THE NEW ATLANTIS
A JOURNAL OF TECHNOLOGY & SOCIETY

Symposium II

The Case for Enhancing People

Ronald Bailey

Does the enhancement of human physical and intellectual capacities undermine virtue?

In answering this question, we must first make a distinction between therapy and enhancement. Therapeutic technologies are meant to restore impaired or degraded human capacities to some more normal level. By contrast, any enhancements would alter human functioning beyond the normal.

We must also keep in mind that, whatever we think about them, enhancements are going to happen. Age-retardation or even age-reversal are prime targets for research, but other techniques aimed at preventing disease and boosting memory, intelligence, and physical strength will also be developed.

Much worried attention is focused particularly on the possibility of achieving these and other enhancements through genetic engineering; that will indeed one day happen. But the fastest advances in enhancement will occur using pharmaceutical and biomedical interventions to modulate and direct the activity of existing genes in the bodies of people who are already alive. These will happen alongside the development of human-machine interfaces that will extend and boost human capacities.

Contrary to oft-expressed concerns, we will find, first, that enhancements will better enable people to flourish; second, that enhancements will not dissolve whatever existential worries people have; third, that enhancements will enable people to become more virtuous; fourth, that people who don't want enhancement for themselves should allow those of us who do to go forward without hindrance; fifth, that concerns over an "enhancement divide" are largely illusory; and sixth, that we already have at hand the social "technology," in the form of protective social and political institutions, that will enable the enhanced and the unenhanced to dwell together in peace.

***Ronald Bailey**, the science correspondent for* Reason *magazine, is the author of* Liberation Biology: The Moral and Scientific Case for the Biotech Revolution *(Prometheus, 2005).*

Strengthening Virtue

What is an enhancement? A good definition is offered by Sarah Chan and John Harris in a 2007 article in the journal *Studies in Ethics, Law, and Technology*: an enhancement is "a procedure that improves our functioning: any intervention which increases our general capabilities for human flourishing." People will choose enhancements that they believe are likely to help them or their children to flourish. Of course, their knowledge of a benefit will be likely rather than certain because people choosing enhancements will recognize that there is always the risk that they are wrong about the benefit, or that the attempt at enhancement will go awry, such as with a treatment failure. After all, most medical and technological advances are riskier in their early stages.

Just as Dante found it easier to conjure the pains of Hell than to evoke the joys of Heaven, so too do bioethicists find it easier to concoct the possible perils of a biotech-nanotech-infotech future than to appreciate how enhancements will contribute to flourishing lives. One of the chief goals of this symposium is to think about the indispensable role that virtue plays in human life. The chief motivating concern seems to be the fear that biotechnologies and other human enhancement technologies will somehow undermine human virtue. As we will see, far from undermining virtue, biotech, nanotech, and infotech enhancements will tend to support virtue; that is, they will help enable people to be actually good.

Peter Lawler, in *Stuck With Virtue* (2005), agrees that "the unprecedented health, longevity, and other indispensable means for human flourishing will deserve our gratitude." So far, so good. Then he goes on to claim, "But the victories that will be won [over nature]—like most of the victories won on behalf of the modern individual—will also probably be, in part, at the expense of the distinctively human goods: love, family, friends, country, virtue, art, spiritual life, and, most generally, living responsibly in light of what we really know about what we have been given." In fact, according to Lawler, we don't have to wait for future enhancements; modern technology is already making people less virtuous: as he has argued in the pages of this journal, "one of the downsides of living in an increasingly high-tech society is that both virtue and opportunities to act virtuously seem to be in short supply" ["Restless Souls," Winter 2004].

Really? Thanks to modern technology, sanitation, better nutrition, and medical care, Americans are living much longer and healthier lives than people did just a century ago. Do longer lives mean that people today are less virtuous? Or, inversely, does this mean that when people

lived shorter lives they were *more* virtuous? Harvard political philosopher Michael Sandel offered a tart and persuasive response to suggestions that enhancing life spans might result in a less virtuous world:

> Are the background conditions in human self-understandings for the virtues just about right now at 78 years of the average life span, or such that they would be eroded and diminished if we extend it to 120 or 150, or 180? . . . Is it the suggestion that back when it was 48, rather than 78, a century ago . . . that the virtues we prize were on greater display or more available to us? And if so, would that be reason to aim for, or at least to wish for or long for, a shorter life span, rather than a longer one?

Sandel also wondered if people were more heroic when they could expect to live only to 48. If so, should we cut life expectancy from 78 in order to nurture the heroic virtues? For that matter, if an average life span of 48 produced people who were more committed and engaged than does an average life span of 78, is even that change in virtue desirable? After all, heightened engagement and commitment can easily become fanaticism and dogmatism.

Further, on what grounds do Lawler and others suggest that smarter, stronger, healthier, longer-lived people will care less about human goods like friendship, art, and the pursuit of virtue? As Elizabeth Fenton argued in a 2008 article in the journal *Bioethics*, "none of these capabilities (bodily health, imagination, emotion, practical reason, friendship, etc.) are in fact threatened by, for example, enhanced intelligence or athleticism." Being stronger, healthier, and smarter would more likely aid a person in his pursuit of virtue and moral excellence. And the unspoken implication that the state should somehow aim at inculcating collective virtue is incoherent: the pursuit of virtue is what *individuals* do.

The Dangers of Immortality?

Age-retardation technologies are the "killer app" (so to speak) of enhancements—so deeply and self-evidently appealing that they would seem to sell the whole project of enhancement on their own. Nonetheless, there are those who oppose them. For example, Leon Kass, the former chairman of the President's Council on Bioethics (PCBE) under President Bush, has asserted, "the finitude of human life is a blessing for every individual, whether he knows it or not." And Daniel Callahan, co-founder of the Hastings Center, has declared, "There is no known social good coming from the conquest of death." Callahan added, "The worst possible way

to resolve [the question of life extension] is to leave it up to individual choice." When asked if the government has a right to tell its citizens that they have to die, Johns Hopkins University political scientist Francis Fukuyama answered, "Absolutely."

The PCBE's 2003 report *Beyond Therapy* raised concerns that a society of people with "ageless bodies" might have significant downsides. Much longer lives would weaken our "commitment and engagement," the Council fretted: Today, we live with the knowledge that we will soon die, and thus "aspire to *spend* our lives in the ways we deem most important and vital"; but this "aspiration and urgency" might flag because we would ask, "Why not leave for tomorrow what you might do today, if there are endless tomorrows before you?" Further, our "attitudes toward death and mortality" might shift dramatically because "an individual committed to the technological struggle against aging and decline would be less prepared for…death, and the least willing to acknowledge its inevitability." Finally, age-retardation might undermine "the meaning of the life cycle" so that we would not be able "to make sense of what time, age, and change should mean to us." The Council does admit that as "powerful as some of these concerns are, however, from the point of view of the individual considered in isolation, the advantages of age-retardation may well be deemed to outweigh the dangers." Indeed.

But what about the consequences of longer human life spans to society as a whole? *Beyond Therapy* highlights three areas of societal concern. Significant age-retardation would disrupt the succession of "generations and families." This succession "could be obstructed by a glut of the able," the report suggests, since cohorts of healthy geezers would have no intention of shuffling off this mortal coil to be replaced by younger people. Longer lives could also slow down "innovation, change, and renewal" since "innovation…is…often the function of a new generation of leaders." Finally, even if we are not aging individually, we will need to worry about "the aging of society" that would then result. Societies composed of people whose bodies do not age significantly might "experience their own sort of senescence—a hardening of the vital social pathways."

Let us address each of these concerns in turn. First, we must deal with the notion of a nursing-home world. The point of anti-aging research is not to make people older longer, but to make them younger longer. So what about the concerns raised by the PCBE? Political scientist Diana Schaub, who also served on the Council, has made similar points. For instance, in an article in *Cato Unbound*, she asked, if people lived for a thousand years, "how would human relations be affected? How would monogamy fare?… Would there be enough psychic energy for ever-renewed love?"

As we age today, our declining psychic energy correlates pretty well with our declining physical energy. Who is to say, then, that with renewed physical energy we would not have more psychic energy as well? Actually, a pressing current question is: why has monogamy already begun to fall apart in developed societies? The rise in life expectancy over the last century may have had a bit to do with it; but surely the advent of truly effective contraception and the entrance of women fully into the paid workforce are far more significant factors. Marriage based on romantic love is a relatively modern notion, after all. As some commentators have noted, marriage before the twentieth century was not often based on romantic love, but could well be described as an alliance in which a man and woman stood together back to back fending off attacks on their family. As the modern world became less economically and socially threatening, marriage partners began to turn toward each other seeking more emotional support and often found it lacking.

Schaub next asks, "What would the tally of disappointments, betrayals, and losses be over a millennium?" Try turning that question around: what would the tally of satisfactions, affections, and triumphs be over a millennium? Modern material and intellectual abundance has already offered many of us a way out of the lives of quiet desperation suffered by our impoverished ancestors. The twenty-first century will provide an ever-increasing menu of life plans and choices. Surely, exhausting the coming possibilities for intellectual, artistic, and even spiritual growth will take more time than a typical life span today.

Schaub also queries, "Would we love other people more or less than at present? Would we be better partners, parents, friends, and neighbors?" She does not offer any evidence that shorter-lived people in past centuries and societies loved more deeply or were better neighbors, friends, and parents. But as Steven Pinker has argued in *The New Republic*, it is very suggestive that as life expectancies increased over the past century, levels of domestic and international violence also declined: "When pain and early death are everyday features of one's own life, one feels fewer compunctions about inflicting them on others. As technology and economic efficiency lengthen and improve our lives, we place a higher value on life in general." More simply, perhaps empathy has more of an opportunity to flourish when we are not constantly in danger of our lives.

"What would it be like to experience the continued vitality of the body in conjunction with the aging of the spirit?" continues Schaub. She initially suggests that longer, healthier lives might happily unite the vitality of youth with the wisdom of maturity. But she then worries that, instead,

longer lives would combine the "characteristic vices of age with the strength of will to impose them on others." What is meant by the phrase "aging of the spirit," and just what are the "characteristic vices of age" that trouble her? Which of the traditional vices—gluttony, anger, greed, envy, pride, lust, indifference, melancholy—does she expect will increase among hale near-immortals? As Georges Minois notes in his *History of Old Age*, avarice is among the vices of old age most commonly depicted in classical literature. Roman playwright Terence wrote, "A vice common to all mankind is that of being too keen after money when we are old." In Gulliver's Travels, Jonathan Swift warned, "avarice is the necessary consequence of old age." Swift was describing the immortal, but not ageless, people known as the Struldbrugs. There is little reason to doubt that material comfort and security grow in importance as physical vitality ebbs and mental acuity withers. But perpetually vital oldsters would have no need for such security, because they could count on having the mental and physical powers necessary to pursue new goals and possibilities. No failures would be permanent; they would instead become learning experiences.

In addition to these concerns, Schaub suggests that "a nation of ageless individuals could well produce a sclerotic society, petrified in its ways and views." Daniel Callahan makes a similar argument in a debate with life-extension advocate Gregory Stock, in which he claims, "I doubt that if you give most people longer lives, even in better health, they are going to find new opportunities and make new initiatives." Stock goes so far as to help his interlocutor with the hoary example of brain-dead old professors blocking the progress of vibrant young researchers by holding onto tenure. But that seems more of a problem for medieval institutional holdovers like universities than for modern social institutions like corporations. Assuming it turns out that even with healthy long-lived oldsters there is still an advantage in turnover in top management, then institutions that adopt that model will thrive and those that do not will be out-competed. Besides, even today youngsters don't simply wait around for their elders to die. They go out and found their own companies and other institutions. Bill Gates didn't wait to take over IBM; he launched Microsoft at age 19. Scott Harrison started a nonprofit to supply clean drinking water to poor people in developing countries at age 31. Larry Page and Sergey Brin were both 25 when they founded Google. Nor did human genome sequencer Craig Venter loiter about until the top slot at the National Institutes of Health opened up. In politics, we already solve the problem of entrenched oldsters by term-limiting the presidency, as well as many state and local offices.

In fact, the available evidence cuts against concerns about "a hardening of the vital social pathways." Social and technological innovation has been most rapid in those societies with the highest average life expectancies. Yale economist William D. Nordhaus estimates that increases in longevity in the West account for 40 percent of the growth in gross national product for the period 1975-1995. Why? Not only do people work longer, but they work smarter—long lives allow for the accumulation of human capital. Economists Kevin M. Murphy and Robert H. Topel have analyzed how much human capital was gained by overcoming the vagaries of nature, to the tune of $1.2 million in value per person over the course of the twentieth century, during which time life expectancy at birth for a representative American increased by roughly thirty years. In 1900, they note, "nearly 18 percent of males born in the United States died before their first birthday: today, cumulative mortality does not reach 18 percent until age 62." The economic and social dynamism of societies that already enjoy longer average life expectancies (such as ours) also cuts against fears that "urgency" and "engagement" might flag with increased life spans.

Schaub further conjures the possibility of near-immortal dictators—Stalin and Hitler, alive forever. The implied argument that everyone must continue to die before age 100 to avoid the possibility of thousand-year tyrants is not persuasive. Must we really surrender to the tyranny of aging and death in order to prevent human despotism? Wouldn't a better strategy be to focus on preventing the emergence of tyrants, either of the short- or long-lived variety?

Like the PCBE, Schaub also worries about decreased fertility—that healthy oldsters would be less interested in reproducing. The facts seem to support this view: already, countries with the highest life expectancies have the lowest levels of fertility. In a recent study published in the journal *Human Nature*, University of Connecticut anthropologists Nicola L. Bulled and Richard Sosis reported that total fertility rates (the number of children a woman will have over the course of her lifetime) drop by half in reaching a life expectancy threshold of 60. For example, they found that women who live in countries where life expectancy is below 50 years bear an average of 5.5 children. When life expectancy is between 50 and 60, they bear an average of 4.8 children. The big drop occurs when they can expect to live between 60 and 70 years, in which case women have about 2.5 children on average.

But so what? A lack of interest in progeny could have the happy side effect of addressing the possibility that radically increased human life spans might lead to overpopulation. On the other hand, it might turn out

that bearing and rearing children would eventually interest long-lived oldsters who would come to feel that they had the time and the resources to do it right. Since assisted reproductive techniques will extend procreation over many decades, perhaps centuries, people who can look forward to living and working for hundreds of years will be able to delay and stretch out the period in which they can choose to become parents.

And again, what about love? Do people today love their children, their spouses, and their friends less than shorter-lived people did a century ago? Were our forebears who lived thirty fewer years on average more committed to their children than are twenty-first-century American parents? Do people today love their children less than nineteenth-century Americans did because, as Michael Haines of Colgate University reports, instead of having a one-in-five chance of dying in their first year of life, most American kids now face a roughly one-in-200 chance?

Then there is the allegedly special case of "manufactured children." Along with many other opponents of enhancement technologies, Peter Lawler darkly speculates in *Stuck With Virtue* that enhanced children will be less loved than those produced the old-fashioned way: "A world in which children are manufactured and sex and procreation are totally disconnected would surely be one without much love, one where one manufactured being would have little natural or real connection to other manufactured beings."

But Lawler and his *confrères* need not speculate on what happens to parental love in such cases, for we have actual data. As physician Sally Satel notes in the journal *Policy Review*, "For all the deference that conservative bioethics pays to the implicit wisdom of the ages, it rarely mines the recent past for lessons. Instead of concentrating on the ancients, why not also study the history of in vitro fertilization, paid egg donation, and surrogate motherhood to learn about cultural resistance and adaptation to such practices?" Indeed. Fears about waning parental love and loosening generational ties were expressed by many bioethicists when in vitro fertilization began to be used in the 1970s and 1980s. Forty years later, the evidence is that their worries were overblown. A recent study in the journal *Human Reproduction* finds that IVF children and their parents are as well-adjusted as those born in the conventional way. There are no good reasons to doubt that this will not be the case for enhanced children in the future as well. As Harvard philosopher Frances Kamm argues in an essay in the 2009 collection *Human Enhancement*:

> not accepting whatever characteristics nature will bring but altering them ex-ante does not show lack of love.... This is because no

> conscious being yet exists who has to work hard to achieve new traits or suffer fears of rejection at the idea that they should be changed. Importantly, it is rational and acceptable to seek good characteristics in a new person, even though we know that when the child comes to be and we love him or her, many of these characteristics may come and go and we will continue to love the particular person.

In fact, so many infertile people have wanted to have children to love that more than 4 million have been brought into the world using various reproductive technologies since the birth of the first test-tube baby back in 1978.

What about the PCBE's fears that age-retardation technologies would undermine "the meaning of the life cycle" so that we would not be able "to make sense of what time, age, and change should mean to us"? Left-leaning environmental writer Bill McKibben has also expressed this concern. "Without mortality, no *time*," he writes in *Enough: Staying Human in an Engineered Age* (2003). "All moments would be equal; the deep, sad, human wisdom of Ecclesiastes would vanish. If for everything there is an endless season, then there is also no right season.... The future stretches before you, endlessly flat." But that deep, sad wisdom of Ecclesiastes is a powerful human response of existential dread to the oblivion that stretches endlessly before the dead: "For the living know that they shall die: but the dead know not any thing, neither have they any more a reward; for the memory of them is forgotten. Also their love, and their hatred, and their envy, is now perished; neither have they any more a portion for ever in any thing that is done under the sun" (Ecclesiastes 9:5-6). Is there not in this an argument against death? If wisdom is lost in death, does it not follow that longer lives could lead to greater wisdom? And this is not to mention love and all the other good things that are snuffed out in that oblivion.

On the other hand, if the endless future turns out to be as horrible as McKibben imagines it to be, then people can still simply choose to give up their empty, meaningless lives. So if people did opt to live yet longer, would that not mean they had found sufficient pleasure, joy, love, and even meaning to keep them going? McKibben is right: We do not know what immortality would be like. But should that happy choice become available, we can still decide whether or not we want to enjoy it. Besides, even if the ultimate goal of this technological quest is immortality, what will be immediately available is only longevity. The experience of longer lives will give the human race an opportunity to see how it works out. If immortality is a problem, it is a correctable one. Death always remains an

option. Let us turn on its head the notorious argument by Leon Kass that our initial repugnance to biotechnological advances should make us wary of them. Put the other way around, the near-universal human *yearning for* longer, healthier lives should serve as a preliminary warrant for pursuing age-retardation as a moral good.

Inviolable Characteristics?

What other features of human life might ethically be altered by enhancements? Almost any, according to the argument of George Washington University philosophy professor David DeGrazia. Writing in the *Journal of Medicine and Philosophy*, he systematically examines several core human traits—internal psychological style, personality, general intelligence and memory, sleep, normal aging, gender, and being a member of the species *Homo sapiens*—that might be considered so fundamental that they cannot be ethically altered, but concludes that "*characteristics likely to be targeted or otherwise affected by enhancement technologies* are not plausibly regarded as [ethically] inviolable."

Regarding psychological style, there is no ethical reason to require that a particular person remain worried, suspicious, or downbeat if he wants to change. As DeGrazia points out, psychotherapy already aims at such self-transformation. And what about the impact of education? Many people who come back from college or the military seem unrecognizable to their old friends. If a pill will make a person more confident and upbeat, then there is no reason for him not to use it if he so wishes. Personality is perhaps the external manifestation of one's internal psychological style, and here, too, it's hard to think of any ethical basis for requiring someone to remain, for example, cynical or excessively shy.

But what about boosting intelligence and memory? Of course, from childhood on, we are constantly exhorted to improve ourselves by taking more classes, participating in more job training, and reading good books. Opponents of biotech enhancements might counter that all of these methods of improvement manipulate our environments and do not reach to the genetic cores of our beings. But DeGrazia points out that the wiring of our brains is the result of the interaction between our genes and our environment. For example, our intellectual capacities depend on proper nutrition as well as on our genetic endowments. One's genome is not fundamentally more important than environmental factors, he concludes; rather, "they are equally important, so we should bear in mind that no one objects to deliberately introducing environmental factors [such as schools or diet]

that promote intelligence." It does not matter ethically whether one's intellectual capacities are boosted by schooling, a pill, or a set of genes.

As for sleep: all vertebrates sleep. Sleep, unlike cynicism, does seem biologically fundamental—but again, so what? Nature is not a reliable source for ethical norms. If a person could safely reduce his need for sleep and enjoy more waking life, that wouldn't be at all ethically problematic. Our ancestors who lacked artificial light probably got a lot more sleep than we moderns do, yet history doesn't suggest that they were morally superior to us.

Then, again, there is the argument about normal aging. As everyone knows, the only inevitabilities are death and taxes. Death, however, used to come far more frequently at younger ages, but global average life expectancy has doubled in the past century. DeGrazia asks whether "normal aging" is "an essential part of any recognizable human life," and falters here, admitting, "frankly, I do not know how to determine whether aging is an inviolable characteristic." The question, then, is whether someone who does try to "violate" this characteristic by biotechnological means is acting unethically. It is hard to see why the answer would be yes. Such would-be immortals are not forcing other people to live or die, nor are they infringing on the rights or dignities of others. DeGrazia finally recognizes that biotech methods aimed at slowing or delaying aging significantly are not morally different from technologies that would boost intelligence or reduce the need for sleep. He concludes, "even if aging is an inviolable core trait of human beings, living no more than some specified number of years is not."

Another potentially inviolable trait that DeGrazia considers is gender. But in the age of transgendered people and sex-change surgery, it seems a bit outmoded to ask if one's biological sex is an inviolable core characteristic. Plenty of people have already eagerly violated it. Yet *Beyond Therapy* declared, "Every cell of the body…mark[s] us as either male or female, and it is hard to imagine any more fundamental or essential characteristic of a person." Clearly, thousands of people's fundamental sexual identities depend on more than the presence of an X or Y chromosome in their bodies' cells.

Finally, DeGrazia wonders if even being a member of the species *Homo sapiens* constitutes an inviolable core trait. He specifically thinks of a plausible future in which parents add an extra pair of artificial chromosomes carrying various beneficial genetic modifications to the genomes of the embryos that will become their children. Such people would have 48 chromosomes, which means that they could not reproduce fertile offspring

with anyone who carries the normal 46 chromosomes. "It seems to me, however, that these individuals would still be 'human' in any sense that might be normatively important," concludes DeGrazia. This certainly seems correct. After all, infertile people today are still fully human. Oddly, however, DeGrazia thinks that this "risk to reproductive capacities" might warrant restricting the installation of extra chromosomes to consenting adults only. But couldn't a person with 48 chromosomes who falls in love with a person with only 46 chromosomes simply use advanced genetic engineering techniques to overcome that problem?

DeGrazia convincingly argues that whatever it is that makes us fundamentally us is not captured by the set of characteristics he considers. The inviolable core of our identities is the narrative of our lives—the sum of our experiences, enhanced or not. If we lose that core (say, through dementia), we truly do lose ourselves. But whoever we are persists and perhaps even flourishes if we choose to use biotech to brighten our moods, improve our personalities, boost our intelligence, sleep less, live longer and healthier lives, change our gender, or even change species.

The Politics of Toleration

The Enlightenment project that spawned modern liberal democracies sought to keep certain questions about the transcendent out of the public sphere. To keep the social peace and allow varying visions of the human to flourish alongside one another, questions about the ultimate meaning and destiny of humanity were deemed to be private concerns. In our own time, hostility to the prospect of technological enhancement must not be used as an excuse to breach the Enlightenment understanding of what belongs in the private sphere and what belongs in the public. Technologies dealing with birth, death, and the meaning of life need protection from meddling—even democratic meddling—by those who want to control them as a way to force their visions of right and wrong on the rest of us.

The ideal of political equality arose from the Enlightenment's insistence that since no one has access to absolute truth, no one has a moral right to impose his values and beliefs on others. (Or, to put it another way, I may or may not have access to some absolute transcendent truth, but I'm good and sure that you don't.) Consequently, under constitutional liberalism, there are questions that should not and cannot be decided by a majority vote. As James Madison eloquently explained in *Federalist 51*,

> It is of great importance in a republic, not only to guard the society against the oppression of its rulers; but to guard one part of the society

> against the injustice of the other part. Different interests necessarily exist in different classes of citizens. If a majority be united by a common interest, the rights of the minority will be insecure.

Alexis de Tocqueville made the same point when he asked, "If you accept that one man vested with omnipotence can abuse it against his adversaries, why not accept the same thing for a majority?"

Philosopher John Rawls updated and extended the arguments supporting these Enlightenment ideals in *Political Liberalism* (1993), in which he made the case for a limited conception of politics that could reconcile and tolerate diverse "reasonable comprehensive doctrines." According to Rawls, a reasonable comprehensive doctrine has three features: it deals with the major religious, philosophical, and moral aspects of human life in a coherent and consistent fashion; it recognizes certain values as significant, and by granting primacy of some values over others expresses an intelligible view of the world; and it is not unchanging, but generally evolves slowly over time in light of what its adherents see as good and sufficient reasons. The result is that

> many of our most important judgments are made under conditions where it is not to be expected that conscientious persons with full powers of reason, even after free discussion, will all arrive at the same conclusion. Some conflicting reasonable judgments…may be true, others false; conceivably, all may be false. These burdens of judgment are of first significance for a democratic idea of toleration.

Because there is no objective way to determine the truth or falsity of diverse beliefs, moral strangers can only get along by tolerating what each would regard as the other's errors.

Consequently, Rawls argues, "reasonable persons will think it unreasonable to use political power, should they possess it, to repress comprehensive views that are not unreasonable, though different from their own." If, however, we insist that all members of a polity should adopt our beliefs because they are "true," then "when we make such claims others, who are themselves reasonable, must count us unreasonable." In such a case, members of the polity have the right to resist the imposition of views that they do not hold. Rawls concludes, "Once we accept the fact that reasonable pluralism is a permanent condition of public culture under free institutions, the idea of the reasonable is more suitable as part of the basis of public justification for a constitutional regime than the idea of moral truth."

The kind of constitutional regime that is compatible with reasonable pluralism is one in which the powers that government can exercise over the choices of its citizens are limited. The German political philosopher Jürgen Habermas, in his essay "Popular Sovereignty as Procedure," describes (without endorsing) the point of view of liberalism pretty well when he explains that the dispute between liberalism and egalitarianism

> has to do with how one can reconcile equality with liberty, unity with diversity, or the right of the majority with the right of the minority. Liberals begin with the legal institutionalization of equal liberties, conceiving these as rights held by individual subjects. In their view, human rights enjoy normative priority over democracy, and the constitutional separation of powers has priority over the will of the democratic legislature.

Advocating the option to use biotech, nanotech, and infotech enhancements to increase healthy human life spans and to enhance human physical and intellectual capacities certainly counts as a "reasonable comprehensive doctrine." Thus it should be accommodated within the constitutional consensus of liberal democratic societies, and protected from the will even of a democratic majority.

What about genetically engineered children? Genetic engineering is still years away, but it will one day be available. An oft-cited objection to it is that genetic engineering will be imposed on children-to-be without their consent. First, let it be recalled that *no one* ever gives his consent to be born, much less to be born with the specific complement of genes that he bears. Nor does anyone give prenatal consent to being born into a specific family or community. Thus, the children born by means of assisted reproductive therapies and those produced more conventionally stand in exactly the same ethical relationship to their parents.

Habermas, in *The Future of Human Nature* (2003), disagrees, claiming, "Eugenic interventions aiming at enhancement reduce ethical freedom insofar as they tie down the person concerned to rejected, but irreversible intentions of third parties, barring him from the spontaneous self-perception of being the undivided author of his own life." However, Allen Buchanan, in the *Kennedy Institute of Ethics Journal*, correctly points out that Habermas does not actually make clear why a person who develops from a genetically enhanced embryo should feel that he is not the "author" of his life or be regarded as being somehow less free by others. Habermas, Buchanan explains, "is assuming that how one's genome was selected is relevant to one's moral status as a person. This error is no less

fundamental than thinking that a person's pedigree—whether she is of noble blood or 'base-born'—determines her moral status."

The absurdity of a requirement for prenatal consent for enhancement becomes transparent when one asks whether proponents of such a requirement would forbid fetal surgery to correct spina bifida or congenital heart defects. Fetuses operated upon to correct medical problems can't give their consent to those procedures, yet it is certainly the moral thing to do. For that matter, taking this strong position on consent to its logical extreme would mean that children couldn't be treated with drugs or receive vaccinations. Someday, using biotechnological means to correct genetic diseases like cystic fibrosis or sickle cell anemia at the embryonic stage will be considered as morally laudatory as the early interventions that are available today. And surely one can assume that the beneficiary—the not-yet-born, possibly even the not-yet-conceived, child—would happily have chosen to have those diseases corrected.

But what about genetic interventions that are not just therapeutic but genuine enhancements? Suppose parents could choose genes that would guarantee their child a twenty-point IQ boost. It is reasonable to presume that the child would be happy to consent to this enhancement of his capacities. And how about plugging in genes that would boost the child's immune system, guaranteeing that he would never get colon cancer, Alzheimer's, AIDS, or the common cold? Again, it seems reasonable to assume consent. These enhancements are general capacities that any human being would reasonably want to have. In fact, for many genetic endowments that we could give the unborn, lots of children already *do* have them naturally—so it's hard to see that there is any moral justification for outlawing them for others.

Fritz Allhoff, a philosophy professor at Western Michigan University, grapples with the issue of consent in the online *Journal of Evolution and Technology*. Allhoff offers a principle derived from the second formulation of Kant's categorical imperative to "treat individuals as ends and never merely as means or, more simply, to treat them in ways to which they would rationally consent." Allhoff links this to Rawls's notion of primary goods. In *A Theory of Justice* (1971), Rawls defines primary goods as those goods that every rational person should value, regardless of his conception of the good. These goods include rights, liberties, opportunities, health, intelligence, and imagination. As Allhoff argues,

> These are the things that, *ex hypothesi*, everyone should want; it would be *irrational* to turn them down when offered. Nobody could be better

> off with less health or with fewer talents, for example, regardless of her life goals. . . . Since primary goods are those that, by definition, any rational agent would want regardless of his conception of the good, *all rational agents would consent to augmentation of their primary goods.*

Such enhancements would be permissible if every future generation would consent to them, Allhoff then contends. But the requirement that all future generations must consent adds nothing to the moral force of his argument, since it has already been stipulated that all rational agents would consent to such enhancements. So again, safe genetic interventions that improve a prospective child's health, cognition, and so forth would be morally permissible because we can presume consent from the individuals who benefit from the enhancements.

Many opponents of human genetic engineering are either conscious or unconscious genetic determinists. They fear that biotechnological knowledge and practice will undermine human freedom. In a sense, they claim that somehow human freedom resides in the gaps of our knowledge of our genetic makeup. According to Bill McKibben, "The person left without any choice at all is the one you've engineered. You've decided, for once and for all, certain things about him: he'll have genes expressing proteins that send extra dopamine to his brain to alter his mood; he'll have genes expressing proteins to boost his memory, to shape his stature."

Even if people like McKibben were right (and they are not) that our freedom and autonomy somehow depend on the unknown and random combinations of genes that a person inherits, genetic ignorance of this type will not last. Advances in human whole-genome testing make it likely that every person's entire complement of genes can be scanned and known at his or her physician's office for as little as $1,000 by 2014. Once whole-genome testing is perfected, we will all learn what even our randomly conferred genes may predispose us to do, and from what future ills we are likely to suffer. Already, my relatively inexpensive genotype scan from the company 23andMe tells me that I have alleles that give me a somewhat greater risk of developing celiac disease, a lower risk of rheumatoid arthritis, and a gene variant that some studies suggest can increase my risk of substance abuse (both alcohol and "street" drugs) fourfold. With more genetic understanding, human freedom will properly be seen as the ability to act against these predispositions, much like a former alcoholic can overcome his thirst for booze. Fortunately, biotech will help here as well, with the development of neuropharmaceuticals to enhance our cognitive abilities and change our moods.

Opponents of biotech enhancement often cite C. S. Lewis's worry in *The Abolition of Man*: "If any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power. They are weaker, not stronger: for though we may have put wonderful machines in their hands we have pre-ordained how they are to use them." In other words, Lewis asserts that the one decisive generation that first masters genetic technologies will control the fate of all future generations. But when has it not been true that past generations control the genetic fate of future generations? Our ancestors, too, through their mating and breeding choices, determined for us the complement of genes that we all bear today. They just didn't know which specific genes they were selecting. Again, the implication is that human freedom rests on ignorance of the more or less random combination of genes one inherits.

Fortunately, our descendants will have at their disposal ever more powerful technologies and the benefit of our own experiences to guide them in their future reproductive and enhancement decisions. In no sense are they prisoners of our decisions now. The future will not be populated by what would in effect be robots who *look* human but are unable to choose for themselves their own destinies, genetic or otherwise. Of course, there *is* one scenario in which future generations would be prisoners of our decisions now—namely, if we fearfully elect to deny them access to the benefits of biotechnology and safe genetic engineering.

Other opponents of human genetic enhancement argue that it is not ethically possible to make the *transition* from the human present to the transhuman future. Again, consent and the risks inherent in deploying novel biogenetic treatments are cited as reasons. The claim is that genetic enhancement necessarily implies experimentation without consent, and this violates bedrock bioethical principles requiring the protection of human subjects. Consequently, there is an unbridgeable gap over which would-be enhancers cannot ethically cross.

But this argument relies on a rather static view of what will be possible for future genetic enhancers to know and test beforehand. Any genetic enhancement techniques will first be extensively tested and perfected in animal models. One possible threshold for morally acceptable genetic enhancement treatments, for example, is the level of risk currently involved with in vitro fertilization techniques. Further, a vastly expanded bioinformatics enterprise will become crucial to understanding the ramifications of proposed genetic interventions. As scientific understanding improves, the risk-benefit calculations of various prospective genetic

enhancements of embryos will shift in favor of proceeding. The arc of scientific discovery and technological progress strongly suggests that this will happen in the next few decades.

Enhancement Wars?

Those who favor restricting human enhancements often argue that human equality will fall victim to differential access to enhancement technologies, resulting in conflicts between the enhanced and the unenhanced. For example, at a 2006 meeting called by the American Association for the Advancement of Science, Richard Hayes, the executive director of the left-leaning Center for Genetics and Society, testified that "enhancement technologies would quickly be adopted by the most privileged, with the clear intent of widening the divisions that separate them and their progeny from the rest of the human species." Deploying such enhancement technologies would "deepen genetic and biological inequality among individuals," exacerbating "tendencies towards xenophobia, racism and warfare." Hayes concluded that allowing people to use genetic engineering for enhancement "could be a mistake of world-historical proportions."

Meanwhile, some right-leaning intellectuals, such as Nigel Cameron, president of the Center for Policy on Emerging Technologies, worry that "one of the greatest ethical concerns about the potential uses of germline interventions to enhance normal human functions is that their availability will widen the existing inequalities between the rich and the poor." In sum, egalitarian opponents of enhancement want the rich and the poor to remain equally diseased, disabled, and dead.

Even proponents of genetic enhancement, such as Princeton University biologist Lee M. Silver, have argued that genetic engineering will lead to a class of people that he calls the "GenRich," who will occupy the heights of the economy while unenhanced "Naturals" provide whatever grunt labor the future economy needs. In *Remaking Eden* (1997), Silver suggests that eventually "the GenRich class and the Natural class will become… entirely separate species with no ability to cross-breed, and with as much romantic interest in each other as a current human would have for a chimpanzee."

In the same vein, George J. Annas, Lori B. Andrews, and Rosario M. Isasi have laid out a rather apocalyptic scenario in the *American Journal of Law and Medicine*:

> The new species, or "posthuman," will likely view the old "normal" humans as inferior, even savages, and fit for slavery or slaughter. The

> normals, on the other hand, may see the posthumans as a threat and if they can, may engage in a preemptive strike by killing the posthumans before they themselves are killed or enslaved by them. It is ultimately this predictable potential for genocide that makes species-altering experiments potential weapons of mass destruction, and makes the unaccountable genetic engineer a potential bioterrorist.

Let's take their over-the-top scenario down a notch or two. The enhancements that are likely to be available in the relatively near term to people now living will be pharmacological—pills and shots to increase strength, lighten moods, and improve memory. Consequently, such interventions could be distributed to nearly everyone who wanted them. Later in this century, when safe genetic engineering becomes possible, it will likely be deployed gradually and will enable parents to give their children beneficial genes for improved health and intelligence that other children already get naturally. Thus, safe genetic engineering in the long run is more likely to ameliorate than to exacerbate human inequality.

In any case, political and moral equality have never rested on the facts of human biology. In prior centuries, when humans were all "naturals," tyranny, aristocracy, slavery, and legally stipulated racial and sexual inequality were common social and political arrangements. Our biology did not change in the past two centuries—our political ideals did. In fact, political liberalism is already the answer to questions about human and posthuman rights. In liberal societies the law is meant to apply equally to all, no matter how rich or poor, powerful or powerless, brilliant or stupid, enhanced or unenhanced.

One crowning achievement of the Enlightenment is the principle of tolerance, of putting up with people who look different, talk differently, worship differently, and live differently than we do (in Rawlsian terms, tolerating those who pursue differing reasonable comprehensive doctrines). In the future, our descendants may not all be natural *Homo sapiens*, but they will still be moral beings who can be held accountable for their actions. There is no *a priori* reason to think that the same liberal political and moral principles that apply to diverse human beings today would not apply to relations among future humans and transhumans.

But what if enhanced posthumans were to take the Nietzschean superman option? What if they really were to see unenhanced people "as inferior, even savages, and fit for slavery or slaughter"? It is an unfortunate historical fact that plenty of unenhanced humans have been quite capable of believing that millions of their fellow unenhanced humans

were inferiors who needed to be eradicated. However, as liberal political institutions, with their limits on the power of the state, have spread and strengthened, they have increasingly restrained technologically superior groups from automatically wiping out less advanced peoples (which was common throughout most of history). Again, there is no *a priori* reason to believe that this dynamic will not continue in the future as biotechnology, nanotechnology, and computational technologies progressively increase people's capabilities and widen their choices.

Opponents of human enhancement focus on the alleged social harms that might result, while overlooking the huge social costs that forgoing the benefits of enhancement technologies would entail. Allen Buchanan posits that

> some enhancements will increase human productivity very broadly conceived and thereby create the potential for large-scale increases in human well-being, and . . . the enhancements that are most likely to attract sufficient resources to become widespread will be those that promise increased productivity and will often exhibit what economists call *network effects*: the benefit to an individual of being enhanced will depend upon, or at least be greatly augmented by, others having the enhancement as well.

Buchanan points out that much of the ethical debate about enhancements focuses on them as positional goods that primarily help an individual to outcompete his rivals. This characterization of enhancements leads ineluctably to zero-sum thinking in which for every winner there is assumed to be a loser. But, on the contrary, enhancements could produce positive results for the common good: as Buchanan writes, "large numbers of individuals with increased cognitive capabilities will be able to accomplish what a single individual could not, just as one can do much more with a personal computer in a world of many computer users." While competition certainly plays a role in underwriting success in society and the economy, most success is achieved through cooperation.

In the future, people in the pursuit of non-zero-sum social and economic relations are likely to choose the sorts of intellectual and emotional enhancements that boost their ability to cooperate more effectively with others, such as increased empathy or greater practical reason. In fact, it is just these sorts of enhancements that will help people to behave more virtuously. Of course, people in the future will have to be on guard against any still-deluded folks who think that free-riding might work; but there may well be an app for that, so to speak: the increasingly transparent

society. People will be able to check the reputations of others for honest dealing and fair cooperation with just a few clicks of a mouse (or by accessing directly whatever follows Google using a brain implant). Such social monitoring will be nearly as omnipresent as what would be found in a hunter-gatherer band. Everyone will want to have a good reputation. One might try to fake being virtuous, but the best and easiest way to have a good reputation will be the same as it is today—by actually being virtuous.

Buchanan argues that modern people have already adopted a wide array of enhancements that display these beneficial network effects, including literacy, numeracy, and social institutions that "extend our capacities beyond what is *natural* for human beings." Some future enhancements that would significantly increase both individual and social productivity include those that increase healthy life spans, boost our immune systems, and raise our cognitive capabilities (memory, attention, processing speed, and so forth).

There are grounds for concern, however, in Buchanan's claim that, if biotech enhancements do in fact dramatically increase social productivity, then the state and its citizens might be far less interested in imposing *limits* on enhancements and instead shift to *promoting* them for everyone: "If a particular enhancement had very strong productivity-enhancing effects, the failure of the state to ensure that no one lacks access to it might be seen as being as culpable as its failure to ensure that all citizens are literate or have access to immunization." The temptation to democratically impose enhancements would be hard to resist, and would result in imposing a particular vision of human flourishing on those who do not want it.

A more optimistic view is that the ability to install whatever genes one might want will become so cheap and routine that everybody would have access to the technology, dissipating the fears of growing inequality, even speciation, between groups of people. As noted above, implicit in the moral hand-wringing over genetic engineering is the concern that genes really matter—that one's life chances are largely determined by the genes one carries. Good genes equal a bright future; bad genes entail a blighted future. But recent genetic research is showing that this view is wrong.

How can we get around genetic determinism? By using outside interventions that regulate and enhance the performance of the genes that people already have. Research across several disciplines promises to bring us pharmacological interventions that can change the activity of various genes and gene combinations so as to enhance cognition, reverse aging, and have other desired effects. And still other kinds of

interventions—like those that may be found in the burgeoning field of neuroelectronics—promise to sidestep the limitations of our biological bodies and brains.

In short, genetically engineered inequality is a bioethical phantom. The more researchers learn more about the effects of our genes, the more we will be liberated from whatever tyranny they do exercise. Biotech and infotech enhancements will increase human freedom, not limit it.

Can We Afford Enhancement?

Another frequently-cited problem with longevity treatments that must be addressed is that they might bankrupt the economy. In a 2005 article in *The Atlantic* on "The Coming Death Shortage," Charles C. Mann discusses the possibility that new longevity treatments might be as expensive as HIV drug treatments are today, at about $15,000 per person annually. Of course, one must keep in mind that one day HIV drugs will go off patent and likely cost less than $300 per year; but for the sake of argument, let us take Mann's assumption at face value. He calculates that 80 million oldsters receiving $15,000 worth of longevity treatments would cost $1.2 trillion per year, and quotes James Lubitz, then a chief analyst for the Centers for Disease Control and Prevention, as saying that that is "the kind of number…that gets people's attention." Mann suggests that in order to avoid class warfare over extended life spans, such huge new costs would have to be borne by the government, since every citizen, rich and poor, would demand access to longevity treatments. Assuming he's right, how worried should we be?

Perhaps $1.2 trillion may get the attention of someone who is living in today's $14 trillion economy. However, in 2003 the Employment Policy Foundation issued a study that estimated that the United States economy would grow to $128 trillion by 2077. If this estimate is correct, longevity treatments for 80 million healthy oldsters would cost less than 1 percent of GDP in 70 years. Or, let's posit an unrealistic scenario in which every one of an estimated 480 million Americans alive in 2077 would require $15,000 worth of longevity treatments annually, for a total bill of $7.2 trillion. That would still be less than 7 percent of projected GDP in 2077. In the long run, the affordability of longevity treatments doesn't seem like a big issue.

The Necessity of Moral Toleration

People should not be forced to use medicines and technologies that they find morally objectionable. Take the case of the Amish. Amish individuals

live in an open society—ours—and can opt out of our society or theirs whenever they want. As followers of a reasonable comprehensive doctrine, they have a system for voluntarily deciding among themselves what new technologies they will embrace. (For instance, despite their generally anti-technology stance, Amish practicality has caused them to embrace modern medicine when it comes to treating genetic maladies that plague their community.) The situation of the Amish demonstrates that technological choices don't have to involve everyone in a given society.

One can imagine that, eventually, different treatment and enhancement regimens will be available to accommodate the different values and beliefs held by citizens. Christian Scientists would perhaps reject most of modern biotechnology outright; Jehovah's Witnesses might remain leery of treatments that they consider akin to using blood products or blood transfusions; Catholics might refuse to use regenerative treatments derived from destroyed human embryos; and still others may wish to take the fullest advantage of all biomedical enhancements and treatments. In this way, members of a pluralistic society respect the reasonable comprehensive doctrines of their fellow citizens, thus enabling social peace among moral strangers.

Daniel Callahan, in an essay in *Cato Unbound*, writes: "I really wish we would be told, when the great day arrives and we have dozens, maybe hundreds of years ahead of us, exactly how it would all work." Well, I wish I knew too, but the fact of the matter is that humanity advances by trial and error. Even the smartest people cannot figure out how scientific and technological advances will play out over the next few decades, much less centuries. In 1960, the optical laser was reputedly described as an invention looking for a job. In 2011, ubiquitous lasers routinely cut metal, play CDs, reshape corneas, carry billions of Internet messages, remove tattoos, and guide bombs. As age-retardation and other enhancement technologies are likely to develop incrementally, humanity will have lots of opportunities for course corrections as we go along.

The very good news is that the history of the last two centuries has shown that technological advance has been far more beneficial than harmful for humanity. The development of age-retardation and other enhancement technologies will be further steps along that encouraging progressive path. We should all have the right to choose to use or not use new technologies to help us and our families flourish. Is humanity ready for enhancements like radically longer life spans? We're about as ready as we'll ever be. In other words: yes.