

Human Genetic Enhancements: A Transhumanist Perspective

NICK BOSTROM

Homepage: www.nickbostrom.com

*Oxford University, Faculty of Philosophy, 10 Merton Street, Oxford, OX1 4JJ, United Kingdom; e-mail: nick@nickbostrom.com
(2003) Journal of Value Inquiry, Vol. 37, No. 4, pp. 493-506.*

1. What is Transhumanism?

Transhumanism is a loosely defined movement that has developed gradually over the past two decades. It promotes an interdisciplinary approach to understanding and evaluating the opportunities for enhancing the human condition and the human organism opened up by the advancement of technology. Attention is given to both present technologies, like genetic engineering and information technology, and anticipated future ones, such as molecular nanotechnology and artificial intelligence.¹

The enhancement options being discussed include radical extension of human health-span, eradication of disease, elimination of unnecessary suffering, and augmentation of human intellectual, physical, and emotional capacities.² Other transhumanist themes include space colonization and the possibility of creating superintelligent machines, along with other potential developments that could profoundly alter the human condition. The ambit is not limited to gadgets and medicine, but encompasses also economic, social, institutional designs, cultural development, and psychological skills and techniques.

Transhumanists view human nature as a work-in-progress, a half-baked beginning that we can learn to remold in desirable ways. Current humanity need not be the endpoint of evolution. Transhumanists hope that by responsible use of science, technology, and other rational means we shall eventually manage to become post-human, beings with vastly greater capacities than present human beings have.

Some transhumanists take active steps to increase the probability that they personally will survive long enough to become post-human, for example by choosing a healthy lifestyle or by making provisions for having themselves

cryonically suspended in case of de-animation.³ In contrast to many other ethical outlooks, which in practice often reflect a reactionary attitude to new technologies, the transhumanist view is guided by an evolving vision to take a more active approach to technology policy. This vision, in broad strokes, is to create the opportunity to live much longer and healthier lives, to enhance our memory and other intellectual faculties, to refine our emotional experiences and increase our subjective sense of well-being, and generally to achieve a greater degree of control over our own lives. This affirmation of human potential is offered as an alternative to customary injunctions against playing God, messing with nature, tampering with our human essence, or displaying punishable hubris.

Transhumanism does not entail technological optimism. While future technological capabilities carry immense potential for beneficial deployments, they also could be misused to cause enormous harm, ranging all the way to the extreme possibility of intelligent life becoming extinct. Other potential negative outcomes include widening social inequalities or a gradual erosion of the hard-to-quantify assets that we care deeply about but tend to neglect in our daily struggle for material gain, such as meaningful human relationships and ecological diversity. Such risks must be taken very seriously, as thoughtful transhumanists fully acknowledge.⁴

Transhumanism has roots in secular humanist thinking, yet is more radical in that it promotes not only traditional means of improving human nature, such as education and cultural refinement, but also direct application of medicine and technology to overcome some of our basic biological limits.

2. A Core Transhumanist Value: Exploring the Post-human Realm

The range of thoughts, feelings, experiences, and activities that are accessible to human organisms presumably constitute only a tiny part of what is possible. There is no reason to think that the human mode of being is any more free of limitations imposed by our biological nature than are the modes of being of other animals. Just as chimpanzees lack the brainpower to understand what it is like to be human, so too do we lack the practical ability to form a realistic intuitive understanding of what it would be like to be post-human.

This point is distinct from any principled claims about impossibility. We need not assert that post-humans would not be Turing computable or that their concepts could not be expressed by any finite sentences in human language. The impossibility is more like the impossibility for us to visualize a twenty-dimensional hypersphere or to read, with perfect recollection and understanding, every book in the Library of Congress. Our own current mode of being, therefore, spans but

a minute subspace of what is possible or permitted by the physical constraints of the universe. It is not farfetched to suppose that there are parts of this larger space that represent extremely valuable ways of living, feeling, and thinking.

We can conceive of aesthetic and contemplative pleasures whose blissfulness vastly exceeds what any human being has yet experienced. We can imagine beings that reach a much greater level of personal development and maturity than current human beings do, because they have the opportunity to live for hundreds or thousands of years with full bodily and psychic vigor. We can conceive of beings that are much smarter than us, that can read books in seconds, that are much more brilliant philosophers than we are, that can create artworks, which, even if we could understand them only on the most superficial level, would strike us as wonderful masterpieces. We can imagine love that is stronger, purer, and more secure than any human being has yet harbored. Our everyday intuitions about values are constrained by the narrowness of our experience and the limitations of our powers of imagination. We should leave room in our thinking for the possibility that as we develop greater capacities, we shall come to discover values that will strike us as being of a far higher order than those we can realize as un-enhanced biological humans beings.

The conjecture that there are greater values than we can currently fathom does not imply that values are not defined in terms of our current dispositions. Take, for example, a dispositional theory of value such as the one described by David Lewis.⁵ According to Lewis's theory, something is a value for you if and only if you would want to want it if you were perfectly acquainted with it and you were thinking and deliberating as clearly as possible about it. On this view, there may be values that we do not currently want, and that we do not even currently want to want, because we may not be perfectly acquainted with them or because we are not ideal deliberators. Some values pertaining to certain forms of post-human existence may well be of this sort; they may be values for us now, and they may be so in virtue of our current dispositions, and yet we may not be able to fully appreciate them with our current limited deliberative capacities and our lack of the receptive faculties required for full acquaintance with them. This point is important because it shows that the transhumanist view that we ought to explore the realm of post-human values does not entail that we should forego our current values. The post-human values can be our current values, albeit ones that we have not yet clearly comprehended. Transhumanism does not require us to say that we should favor post-human beings over human beings, but that the right way of favoring human beings is by enabling us to realize our ideals better and that some of our ideals may well be located outside the space of modes of being that are accessible to us with our current biological constitution.

We can overcome many of our biological limitations. It is possible that there are some limitations that are impossible for us to transcend, not only because of technological difficulties but on metaphysical grounds. Depending on what our views are about what constitutes personal identity, it could be that certain modes of being, while possible, are not possible for us, because any being of such a kind would be so different from us that they could not be us. Concerns of this kind are familiar from theological discussions of the afterlife. In Christian theology, some souls will be allowed by God to go to heaven after their time as corporal creatures is over. Before being admitted to heaven, the souls would undergo a purification process in which they would lose many of their previous bodily attributes. Skeptics may doubt that the resulting minds would be sufficiently similar to our current minds for it to be possible for them to be the same person. A similar predicament arises within transhumanism: if the mode of being of a post-human being is radically different from that of a human being, then we may doubt whether a post-human being could be the same person as a human being, even if the post-human being originated from a human being.

We can, however, envision many enhancements that would not make it impossible for the post-transformation someone to be the same person as the pre-transformation person. A person could obtain considerable increased life expectancy, intelligence, health, memory, and emotional sensitivity, without ceasing to exist in the process. A person's intellectual life can be transformed radically by getting an education. A person's life expectancy can be extended substantially by being unexpectedly cured from a lethal disease. Yet these developments are not viewed as spelling the end of the original person. In particular, it seems that modifications that add to a person's capacities can be more substantial than modifications that subtract, such as brain damage. If most of someone currently is, including her most important memories, activities, and feelings, is preserved, then adding extra capacities on top of that would not easily cause the person to cease to exist.

Preservation of personal identity, especially if this notion is given a narrow construal, is not everything. We can value other things than ourselves, or we might regard it as satisfactory if some parts or aspects of ourselves survive and flourish, even if that entails giving up some parts of ourselves such that we no longer count as being the same person. Which parts of ourselves we might be willing to sacrifice may not become clear until we are more fully acquainted with the full meaning of the options. A careful, incremental exploration of the post-human realm may be indispensable for acquiring such an understanding, although we may also be able to learn from each other's experiences and from works of the imagination. Additionally, we may favor future people being posthuman rather than human, if the posthumans would lead lives more

worthwhile than the alternative humans would. Any reasons stemming from such considerations would not depend on the assumption that we ourselves could become posthuman beings.

Transhumanism promotes the quest to develop further so that we can explore hitherto inaccessible realms of value. Technological enhancement of human organisms is a means that we ought to pursue to this end. There are limits to how much can be achieved by low-tech means such as education, philosophical contemplation, moral self-scrutiny and other such methods proposed by classical philosophers with perfectionist leanings, including Plato, Aristotle, and Nietzsche, or by means of creating a fairer and better society, as envisioned by social reformists such as Marx or Martin Luther King. This is not to denigrate what we can do with the tools we have today. Yet ultimately, transhumanists hope to go further.

3. The Morality of Human Germ-Line Genetic Engineering

Most potential human enhancement technologies have so far received scant attention in the ethics literature. One exception is genetic engineering, the morality of which has been extensively debated in recent years. To illustrate how the transhumanist approach can be applied to particular technologies, we shall therefore now turn to consider the case of human germ-line genetic enhancements.

Certain types of objection against germ-line modifications are not accorded much weight by a transhumanist interlocutor. For instance, objections that are based on the idea that there is something inherently wrong or morally suspect in using science to manipulate human nature are regarded by transhumanists as wrongheaded. Moreover, transhumanists emphasize that particular concerns about negative aspects of genetic enhancements, even when such concerns are legitimate, must be judged against the potentially enormous benefits that could come from genetic technology successfully employed.⁶ For example, many commentators worry about the psychological effects of the use of germ-line engineering. The ability to select the genes of our children and to create so-called designer babies will, it is claimed, corrupt parents, who will come to view their children as mere products.⁷ We will then begin to evaluate our offspring according to standards of quality control, and this will undermine the ethical ideal of unconditional acceptance of children, no matter what their abilities and traits. Are we really prepared to sacrifice on the altar of consumerism even those deep values that are embodied in traditional relationships between child and parents? Is the quest for perfection worth this cultural and moral cost? A transhumanist should not dismiss such concerns as irrelevant. Transhumanists recognize that the depicted

outcome would be bad. We do not want parents to love and respect their children less. We do not want social prejudice against people with disabilities to get worse. The psychological and cultural effects of commodifying human nature are potentially important.

But such dystopian scenarios are speculations. There is no firm ground for believing that the alleged consequences would actually happen. What relevant evidence we have, for instance regarding the treatment of children who have been conceived through the use of in vitro fertilization or embryo screening, suggests that the pessimistic prognosis is alarmist. Parents will in fact love and respect their children even when artificial means and conscious choice play a part in procreation.

We might speculate, instead, that germ-line enhancements will lead to more love and parental dedication. Some mothers and fathers might find it easier to love a child who, thanks to enhancements, is bright, beautiful, healthy, and happy. The practice of germ-line enhancement might lead to better treatment of people with disabilities, because a general demystification of the genetic contributions to human traits could make it clearer that people with disabilities are not to blame for their disabilities and a decreased incidence of some disabilities could lead to more assistance being available for the remaining affected people to enable them to live full, unrestricted lives through various technological and social supports. Speculating about possible psychological or cultural effects of germ-line engineering can therefore cut both ways. Good consequences no less than bad ones are possible. In the absence of sound arguments for the view that the negative consequences would predominate, such speculations provide no reason against moving forward with the technology.

Ruminations over hypothetical side-effects may serve to make us aware of things that could go wrong so that we can be on the lookout for untoward developments. By being aware of the perils in advance, we will be in a better position to take preventive countermeasures. For instance, if we think that some people would fail to realize that a human clone would be a unique person deserving just as much respect and dignity as any other human being, we could work harder to educate the public on the inadequacy of genetic determinism. The theoretical contributions of well-informed and reasonable critics of germ-line enhancement could indirectly add to our justification for proceeding with germ-line engineering. To the extent that the critics have done their job, they can alert us to many of the potential untoward consequences of germ-line engineering and contribute to our ability to take precautions, thus improving the odds that the balance of effects will be positive. There may well be some negative consequences of human germ-line engineering that we will not forestall, though of course the mere existence of negative effects is not a decisive reason not to proceed. Every major technology has

some negative consequences. Only after a fair comparison of the risks with the likely positive consequences can any conclusion based on a cost-benefit analysis be reached.

In the case of germ-line enhancements, the potential gains are enormous. Only rarely, however, are the potential gains discussed, perhaps because they are too obvious to be of much theoretical interest. By contrast, uncovering subtle and non-trivial ways in which manipulating our genome could undermine deep values is philosophically a lot more challenging. But if we think about it, we recognize that the promise of genetic enhancements is anything but insignificant. Being free from severe genetic diseases would be good, as would having a mind that can learn more quickly, or having a more robust immune system. Healthier, wittier, happier people may be able to reach new levels culturally. To achieve a significant enhancement of human capacities would be to embark on the transhuman journey of exploration of some of the modes of being that are not accessible to us as we are currently constituted, possibly to discover and to instantiate important new values. On an even more basic level, genetic engineering holds great potential for alleviating unnecessary human suffering. Every day that the introduction of effective human genetic enhancement is delayed is a day of lost individual and cultural potential, and a day of torment for many unfortunate sufferers of diseases that could have been prevented. Seen in this light, proponents of a ban or a moratorium on human genetic modification must take on a heavy burden of proof in order to have the balance of reason tilt in their favor. Transhumanists conclude that the challenge has not been met.

4. Should Human Reproduction be Regulated?

One way of going forward with genetic engineering is to permit everything, leaving all choices to parents. While this attitude may be consistent with transhumanism, it is not the best transhumanist approach. One thing that can be said for adopting a libertarian stance in regard to human reproduction is the sorry track record of socially planned attempts to improve the human gene pool. The list of historical examples of state intervention in this domain ranges from the genocidal horrors of the Nazi regime, to the incomparably milder but still disgraceful semi-coercive sterilization programs of mentally impaired individuals favored by many well-meaning socialists in the past century, to the controversial but perhaps understandable program of the current Chinese government to limit population growth. In each case, state policies interfered with the reproductive choices of individuals. If parents had been left to make the choices for themselves, the worst transgressions of the eugenics movement would not have occurred. Bearing this in mind, we ought to think twice before giving our support to any proposal that would have the state

regulate what sort of children people are allowed to have and the methods that may be used to conceive them.⁸

We currently permit governments to have a role in reproduction and child-rearing and we may reason by extension that there would likewise be a role in regulating the application of genetic reproductive technology. State agencies and regulators play a supportive and supervisory role, attempting to promote the interests of the child. Courts intervene in cases of child abuse or neglect. Some social policies are in place to support children from disadvantaged backgrounds and to ameliorate some of the worst inequities suffered by children from poor homes, such as through the provision of free schooling. These measures have analogues that apply to genetic enhancement technologies. For example, we ought to outlaw genetic modifications that are intended to damage the child or limit its opportunities in life, or that are judged to be too risky. If there are basic enhancements that would be beneficial for a child but that some parents cannot afford, then we should consider subsidizing those enhancements, just as we do with basic education. There are grounds for thinking that the libertarian approach is less appropriate in the realm of reproduction than it is in other areas. In reproduction, the most important interests at stake are those of the child-to-be, who cannot give his or her advance consent or freely enter into any form of contract. As it is, we currently approve of many measures that limit parental freedoms. We have laws against child abuse and child neglect. We have obligatory schooling. In some cases, we can force needed medical treatment on a child, even against the wishes of its parents.

There is a difference between these social interventions with regard to children and interventions aimed at genetic enhancements. While there is a consensus that nobody should be subjected to child abuse and that all children should have at least a basic education and should receive necessary medical care, it is unlikely that we will reach an agreement on proposals for genetic enhancements any time soon. Many parents will resist such proposals on principled grounds, including deep-seated religious or moral convictions. The best policy for the foreseeable future may therefore be to not legally require any genetic enhancements, except perhaps in extreme cases for which there is no alternative treatment. Even in such cases, it is dubious that the social climate in many countries is ready for mandatory genetic interventions.

The scope for ethics and public policy, however, extend far beyond the passing of laws requiring or banning specific interventions. Even if a given enhancement option is neither outlawed nor legally required, we may still seek to discourage or encourage its use in a variety of ways. Through subsidies and taxes, research-funding policies, genetic counseling practices and guidelines, laws regulating genetic information

and genetic discrimination, provision of health care services, regulation of the insurance industry, patent law, education, and through the allocation of social approbation and disapproval, we may influence the direction in which particular technologies are applied. We may appropriately ask, with regard to genetic enhancement technologies, which types of applications we ought to promote or discourage.

5. Which Modifications Should Be Promoted and which Discouraged?

An externality, as understood by economists, is a cost or a benefit of an action that is not carried by a decision-maker. An example of a negative externality might be found in a firm that lowers its production costs by polluting the environment. The firm enjoys most of the benefits while escaping the costs, such as environmental degradation, which may instead paid by people living nearby. Externalities can also be positive, as when people put time and effort into creating a beautiful garden outside their house. The effects are enjoyed not exclusively by the gardeners but spill over to passersby. As a rule of thumb, sound social policy and social norms would have us internalize many externalities so that the incentives of producers more closely match the social value of production. We may levy a pollution tax on the polluting firm, for instance, and give our praise to the home gardeners who beautify the neighborhood.

Genetic enhancements aimed at the obtainment of goods that are desirable only in so far as they provide a competitive advantage tend to have negative externalities. An example of such a positional good, as economists call them, is stature. There is evidence that being tall is statistically advantageous, at least for men in Western societies. Taller men earn more money, wield greater social influence, and are viewed as more sexually attractive. Parents wanting to give their child the best possible start in life may rationally choose a genetic enhancement that adds an inch or two to the expected length of their offspring. Yet for society as a whole, there seems to be no advantage whatsoever in people being taller. If everybody grew two inches, nobody would be better off than they were before. Money spent on a positional good like length has little or no net effect on social welfare and is therefore, from society's point of view, wasted.

Health is a very different type of good. It has intrinsic benefits. If we become healthier, we are personally better off and others are not any worse off. There may even be a positive externality of enhancing our own health. If we are less likely to contract a contagious disease, others benefit by being less likely to get infected by us. Being healthier, you may also contribute more to society and consume less of publicly funded healthcare.

If we were living in a simple world where people were perfectly rational self-interested economic agents and where

social policies had no costs or unintended effects, then the basic policy prescription regarding genetic enhancements would be relatively straightforward. We should internalize the externalities of genetic enhancements by taxing enhancements that have negative externalities and subsidizing enhancements that have positive externalities. Unfortunately, crafting policies that work well in practice is considerably more difficult. Even determining the net size of the externalities of a particular genetic enhancement can be difficult. There is clearly an intrinsic value to enhancing memory or intelligence in as much as most of us would like to be a bit smarter, even if that did not have the slightest effect on our standing in relation to others. But there would also be important externalities, both positive and negative. On the negative side, others would suffer some disadvantage from our increased brainpower in that their own competitive situation would be worsened. Being more intelligent, we would be more likely to attain high-status positions in society, positions that would otherwise have been enjoyed by a competitor. On the positive side, others might benefit from enjoying witty conversations with us and from our increased taxes.

If in the case of intelligence enhancement the positive externalities outweigh the negative ones, then a *prima facie* case exists not only for permitting genetic enhancements aimed at increasing intellectual ability, but for encouraging and subsidizing them too. Whether such policies remain a good idea when all practicalities of implementation and political realities are taken into account is another matter. But at least we can conclude that an enhancement that has both significant intrinsic benefits for an enhanced individual and net positive externalities for the rest of society should be encouraged. By contrast, enhancements that confer only positional advantages, such as augmentation of stature or physical attractiveness, should not be socially encouraged, and we might even attempt to make a case for social policies aimed at reducing expenditure on such goods, for instance through a progressive tax on consumption.⁹

6. The Issue of Equality

One important kind of externality in germ-line enhancements is their effects on social equality. This has been a focus for many opponents of germ-line genetic engineering who worry that it will widen the gap between haves and have-nots. Today, children from wealthy homes enjoy many environmental privileges, including access to better schools and social networks. Arguably, this constitutes an inequity against children from poor homes. We can imagine scenarios where such inequities grow much larger thanks to genetic interventions that only the rich can afford, adding genetic advantages to the environmental advantages already benefiting privileged children. We could even speculate about the members of the privileged stratum of society eventually

enhancing themselves and their offspring to a point where the human species, for many practical purposes, splits into two or more species that have little in common except a shared evolutionary history.¹⁰ The genetically privileged might become ageless, healthy, super-geniuses of flawless physical beauty, who are graced with a sparkling wit and a disarmingly self-deprecating sense of humor, radiating warmth, empathetic charm, and relaxed confidence. The non-privileged would remain as people are today but perhaps deprived of some their self-respect and suffering occasional bouts of envy. The mobility between the lower and the upper classes might disappear, and a child born to poor parents, lacking genetic enhancements, might find it impossible to successfully compete against the super-children of the rich. Even if no discrimination or exploitation of the lower class occurred, there is still something disturbing about the prospect of a society with such extreme inequalities.

While we have vast inequalities today and regard many of these as unfair, we also accept a wide range of inequalities because we think that they are deserved, have social benefits, or are unavoidable concomitants to free individuals making their own and sometimes foolish choices about how to live their lives. Some of these justifications can also be used to exonerate some inequalities that could result from germ-line engineering. Moreover, the increase in unjust inequalities due to technology is not a sufficient reason for discouraging the development and use of the technology. We must also consider its benefits, which include not only positive externalities but also intrinsic values that reside in such goods as the enjoyment of health, a soaring mind, and emotional well-being.

We can also try to counteract some of the inequality-increasing tendencies of enhancement technology with social policies. One way of doing so would be by widening access to the technology by subsidizing it or providing it for free to children of poor parents. In cases where the enhancement has considerable positive externalities, such a policy may actually benefit everybody, not just the recipients of the subsidy. In other cases, we could support the policy on the basis of social justice and solidarity.

Even if all genetic enhancements were made available to everybody for free, however, this might still not completely allay the concern about inequity. Some parents might choose not to give their children any enhancements. The children would then have diminished opportunities through no fault of their own. It would be peculiar, however, to argue that governments should respond to this problem by limiting the reproductive freedom of the parents who wish to use genetic enhancements. If we are willing to limit reproductive freedom through legislation for the sake of reducing inequities, then we might as well make some enhancements obligatory for all children. By requiring genetic enhancements for everybody to

the same degree, we would not only prevent an increase in inequalities but also reap the intrinsic benefits and the positive externalities that would come from the universal application of enhancement technology. If reproductive freedom is regarded as too precious to be curtailed, then neither requiring nor banning the use of reproductive enhancement technology is an available option. In that case, we would either have to tolerate inequities as a price worth paying for reproductive freedom or seek to remedy the inequities in ways that do not infringe on reproductive freedom.

All of this is based on the hypothesis that germ-line engineering would in fact increase inequalities if left unregulated and no countermeasures were taken. That hypothesis might be false. In particular, it might turn out to be technologically easier to cure gross genetic defects than to enhance an already healthy genetic constitution. We currently know much more about many specific inheritable diseases, some of which are due to single gene defects, than we do about the genetic basis of talents and desirable qualities such as intelligence and longevity, which in all likelihood are encoded in complex constellations of multiple genes. If this turns out to be the case, then the trajectory of human genetic enhancement may be one in which the first thing to happen is that the lot of the genetically worst-off is radically improved, through the elimination of diseases such as Tay Sachs, Lesch-Nyhan, Downs Syndrome, and early-onset Alzheimer's disease. This would have a major leveling effect on inequalities, not primarily in the monetary sense, but with respect to the even more fundamental parameters of basic opportunities and quality of life.

7. Are Germ-Line Interventions Wrong Because They Are Irreversible?

Another frequently heard objection against germ-line genetic engineering is that it would be uniquely hazardous because the changes it would bring are irreversible and would affect all generations to come. It would be highly irresponsible and arrogant of us to presume we have the wisdom to make decisions about what should be the genetic constitutions of people living many generations hence. Human fallibility, on this objection, gives us good reason not to embark on germ-line interventions. For our present purposes, we can set aside the issue of the safety of the procedure, understood narrowly, and stipulate that the risk of medical side-effects has been reduced to an acceptable level. The objection under consideration concerns the irreversibility of germ-line interventions and the lack of predictability of its long-term consequences; it forces us to ask if we possess the requisite wisdom for making genetic choices on behalf of future generations.

Human fallibility is not a conclusive ground for resisting germ-line genetic enhancements. The claim that such interventions would be irreversible is incorrect. Germ-line interventions can be reversed by other germ-line interventions. Moreover, considering that technological progress in genetics is unlikely to grind to an abrupt halt any time soon, we can count on future generations being able to reverse our current germ-line interventions even more easily than we can currently implement them. With advanced genetic technology, it might even be possible to reverse many germ-line modifications with somatic gene therapy, or with medical nanotechnology.¹¹ Technologically, germ-line changes are perfectly reversible by future generations.

It is possible that future generations might choose to retain the modifications that we make. If that turns out to be the case, then the modifications, while not irreversible, would nevertheless not actually be reversed. This might be a good thing. The possibility of permanent consequences is not an objection against germ-line interventions any more than it is against social reforms. The abolition of slavery and the introduction of general suffrage might never be reversed; indeed, we hope they will not be. Yet this is no reason for people to have resisted the reforms. Likewise, the potential for everlasting consequences, including ones we cannot currently reliably forecast, in itself constitutes no reason to oppose genetic intervention. If immunity against horrible diseases and enhancements that expand the opportunities for human growth are passed on to subsequent generations *in perpetuo*, it would be a cause for celebration, not regret.

There are some kinds of changes that we need be particularly careful about. They include modifications of the drives and motivations of our descendants. For example, there are obvious reasons why we might think it worthwhile to seek to reduce our children's propensity to violence and aggression. We would have to take care, however, that we do not do this in a way that would make future people overly submissive or complacent. We can conceive of a dystopian scenario along the lines of *Brave New World*, in which people are leading shallow lives but have been manipulated to be perfectly content with their sub-optimal existence. If the people transferred their shallow values to their children, humanity could get permanently stuck in a not-very-good state, having foolishly changed itself to lack any desire to strive for something better. This outcome would be dystopian because a permanent cap on human development would destroy the transhumanist hope of exploring the post-human realm. Transhumanists therefore place an emphasis on modifications which, in addition to promoting human well-being, also open more possibilities than they close and which increase our ability to make subsequent choices wisely. Longer active lifespans, better memory, and greater intellectual capacities are plausible candidates for enhancements that would improve our

ability to figure out what we ought to do next. They would be a good place to start.¹²

Notes

1. See Eric K. Drexler, *Nanosystems: Molecular Machinery, Manufacturing, and Computation* (New York: John Wiley & Sons, Inc., 1992); Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking, 1999); Hans Moravec, *Robot: Mere Machine to Transcendent Mind*. (New York: Oxford University Press, 1999).
2. See Robert A. Freitas Jr., *Nanomedicine, Volume 1: Basic Capabilities* (Georgetown, Tex.: Landes Bioscience, 1999).
3. See Robert Ettinger, *The Prospect of Immortality* (New York: Doubleday, 1964); James Hughes, "The Future of Death: Cryonics and the Telos of Liberal Individualism," *Journal of Evolution and Technology* 6 (2001).
4. See Eric K. Drexler, *Engines of Creation: The Coming Era of Nanotechnology* (London: Fourth Estate, 1985).
5. See David Lewis, "Dispositional Theories of Value," *Proceedings of the Aristotelian Society Supp.* 63 (1989).
6. See Erik Parens, ed., *Enhancing Human Traits: Ethical and Social Implications*. (Washington, D. C: Georgetown University Press, 1998).
7. See Leon Kass, *Life, Liberty, and Defense of Dignity: The Challenge for Bioethics* (San Francisco: Encounter Books, 2002).
8. See Jonathan Glover, *What Sort of People Should There Be?* (New York: Penguin, 1984); Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (New York, Houghton Mifflin, 2002); and Allen Buchanan et al., *From Chance to Choice: Genetics & Justice* (Cambridge, England: Cambridge University Press, 2002).
9. See Robert H. Frank, *Luxury Fever: Why Money Fails to Satisfy in an Era of Excess* (New York: Free Press, 1999).
10. Cf. Lee M. Silver, *Remaking Eden: How Genetic Engineering and Cloning will Transform the American Family* (New York: Avon Books, 1997); and Nancy Kress, *Beggars in Spain* (Avon Books, 1993).
11. See Freitas, op. cit.
12. For their helpful comments I am grateful to Heather Bradshaw, Robert A. Freitas Jr., James Hughes, Gerald Lang, Matthew Liao, Thomas Magnell, David Rodin, Jeffrey Soreff,

Mike Treder, Mark Walker, Michael Weingarten, and an
anonymous referee of the *Journal of Value Inquiry*.