavior if we consider it suspect and highly questionable morally? Where might technology enter the picture? On the premise that drugs will be found to improve moral precepts, it can be hypothesized that one could transform this

individual into someone who now appears to love God and those around him: that is, he is changed from an atheist into an apparent believer. In the unlikely event that such a change could be effected, would the end result be any different from the changes that can be wrought using psychological conditioning or possibly torture?

The resulting individual, R transformed, may give the appearance of conforming to certain external expectations but would not be a more moral individual. The moral technology would have failed to improve the stock of moral behavior. It may even resemble the results of classic psychosurgery of the 1940s and 1950s, when aggressive patients were transformed into placid conformists—without the aggression but without any interest in life or in the activities that had once been central to their existence.⁵⁰ The central queries are how moral is the use of such technology, and who is to determine that love of God and love of neighbor (as opposed to love of the state and conformity to its dictates) should be dominant characteristics of the lives of those in society? The contentious and dubious nature of such a proposal is all too obvious.

It is also worth returning to Jesus, who was well aware of the contrast between external appearances and inner motivations. Toward the latter part of the Sermon on the Mount, he explicitly pointed out to his listeners that they were to beware of practicing their religiosity before others.⁵¹ Giving to assist others and providing for others were always to be done secretly and without fanfare. If ways will ever emerge of improving the response of people in giving altruistically to help others, these procedures will also have to ensure that there is no desire on the part of the modified individuals to demonstrate to others how generous they are being. This goes well beyond simply "doing the right thing"; it includes both knowing why one is acting in this way and wanting nothing in return.

The attempt to transform people mechanistically is a manifestation of a quasi-religious faith that scientific knowledge is the only legitimate form of knowledge. The message of moral bioenhancement is that everything about human life is confined to the physical, including moral behavior. The realism of any religious approach is discounted, and yet the realism is not to be readily dismissed. The apostle Paul encountered numerous difficulties and much

Article

Moral Enhancement as a Technological Imperative

strife in radically transforming his priorities and attitudes.⁵² For him, the only way out of his predicament lay in the power and direction provided by the risen Christ. The contemporary question is whether taking appropriate drugs would have assisted him in his inner battle.

Even posing this query highlights a confusion of domains, one that has much in common with retail therapy. Buying clothes or a new house or a more expensive car in order to fill the void in one's life is the answer of retail therapy. Replacing a part of one's brain or modifying brain circuits in order to overcome moral struggles and act more morally is the answer of moral bioenhancement. This is what one might term "existential neural therapy." Attempts to "inject" morality into an individual are flawed since moral behavior develops and matures with time, as struggles are overcome and tensions are resolved. The wise individual has thought long and hard about ways of resolving moral predicaments, about means of approaching moral quandaries, and has learned from mistakes and errors of judgment. It is a process that builds on experience and that takes note of wise counsel from across many fields of human endeavor. Instantaneous answers have no part to play in establishing a moral repertoire, which for those working within a Christian framework will rely heavily upon the Christian scriptures and the writings of Christian scholars through the ages.

In writing to the Christians in Galatia, Paul outlined the contrast between two ways of living:⁵³ the one uninformed by a spiritual dimension (the desires of the flesh) and the other based upon spiritual imperatives (the fruit of the Spirit). There is no suggestion that this is an easy path, but it is presented to his readers as the preferable path and one that is available to them. The moral instructions are clear, but individuals have to choose. They are treated as adults, with responsibilities to both themselves and others within their community. The contrast between this and the quasi-scientific, technological approach is marked, and is an important consideration when assessing the attractions of moral bioenhancement.

The answer is not to reject outright technological interventions in the brain, since some are helpful and assist an individual to live as he or she seeks to live. These are to be welcomed. By the same token, there is no simple way of transforming an immoral indi-

vidual into a moral individual by manipulating that person's brain. Treat whatever is clouding that person's thinking and responses using technological means, thereby enabling the person to be a whole person. One may wish to call this moral biotherapy, but it is far removed from moral bioenhancement with its theoretical capability of providing a person with a pre-set moral repertoire. This is an abrogation of the responsibility built into those made in the image of God and with God-like attributes.⁵⁴ ●

Notes

- ¹This is an expanded and modified version of a talk given at a Christians in Science residential conference at Cambridge in July 2012, under the title, "Ethical Issues Raised by Cognitive and Moral Bioenhancement."
- ²H. Looy, "Psychology at the Theological Frontiers," *Perspectives on Science and Christian Faith* 65, no. 3 (2013): ???-??.
- ³J. Garreau, *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies – and What It Means to Be Human* (New York: Doubleday, 2005).
- ⁴I. Persson and J. Savulescu, *Unfit for the Future: The Need for Moral Enhancement* (Oxford: Oxford University Press, 2012).
- ⁵A. Huxley, *Brave New World* (1932; reprint, Harmondsworth, UK: Penguin Books, 1958).
- ⁶*Ibid.*, 185.
- ⁷P. Singer and A. Sagan, "Are We Ready for a 'Morality Pill'?" *New York Times*, January 28, 2012, http://opinionator.blogs.nytimes.com/2012/01/28/are-we-ready-for-a-morality-pill/?_r=0, 2.
- ⁸I. Persson and J. Savulescu, "The Perils of Cognitive Enhancement and the Urgent Imperative to Enhance the Moral Character of Humanity," *Journal of Applied Philosophy* 25, no. 3 (2008): 174.
- ⁹D. G. Jones, "Enhancement: Are Ethicists Excessively Influenced by Baseless Speculations?," *Medical Humanities* 32 (2006): 77–81.
- ¹⁰H. Greely, B. Sahakian, J. Harris, R. C. Kessler, M. Gazzaniga, P. Campbell, and M. J. Farah, "Towards Responsible Use of Cognitive-Enhancing Drugs by the Healthy," *Nature* 456 (2008): 702–5.
- ¹¹A. Heinz, A. Beck, S. M. Grüsser, et al., "Identifying the Neural Circuitry of Alcohol Craving and Relapse Vulnerability," *Addiction Biology* 14 (2009): 108–18.
- ¹²B. Sahakian and S. Morein-Zamir, "Professor's Little Helper," *Nature* 450 (2007): 1157–9.
- ¹³M. J. Minzenberg and C. S. Carter, "Modafinil: A Review of Neurochemical Actions and Effects on Cognition," *Neuropsychopharmacology* 33 (2008): 1477–502; B. Vastag, "Poised to Challenge Need for Sleep, 'Wakefulness Enhancer' Rouses Concerns," *Journal of the American Medical Association* 291 (2004): 167–70.
- ¹⁴G. Grön, M. Kirstein, A. Thielscher, M. W. Riepe, and M. Spitzer, "Cholinergic Enhancement of Episodic Memory in Healthy Young Adults," *Psychopharmacology* 182 (2005): 170–9; G. Lynch and C. M. Gall, "Ampakines and the Three-fold Path to Cognitive Enhancement," *Trends in Neuroscience* 29 (2006): 554–62.

- ¹⁵R. K. Pitman, K. M. Sanders, R. M. Zusman, et al., "Pilot Study of Secondary Prevention of Posttraumatic Stress Disorder with Propranolol," *Biological Psychiatry* 51, no. 2 (2002): 189–92.
- ¹⁶The President's Council on Bioethics, *Beyond Therapy: Biotechnology and the Pursuit of Happiness* (Washington, DC: President's Council on Bioethics, 2003).
- ¹⁷Heinz et al., "Identifying the Neural Circuitry of Alcohol Craving and Relapse Vulnerability."
- ¹⁸Ibid.; A. Heinz, R. Kipke, H. Heimann, and U. Wiesing, "Cognitive Neuroenhancement: False Assumptions in the Ethical Debate," *Journal of Medical Ethics* 38 (2012): 372–5.
- ¹⁹R. C. Kadosh, N. Levy, J. O'Shea, N. Shea, and J. Savulescu, "The Neuroethics of Non-invasive Brain Stimulation," *Current Biology* 22 (2012): R1–R4.
- ²⁰C. A. Dockery, R. Hueckel-Weng, N. Birbaumer, and C. Plewnia, "Enhancement of Planning Ability by Transcranial Direct Current Stimulation," *Journal of Neuroscience* 29 (2009): 7271–7.
- ²¹C. J. Stagg and M. A. Nitsche, "Physiological Basis of Transcranial Direct Current Stimulation," *Neuroscientist* 17 (2011): 37–53.
- ²²M. A. Nitsche, L. G. Cohen, E. M. Wassermann, et al., "Transcranial Direct Current Stimulation: State of the Art 2008," *Brain Stimulation* 1 (2008): 206–23; M. A. Nitsche and W. Paulus, "Transcranial Direct Current Stimulation: Update 2011," *Restorative Neurology and Neuroscience* 29 (2011): 463–92; K. S. Utz, V. Dimova, K. Oppenländer, and G. Kerkhoff, "Electrified Minds: Transcranial Direct Current Stimulation (TDCS) and Galvanic Vestibular Stimulation (GVS) as Methods of Non-invasive Brain Stimulation in Neuropsychology – A Review of Current Data and Future Implications," *Neuropsychologia* 48 (2010): 2789–810.
- ²³Kadosh et al., "The Neuroethics of Non-invasive Brain Stimulation."
- ²⁴A. Buchanan, *Better Than Human: The Promise and Perils of Enhancing Ourselves* (Oxford: Oxford University Press, 2011).
- ²⁵D. G. Jones and M. I. Whitaker, "Transforming the Human Body," in *Beyond Human: From Animality to Transhumanism*, ed. C. Blake, C. Molloy, and S. Shakespeare (London: Continuum, 2012), 254–79; D. S. Kern and R. Kumar, "Deep Brain Stimulation," *The Neurologist* 13 (2007): 237–52.
- ²⁶W. Glannon, "Stimulating Brains, Altering Minds," *Journal of Medical Ethics* 35 (2009): 289–92.
- ²⁷J. Kuhn, T. O. Gröndler, D. Lenartz, et al., "Deep Brain Stimulation for Psychiatric Disorders," *Deutsches Ärzteblatt International* 107, no. 7 (2010): 105–13.
- ²⁸V. Voon, C. Kubu, P. Krack, et al., "Deep Brain Stimulation: Neuropsychological and Neuropsychiatric Issues," *Movement Disorders* 21, Suppl. 14 (2006): S305–27.
- ²⁹Jones and Whitaker, "Transforming the Human Body."
- ³⁰J. S. Perlmuter and J. W. Mink, "Deep Brain Stimulation," *Annual Review of Neuroscience* 29 (2006): 229–57; M. Hopkin, "Implant Boosts Activity in Injured Brain," *Nature* 448 (2007): 522.
- ³¹J. Moll, R. de Oliveira-Souza, I. E. Bramati, and J. Grafman, "Functional Networks in Emotional Moral and Nonmoral Social Judgments," *NeuroImage* 16 (2002): 696–703; R. J. Blair, "The Amygdala and Ventromedial Pre-Frontal Cortex in Morality and Psychopathy," *Trends in Cognitive Sciences* 11 (2007): 387–92.
- ³²M. J. Crockett, L. Clark, M. D. Hauser, and T. W. Robbins, "Serotonin Selectively Influences Moral Judgment and Behavior through Effects on Harm Aversion," *Proceedings of the National Academy of Sciences* 107 (2010): 17433–8.
- ³³M. Kosfeld, M. Heinrichs, P. J. Zak, U. Fischbacher, and E. Fehr, "Oxytocin Increases Trust in Humans," *Nature* 435 (2005): 673–6.
- ³⁴Crockett et al., "Serotonin Selectively Influences Moral Judgment and Behavior through Effects on Harm Aversion."
- ³⁵Ibid.; H. Tost and A. Meyer-Lindenberg, "I Fear for You: A Role for Serotonin in Moral Behavior," *Proceedings of the National Academy of Sciences* 107 (2010): 17071–2.
- ³⁶I. Mann, D. A. Brent, and V. Arango, "The Neurobiology and Genetics of Suicide and Attempted Suicide: A Focus on the Serotonergic System," *Neuropsychopharmacology* 24 (2001): 467–77.
- ³⁷J. H. Meyer, S. McMain, S. H. Kennedy, et al., "Dysfunctional Attitudes and 5-HT₂ Receptors during Depression and Self-Harm," *American Journal of Psychiatry* 160 (2003): 90–9.
- ³⁸S. E. Crowell, T. P. Beauchaine, E. McCauley, et al., "Parent-Child Interactions, Peripheral Serotonin, and Self-Inflicted Injury in Adolescents," *Journal of Consulting and Clinical Psychology* 76, no. 1 (2008): 15–21.
- ³⁹Levy quoted in E. Selinger, "When the Morality Pill Becomes a Thoughtless Experiment," *Institute for Ethics and Emerging Technologies* (March 26, 2012), <http://ieet.org/index.php/IEET/print/5514>.
- ⁴⁰Kosfeld et al., "Oxytocin Increases Trust in Humans."
- ⁴¹C. K. W. De Dreu, L. L. Greer, G. A. Van Kleef, et al., "Oxytocin Promotes Human Ethnocentrism," *Proceedings of the National Academy of Sciences* 108 (2011): 1262–6.
- ⁴²I. Persson and J. Savulescu, "Getting Moral Enhancement Right: The Desirability of Moral Bioenhancement," *Bioethics* 27, no. 3 (2013): 124.
- ⁴³Ibid.; J. Savulescu, "Genetic Interventions and the Ethics of Enhancement of Human Beings," in *The Oxford Handbook of Bioethics*, ed. Bonnie Steinbock (Oxford: Oxford University Press, 2007), 517.
- ⁴⁴J. Harris, "Moral Enhancement and Freedom," *Bioethics* 25, no. 2 (2011): 102.
- ⁴⁵J. Savulescu, T. Douglas, and I. Persson, "Autonomy and the Ethics of Behavioral Modification," in *The Future of Bioethics: International Dialogues*, ed. A. Akabayashi (Oxford: Oxford University Press, in press), 91–112.
- ⁴⁶I. Persson and J. Savulescu, *Unfit for the Future: The Need for Moral Enhancement* (Oxford: Oxford University Press, 2012), 106–7.
- ⁴⁷Ibid., 123.
- ⁴⁸Savulescu et al., "Autonomy and the Ethics of Behavioral Modification."
- ⁴⁹Matthew 22:35–40.
- ⁵⁰E. S. Valenstein, *Great and Desperate Cures* (New York: Basic Books, 2010).
- ⁵¹Matthew 6:1–5.
- ⁵²Romans 7:14–25.
- ⁵³Galatians 5:16–26.
- ⁵⁴This paper will appear in modified form as chapter 6 of my book *The Peril and Promise of Medical Technology: Christian Insights*, to be published by Peter Lang.