

CAN TECHNOLOGY MAKE YOU BETTER?¹

¿PUEDE MEJORARLE A USTED LA TECNOLOGÍA?

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Abstract: The technological enhancement of a wide range of human cognitive and physical capabilities has been a key attribute of human development since the emergence of our species. New and advancing areas of innovation, such as nanotechnology, robotics, and genomics, are viewed by some observers as promising not only an acceleration of this trend, but also improvement of the species as a whole: better humans. In this essay I explain why continual improvement of human cognitive and physical performance at the level of the individual need not translate into broad progress for humans as a whole.

Keywords: Progress, human enhancement, transhumanism, technology, intelligence.

Resumen: El perfeccionamiento tecnológico de un amplio rango de capacidades cognitivas y físicas de los seres humanos ha sido un atributo fundamental del desarrollo de la especie desde su origen. Nuevas áreas de innovación, tales como la nanotecnología, la robótica y la genómica, son vistas por algunos observadores como la promesa no sólo de una aceleración de esta tendencia, sino también de una mejora de la especie en su conjunto. En este ensayo se explica porqué la mejora continua del rendimiento cognitivo y físico al nivel del individuo no tiene porqué traducirse en un progreso amplio de la humanidad en su conjunto.

Palabras clave: Progreso, perfeccionamiento humano, transhumanismo, tecnología, inteligencia.

Congratulations. You are the proud owner of the latest, new and improved model human brain and body, a version that has only recently become available and that renders all previous models obsolete. Do you think your brain is the same as, for example, a hunter gatherer of your species who lived 10,000 years ago? How about a 13th century peasant's? Queen Victoria's? Queen Victoria could not have even imagined your i-Pod, and she would have been both utterly baffled and probably appalled as well by what you call "music"; nor could she have imagined the world's capacity to wipe out smallpox, or to annihilate itself

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through an arsenal of 20,000 or so nuclear weapons. To mention just a few of the standard features of your enhanced brain-body, you now come equipped with a fully re-engineered immune system, an up-to-date capacity to distinguish fact from fiction, a completely revised set of cultural assumptions about gender, ethnicity, and sexuality, and of course, for those of you under thirty, a special IM language module—all in your own brain and body. Perhaps even more impressive is the amazing range of customized enhancements that some of you have chosen to add to your standard equipment package, ranging from ceramic alloy joints to neurochemical mood modulators to hormone performance boosters.

You are, in other words, enhanced; some would say you are: transhuman, in transition to the next evolutionary phase of humanness. And you are also part of a technology-induced evolutionary program that has been going on more or less since the origins of humankind, a program that to some extent distinguishes and defines humankind, a program of continuing expansion of the human desire to understand, modify, and control its surroundings, its prospects, and its self. From the pre-dawn of civilization, when human tool-making and meat-eating were co-evolving with brain development into the version 1.0 enhanced *Homo sapiens* model almost 200,000 years ago, to the rise of agriculture and the development of early cities with their new capacities for networked human action, to the harnessing of horse power and wind power and water power and the organization of mercantile activities with an intercontinental reach, and the proliferation of the printed word and literacy and of course perhaps above all always new ways to exercise military might and kill one's adversaries, in all this business of enhancing the reach *and the constitution* of our brains and bodies, YOU are the latest and most advanced iteration.

But, if I understand things correctly, the reason I'm here speaking to you now is that a different game is afoot. Until now, some are saying, our application of technology to enhancing our capabilities was largely external: we constructed tools that we could wield to increase our capacity to do things, but as wielders we were more or less fixed in our capabilities. We controlled our external environment, not our internal selves. Or even when we did things to enhance our inner capabilities, we did them with external interventions, like eyeglasses or education. Now, we are told, with powerful new genetic technologies on the horizon, with the increasing fusion of human and machine intelligence, with neuropharmaceuticals and artificial body parts and stem cell therapies, we are beginning the business of transforming ourselves from the inside out, of exerting explicit and conscious control over our own selves and our evolving selves in ways that create new opportunities, new challenges, new ways of thinking about who we are and where we are going. The very notion of what it means to be

human is on the drawing board. And for some people this is a thrilling and wonderful prospect indeed, while others are filled with dread and despair.

Many people are excitedly talking and writing about the coming prospects for the technological enhancement of human brains and bodies and the transition to coming versions of humanness. The most avid and optimistic among these term themselves Transhumanists. The Declaration of the World Transhumanist Association begins: “Humanity will be radically changed by technology in the future. We foresee the feasibility of *redesigning the human condition*, including such parameters as the inevitability of aging, limitations on human and artificial intellects, unchosen psychology, suffering, and our confinement to the planet earth.”² There are certain elements of this agenda that are quite remarkable, although on the whole Transhumanism can also be recognized as just another variety of technological optimism—one might say hyper-optimism—that has often been conspicuous in Western culture, and especially American culture, growing out of the Enlightenment belief in the application of rationality to human betterment.

Transhumanists, as well as other advocates and visionaries of human enhancement, see many possible avenues of technological development that will continue to drive changes in human capabilities. I will devote little time to consideration of these technological specifics, but they emerge from the by-now familiar claims of advance in related and perhaps converging areas of knowledge and innovation such as nanotechnology, information technology, robotics, cognitive science, and genomics. To be clear, the ambitions are comprehensive—not just health and longevity, but radically enhanced intelligence, creative and emotional capabilities, conscious control over offspring attributes and species evolution, and even a greater capacity for mutual understanding through, for example, massively networked brain-to-brain interfaces. At the limits, we have total transcendence, when, as one employee of the U.S. National Science Foundation writes: “advances in genetic engineering, information systems, and robotics will allow archived human beings to live again, even in transformed bodies suitable for life on other planets and moons of the solar system.”³ No I am not making this up.

Nevertheless, what calls attention to Transhumanism is less the nature of the agenda, than the legitimacy that the agenda has garnered by enticing scientists, engineers, journalists, philosophers, and political theorists, among others, into

² <http://transhumanism.org/index.php/WTA/declaration/> [emphasis added]

³ W. Bainbridge, 2007, “Converging Technologies and Human Destiny,” *J. of Medicine and Philosophy*, vol. 32, p. 211.

discussions about the prospects for “redesigning the human condition.” And the key claim here is that we are at some sort of technical threshold where, in the calm words of a fairly restrained report entitled *Better Humans*, “a new set of possibilities for ‘[human] enhancement is opening up,”⁴ and, not only that, where these efforts to use technology for human betterment move decisively inwards-into the brain and body and genes-so that, in journalist Joel Garreau’s words, we become “the first species to take control of our own evolution.”⁵

Well, obviously science and technology are continually expanding their reach into the intricacies of human physical and cognitive function. But are we at the brink of something new and different, or are we just pushing further, and perhaps faster, into domains that have already been invaded, and have always been problematic? Certainly the idea that human enhancement is somehow a separate or new or different branch of the larger human technological program is arguable. In what way is a spear or a bicycle or a book or a telephone not a human enhancement? How are such things different from the sorts of things the Transhumanists and their more measured allies have in mind? Much is made, for example, of the alleged potential of emerging cognitive and genetic technologies to embed enhancements both in our brains-thus internalizing them in the organism-and in our genes-thus propagating them to our progeny. But the fact that, say, both my great-grandfather and I owned and rode bicycles tells you that temporal propagation of enhancement can perfectly well be embodied in the external technologies, not just through my genes, while the apparent fact that you can never forget how to ride a bicycle, or how to read, tells us that allegedly external technologies do in fact have an enhancing effect on our internal capabilities.

In a talk on Transhumanism here last year, my friend Sander van der Leeuw explained how primitive tools and human brains co-evolved; how the imaginative capacity of the tool-maker was both a product of and a requirement for the development of more effective stone tools and more rapid innovation. Education is of course a conscious process of brain modification; culture a process of passing such modifications from generation to generation. Jenner started modifying immune systems with cowpox pus in 1796, and the more dangerous practice of variolating with smallpox pus itself had apparently been used in China since around the turn of the first millennium. The rise of the printing press and the widespread distribution of printed vernacular texts created

⁴ Paul Miller and James Wilsdon, eds., *Better Humans?*, Demos, 2006, pp. 14-15, 2006.

⁵ J. Garreau, “Radical Evolution: Heaven, Hell, or Preval,” In: *Tomorrow’s People* (unpublished ms., p. 1).

a new type of distributed cognitive and information network without precedent, and with profound culturally transforming impacts later amplified by the rise of telegraph and telephone networks. In the 19th century, German doctors were outfitting war amputees with prosthetic arms designed to fit directly into factory machine control mechanisms, blurring the human-machine boundary. So it's not clear to me that we're now crossing some domain that we have never entered before, a domain that demands a new kind of debate or raises new moral considerations and dilemmas. Nor are the claims of miraculous advances to come anything unfamiliar, or the counter-claims of impending troubles, or the moral argumentation for and against. It has been the nature of scientific and technological advance to provoke ardent support and committed opposition on grounds ranging from the spiritual to the pecuniary; and the transformational power of technology especially has shaken societies to their roots at many points in human history, and will surely do so again.

But Transhumanism, and the more general goal of human technological enhancement, is not just familiar in terms of its connections to an ongoing process of technological transformation of society that seems very much interwoven with the human condition itself. The claims of Transhumanism are also familiar from domains beyond the technological. In particular, one need not look too deeply into the language used to promote Transhumanism and human enhancement to recognize an agenda for human betterment that in other contexts marks the domain of faith and spiritual practice-of religion. Transhumanists explicitly embrace the pursuit of immortality, of human perfectibility, of dominion over nature, and of transcendence over the limits of time and space on the individual. Transhumanism also shares with many religions a millenarian, apocalyptic vision of the future day when paradise is gained or regained, although for Transhumanists this day will come when humans-or at least human minds downloaded into computers-by either necessity or choice leave the Earth and expand their domain and dominion in the solar system and toward the infinite, their worldly spirits still, apparently, intact. No, I am still not making this up.

Immortality, perfectibility, dominion, and transcendence. This mimicking of religious goals by technological visionaries is no coincidence. We think, perhaps correctly, of the Enlightenment as a triumph of the power of rational inquiry and creative spirit over the tyranny of dogma. Another way to think about it, however, is that the Enlightenment endorsed the pursuit, through inquiry and invention, of a sort of transubstantiation of the means of religion-prayer, pursuit of virtue, study of sacred texts, and so on-into the corporeal and worldly means of science and technology-microscopes, telescopes, mathematics, and so on.

David Noble in his book *The Religion of Technology* details how science and technology were viewed by 17th century English scientists, exemplified by Francis Bacon, as the tools for regaining paradise, for “fulfillment of the millenarian promise of restored perfection.”⁶ Scientific knowledge will allow humans “to stretch the deplorable narrow limits of man’s dominion over the universe to their promised bounds,”⁷ and attain a “true vision of the footsteps of the Creator imprinted on his creatures.”⁸ Sounding core Transhumanist themes, Bacon in 1627 foresees, in his final, utopian work the *New Atlantis*, “The prolongation of life: the restitution of youth . . . the curing of diseases counted incurable . . . transformation of bodies into other bodies . . . making of new species . . . force of the imagination upon . . . another body . . .”⁹

The similarities between Enlightenment enthusiasms and some of the proclamations made on behalf of technological enhancement of humans are positively spooky: We will, writes technologist Ray Kurzweil, “transcend [the] limitations of our biological bodies and brains. We will gain power over our fates. Our mortality will be in our own hands. We will be able to live as long as we want . . . Our technology will match and then vastly exceed the refinement and suppleness of what we regard as the best of human traits.”¹⁰ The claim here is not just one of material betterment, but of improved humanness. Machine interfaces, neuropharmaceuticals, and genetic modifications can all help do the job. For example: “The arrival of safe, reliable germline technology,” says biophysicist Gregory Stock, “will signal the beginning of human self-design. We do not know where this development will ultimately take us, but it will transform the evolutionary process by drawing reproduction into a highly selective social process that is far more rapid and effective at spreading successful genes than traditional sexual competition and mate selection.”¹¹ We are, it turns out, in neither God’s nor Darwin’s hands, but our own. As the Oxford philosopher Nick Bostrom says in perhaps the strongest statement of faith in the power of reductionist science that I have ever heard, “The difference between the best times in life and the worst times is ultimately a difference in the way our atoms are arranged. In principle, that’s amenable to technological innovation. This simple point is very important, because it shows that there is no

⁶ Noble, D., *The Religion of Technology*, New York, Knopf, 1997, p. 52.

⁷ Bacon quoted in Noble, p. 50-51

⁸ Bacon quoted in Noble, p. 52.

⁹ Bacon quoted in Mumford, L. *The Pentagon of Power*, Marine Books, 1970, p. 117, 1970.

¹⁰ Kurzweil, R., *The Singularity is Near*, New York, Viking, 2006, p. 9.

¹¹ Stock, G., *Redesigning Humans*, Profile books, 2003, p. 3.

fundamental impossibility in enabling all of us to attain the good modes of being.”¹² So here is the technological enhancement of humans in direct competition with religion over the dispensation of our character as individuals and as a species.

Now if you spend some time, as I have done, reading about Transhumanism and human enhancements—the debates about what is technically plausible and what is not; about what is morally acceptable and what is not; about who will benefit and who will be left behind—pretty much every feasible position is staked out and defended vociferously and sometimes even capably. You can read, for example, bioethicist John Harris’s *Enhancing Evolution* and political philosopher Michael Sandel’s *The Case Against Perfection*, and find serious, carefully constructed arguments that lead in antipodal directions. Similarly there are some, like theologian Philip Heffner, who find a sympathetic relation between the aims of technological enhancement and religious practice, and others, like philosopher Alfred Borgman, who see fundamental and corrosive conflict. We can also find diametrically opposed arguments about whether technological enhancement is or is not an obligation of democratic societies, and whether it will improve democracy or undermine it, improve justice and equality or erode them.

Yet the various combatants do seem to share what seems to me like a pretty incredible assumption, an assumption that makes their disputes possible in the first place, and thus, to be cynical I suppose, legitimates the debate and all of the attention it attracts. Everyone seems to accept that something new is happening not just in terms of the technologies, but in terms of the real prospects for changing humanness, for steering its future, through the achievement of new levels of direct control over the physical and cognitive performance of human beings, including the controlled biological evolution of performance standards, the direct intervention in brain function, and the gradual hybridization of human and machine intelligence. The starting point for these diverse moral and philosophical treatments is that these emerging potentials put humanness—however one wants to define it—on the design table in a way that is unprecedented.

In my own overly literal way I want to explore this assumption and even the question of what technological enhancement of humans might mean. When it comes to improving humans, to making us better in any meaningful sense of the word, are there good reasons to think that new technologies can do the job—or, at least, can do it better than, say, religion, or politics? In other words, if you’ll excuse me, I’m not going to talk about what is technically correct or morally

¹² Quoted in Garreau, J., *Radical Evolution*, New York, Doubleday, 2005, p. 242.

right about technological enhancement itself, but about what is, and what is not, operationally feasible-what might work-in this program of making humans better. The type of “better” I mean here is not about cured diseases or healthier lives, but about “redesigning the human condition,” about making humans better than they are across all dimensions of the world made, inhabited, and experienced by humans. John Harris writes: “Enhancements of course are good if and only if [they] do good, and make us better, not perhaps simply by curing or ameliorating our ills, but because they make us better people.”¹³

Now those who have staked out positions of opposition to, or discomfort with, the technological program for enhancement of human capabilities have mobilized several types of arguments. First there are those who call upon some fundamental sense of appropriateness, of received human dignity, of what is natural, right, and sufficient in our world, to question the wisdom of the Transhumanist agenda. Leon Kass, former Chairman of the President’s Council on Bioethics, is perhaps the leader on this approach on the right side of the political spectrum, and the writer Bill McKibben has made a related case from the left. Another line of critique, led by the political philosophers Francis Fukuyama and Michael Sandel, again on the right and left respectively, suggests that changing fundamental aspects of the constitution of humans will threaten the fabric of our social and political institutions in ways that are likely to be negative. Other arguments focus on questions of distributive justice, risk, and cultural erosion.

In contrast with this diversity of critiques, the starting place for most of the arguments that favor a promiscuous, anything-goes approach to technological enhancement of humans is a strong defense of the rights of individuals to make decisions about their own capabilities, and those of their children or children-to-be. This is a quite effective argument to make in modern, market democracies, where individual autonomy is a fundamental value. And I have to say that, having subjected myself to a lot of this debate, there is a reductionist rigor to the individual-rights argument that is simply not available to those whose reservations about technological enhancement are based either on some sense of fundamental human authenticity, or on forebodings about future consequences. Concrete statements about individual rights are pretty easy to make, test, and defend; concepts like authenticity and dignity are much more slippery.

The individual-rights defense also allows the advocates of aggressive human enhancement to distinguish their ambitions from repugnant past efforts to engineer human improvement through coercive, state-sponsored means,

¹³ Harris, J., *Enhancing Evolution*, Princeton University Press, Princeton (NJ), 2007, p. 2.

especially the eugenics movement in the U.S. in the early part of the 20th century, and of course the genocidal eugenic ambitions of Nazi Germany shortly afterwards. If the means of human enhancement are applied at the discretion of the individual, and administered through the democratically regulated economic market, then enhancement becomes an expression of freedom, not repression, and a path to diversity, not homogeneity. Repression thus becomes the tool of those who would like to prevent individuals from choosing to enhance themselves, and the Transhumanists become the guardians of individual freedom.

But: if the goal of human enhancement is better humans, and better humanity, then there's a serious scale-up problem to the individual-rights perspective. For one thing, people are not simple summations of a bunch of individual traits; knowing that a person has an enhanced trait, for example an implanted memory chip, doesn't really tell us anything useful about who that person is. Second, humanity-the aggregation of humans-is not a simple summation of a bunch of humans, and even less of a bunch of human traits. As compelling as the individual rights case for pursuing human enhancement might seem to be, the human enhancement program cannot be about individuals alone because the enhancements of traits and abilities are benefits that are supposed to allow us to act more effectively as whole people, in a world of other people, where social, cultural, and institutional structures help to determine what counts as effective. In most cases, arguments based on the individual are fatally decontextualized, in the following way: although strong arguments in favor of allowing individuals to enhance their own, and their children's and prospective children's, physical and mental attributes can be rooted in an individual rights perspective, whether or not these enhancements actually add up to an improved life, an enhanced life, a better life-whether they even improve the chances of attaining such-is only weakly coupled to the enhanced attributes of the individual. To say that we have enhanced-made better-the particular trait of a particular human has no necessary predictive power in terms of what we have made better at the level of the whole person, and of humanness more generally.

Now I need to distinguish what I'm saying here from a more famous and more sophisticated argument, the one that Francis Fukuyama makes about the dangers of messing with human nature. Fukuyama describes an ineffable quality of humans that is not reducible to any particular function or trait-he calls it "Factor X" to indicate that yes, there is something special we can recognize as an essence of humanness, and though it's not something we can put our finger on, it is something we want to nurture and protect. While I'm overall rather sympathetic to this perspective, it has that holistic mushiness that does not mar

the more philosophically reductionist arguments based on the rights of individual choice. I want to avoid the mushiness by asking a different sort of question. Forget about trying to defend, or even posit, some particular notion of human nature, and let's look instead at the core claim of Transhumanism and human enhancement advocates-the claim that technology, through the choices that individuals make about their own enhancement, will in turn make humans better, and humanness better.

Who are the most enhanced individuals in the world today?-enhanced both physically and cognitively with the latest technological advances? Let me suggest a group of candidates: America's military personnel in Iraq, with their smart weapons and body armor and night vision goggles and special diets and training and, I would suspect, some neuropharmaceuticals like modafinil to keep them alert even when deprived of sleep for 36 hours. Yet who among the less enhanced of us in this room right now, would choose to trade places with them? I don't mean this at all glibly. I'd prefer that they weren't there at all, and since they are there I want them to have every enhancement possible to improve their chances of a safe return home. But the fact that soldiers in combat are the first one's to receive the benefits of many emerging types of physical and cognitive enhancement tells you that the enhancement program is not just one of individuals choosing to improve on their humanness, it is also one of institutional and political settings where human enhancements are being used to advance goals that have nothing to do with individual expressions of liberty in the pursuit of life-goals.

Enhancement at the individual level need not lead either to an enhanced individual, or an enhanced society. Consider a drug or brain implant that improves, say, one's ability to concentrate-something like Ritalin. Now individuals may take this drug to, for example, improve their performance on exams; pretty much everyone wants to perform better on exams. But this is just one attribute in a person who might otherwise, say, be a jerk. The point isn't that jerks shouldn't be allowed to perform well on exams, it's that making any statement one way or the other about the value of better concentration is hard to do if one is considering people as entities, rather than as an aggregate of individual, enhanceable traits. By what definition is a jerk with better concentration a better person than he was before? (Note, also, how in this case it is okay to use the masculine pronoun to represent the whole.) If lots of jerks improved their concentration, the cumulative effect on the rest of us might well be unpleasant, unless those jerks were also our lawyers. So there's an aggregation problem at the individual level. Enhancing individual traits or capacities is a piecemeal project that tells us nothing at all about what society can

expect from the individual who's being enhanced-or what society can expect from millions of such enhanced humans.

And what happens when lots of people start improving their concentration? Well, for one thing, presumably lots of people can benefit from whatever pleasures improved concentration might deliver (although perhaps they would also be deprived of other pleasures, like daydreaming their way through long lectures). But to the extent that people want to improve concentration so they are more competitive at, say, exams, or in the courtroom, or on the tennis court, the benefits of improved concentration across the whole population are diminished, as when everyone stands on their toes in a crowd to get a better view. So there will be incentives to hoard the benefits; and there will be enhanced expectations of better performance among individuals, expectations that are then vitiated for many or even most individuals because others are doing the same thing, thus perhaps creating more disappointment than without the enhancement. We see this phenomenon in American society today, where, for example, competition for admission to elite universities has reached levels of unpleasant intensity as parents continue to do everything in their power to improve their children's competitive positions. Some might still interpret this sort of phenomenon as making society better by improving overall performance, even while perhaps stimulating new heights of individual neuroses. In any case, it turns out that the direct avenue of technological effect on an individual trait-the enhancement of individual concentration-feeds back into the individual person via aggregate consequences that can undermine the original intent behind the particular enhancement. This phenomenon, sometimes called "social limits to growth," is neither surprising nor uncommon; it's exactly what we ought to expect when people are enhancing themselves in order to gain a performance advantage that others will seek as well.

Are baseball and bicycle racing better because individuals are enhancing their physical abilities and performing better? What is the measure of "better" here? Did spectators and the athletes themselves enjoy baseball and bicycle racing less in the past when competitors were less enhanced? At this point, the judgment of society is that certain types of enhancement, like growth hormones and steroids, diminish the value of competition. The individual-rights based response is that our expectations of what is normal or acceptable-for example, the rules of a particular sport-are arbitrary and always in flux-the vitamins and exercise and nutritional regimes that athletes benefit from today make them radically enhanced relative to athletes of the past. How, then, can we justify opposing the next level of enhancement? But such arguments miss the deeper point, which is that if all the enhancements do is keep raising the level of the playing field, as it

were, and our expectations along with it, from what Sisyphean frame of reference can we say that things are getting better? “Better” begins to seem a lot like a synonym for “more.”

The matter of enhanced intelligence presents particular challenges to notions of aggregate betterment. Of course education, both formal and informal, has been a powerful avenue for enhancing human intelligence, and one that correlates with a wide variety of benefits to individuals and to society more generally, but education is an integrative, experiential process that seems at best weakly analogous to direct technological enhancement of particular cognitive traits. Today, research on neuropharmaceuticals, magnetic stimulation, genetic modifications, prenatal dietary interventions, and brain machine interfaces all aim at providing more direct avenues of enhancing intelligence. Yet the links between “more intelligent” and “better” are less obvious than they might seem. On the one hand there is the problem that intelligence is a complex notion, reflecting not just a person’s attributes but also a society’s values. But even if we allow that there will be a variety of avenues for enhancing a variety of cognitive capacities, like concentration, memory, and verbal and math skills, that are part of some composite notion of “intelligence” in a particular human, it seems not at all necessary or inevitable that the consequence of more individuals with more intelligence will be improvements to humanness or humanity.

When it comes to the most difficult challenges facing humanity, the areas where an improved ability to act effectively would be “better” indeed, the main obstacle to progress really does not seem to be a lack of intelligent people. The most important problems, and those most characteristic of the irreducible dilemmas of humanness, are not amenable to radically improved solutions by rational analysis of individuals or small groups of humans. In particular, enhanced intelligence cannot tame two core realities of the human condition: conflict over values, and uncertainty about the future.

Let’s start with the values problem. Intelligent, well-meaning people may—and commonly do—nevertheless have incommensurable values, preferences, and worldviews about important issues. No optimization function exists for this diverse set of beliefs. In the trade-off between justice and mercy, for example, you may prefer more mercy, I may prefer more justice. In the context of terrorism, what is the appropriate trade-off between freedom and security? In the context of reproductive freedom, what is the point at which a developing embryo acquires the rights of a human being? There are, obviously, no right answers. Even questions that, in my view, had been entirely settled in our society—for example, absolute proscriptions on torture—end up re-emerging in debates over value trade-offs, with apparently intelligent people taking committed views that I

find incomprehensible and even offensive. So, to the extent that challenges to human well-being are related to disagreements about the balancing of competing values-and this extent is considerable-I can see no reason why we should connect the enhancement of intelligence to a capacity to better solve problems of value conflict that have bedeviled humanity since its beginnings.

Others, however, are more sanguine. In the spring of 2001 I participated in a planning workshop for a new program at the National Science Foundation on human performance enhancement. The other participants in this small group were drawn from places like IBM and Hewlett Packard, from the Lawrence Livermore and Sandia National Laboratories, from the Office of Naval Research and the National Institutes of Health. At one point the discussion turned from machine-brain interfaces where computers can be hooked up to human brains to augment cognitive function, to brain-brain interfaces, where the idea was that people would be able to communicate directly, without having to depend on the imprecisions of language, leading to a sort-of two-way facilitated ESP that would eliminate misunderstandings between people and help to usher in a new era of peaceful co-existence based on mutual understanding. I'm not making this up, either, and the people in this room were not science fiction writers-science fiction writers would never have suggested something so dumb-but scientists and engineers, quite enhanced relative to the norm.

You can see how dumb this is, right? If only people could see with perfect clarity what is in each other's brains, then they would understand each other and get along better. But what if people held conflicting values or interests or ways of understanding how the world worked? Would knowing what was going on in the heads of people with whom one disagreed be a path to harmony or conflict? Imagine two seasoned diplomats, say one from Israel and one a Palestinian, engaged in tense negotiations, and with direct access to the other's thoughts? My enhanced workshop colleagues were somehow missing the fact that what they saw as imperfections in language-something to be enhanced-also provide the subtlety, malleability, and ambiguity that in fact may keep people talking to each other rather than killing each other. I raised these points, and one participant acknowledged that he "hadn't thought about values," while another suggested I was being too negative. In any case, these enhanced individuals apparently didn't buy what I was saying. A year or so later the group-again, under the sponsorship of the National Science Foundation-issued a report that included a Baconian vision of performance enhancement technologies that "could achieve a golden age that would be a turning point for human productivity and quality of life. The Twenty-first century could end in world

peace, universal prosperity, and evolution to a higher level of compassion and accomplishment.”¹⁴ We’re not off to such a good start, however.

The second, quite related reality of the human condition that seems unresponsive to more intelligent individuals is the irreducibility of uncertainty about the future—a function of the complex nature of social and natural systems. No one knows how to intervene in complex systems to reliably yield particular desired results over the long-term. How has all of our advanced economic modeling and theoretical capacity helped us to avoid the sub-prime mortgage melt-down? Hundreds of thousands of academic publications on subjects ranging from ecosystems management to weapons non-proliferation to organizational management to immigration policy to improving the conditions of our inner cities have certainly added in some sense to our intelligence, but without adding much to our capacity to act with consistent or increasing effectiveness. The remarkable absence of increasingly effective practice in these broad areas of human affairs, despite all the effort aimed at better understanding, is not a statement about the limits of our intelligence but about the limits of the type of intelligibility that can reliably guide prescriptive action when the future is uncertain and values conflict. Cause-effect chains simply do not carry out very far from the present.

When people convince themselves that they are smart enough to escape from these limits, watch out. Consider the careful and persistent deliberations of a small group of influential people whose intelligence is supremely enhanced relative to the norm via privileged education and rarified social networks. I’m referring to the Neoconservatives who convened around the Project for the New American Century in the late 1990s, many of whom then rose to high level political posts in the Bush Administration. The insular deliberations of this group of extremely intelligent men gave rise to the theory that justified the War in Iraq—a theory of democratic nation-building that looked good for a few months but then turned out to be incapable of encompassing the widening gyre of consequences of the war. If you think I’m being partisan then you might prefer to consider the super-intelligent Kremlinites who thought it was a good idea for the Soviet Union to invade Afghanistan but instead helped to hasten the demise of their own empire. Or forget about war, what about the two Nobel-prize-winning economists who helped to found the risk-free hedge fund Long-Term Capital Management, but were unable to anticipate the downturns in the East Asian and then Russian economies that led to the fund’s collapse in 1998 after

¹⁴ Roco, M., and Bainbridge, W., *Converging Technologies for Improving Human Performance*, Dordrecht, Kluwer, 2002, p. 6.

incurring four billion dollars in losses; or the distributed cognitive network of bankers and corporate investors that gave mortgages to millions of people who might not be able to pay them back because, after all, housing prices could never go down.

When the system is complex, and when values conflict about what is to be done (the two go together, of course), muddling through is often the best we can do. Progress, when it occurs, is via trial-and-error, through learning what works in particular situations, through incremental change that incorporates such learning, and through the difficult process of political compromise that allows people to take a next step. Complex, value-laden problems like immigration, environmental degradation, health care system dysfunction, or conflict in the Middle East don't get solved; at best they get managed; at worst we lurch from crisis to crisis. What the political theorist Charles Lindblom called the intelligence of democracy is not a summation of IQ's that allows "smarter" societies to arrive at the right solution to a complex problem fraught with value conflict and complexity, but a melange of diverse worldviews and value structures that keeps democratic societies-some of the time-from doing anything too stupid. Obviously this does not mean that a nation of chimps would do as well as a nation of geniuses, but it does mean that a nation of geniuses needn't do any better than the standard normal distribution of cognitive capacities that we have at our disposal right now. Intelligence needs to co-evolve with and emerge from experience. When the hubris of intelligence gets out in front of what is learned from direct, contextual experience, the results are often disastrous.

We cannot enhance ourselves out of this dilemma any more than we can enhance ourselves out of gravity or entropy. The challenge is to our political and social institutions, not to our individual intellects. I am reluctant to mention the Transhumanist James Hughes in this regard, because to do so-even to show why he is wrong-gives his ideas more legitimacy than they merit-but Hughes does propose a connection between human enhancement and democracy, which leads him to argue that "increasing human intelligence will encourage liberty [and] democracy," and that "the more intelligent the citizen, the more capable they will be at assessing their own interests, understanding the political process and effectively organizing." This is nonsense for so many reasons. First it treats "intelligence" as some single attribute whose enhancement will inevitably yield a particular outcome. What about people of great intelligence who have been leaders of some of history's most authoritarian movements-perhaps for exactly the reasons Hughes states? Even if some sort of enhanced intelligence did allow people to better assess "their own interests," which seems like a strange claim to make, it's not as if "one's own interests" is a simple thing that, once recognized

in a particular way, will lead people to accept the legitimacy of advancing those interests democratically. Why wouldn't the opposite be the case, that people would, as they do now, seek whatever means they could find to advance their interests-in which case democracy and rule of law would remain the only antidote to the efforts of particular groups of enhanced people to pursue their interests at the expense of others?

Nobody knows, or can know, what the best distribution of intelligence in its many forms might be for a healthy democracy. Or, as the recently deceased conservative intellectual William F. Buckley famously explained, it is better to be governed by the first 2000 names in the phone book than by 2000 members of the Harvard University faculty¹⁵.

The incommensurability of human values and value systems, and the real world complexity that makes it so difficult to know how actions in the present will connect to consequences in the future, are direct and fatal challenges to the belief that technological enhancement of human cognitive capacities will chart some new and improved path toward better humanness and humanity. Humans do not live lives unconnected to other humans, and the outcomes of human enhancement will depend on the world into which enhanced traits are inserted, not on the enhancements themselves, as our enhanced soldiers in Iraq tell us.

Another way to put this is that if we were to imagine a better world, where humans and humanness are better, it would be a world with more justice, more equality, more peace, more freedom, more tolerance and friendship, more beauty, more opportunity. Such conditions, and the social and political changes that could encourage them, are not internalizable in the technologies of human enhancement, and even less can they be designed to emerge from the aggregate effects of enhanced individual traits in many humans. Transhumanism and the technological program for human enhancement turn out to be the mirror of, not the cure for, the modern human condition.

This reality will hardly be an obstacle to the proliferation of human enhancement technologies. One can hardly doubt that many, perhaps most, people will avail themselves of all the enhancements they can afford and can stomach if they believe they will individually benefit in some way. But we can best understand this process not as the noble pursuit of better humanness but as the usual brand of consumerism, advertised as self-improvement, embraced by hope, enforced by the fear of falling behind, and indefinitely sustained by the certainty that tomorrow's enhancements will soon come to feel boringly normal,

¹⁵ Meet the Press (1965), as quoted in KEYES, R. *The Quote Verifier: Who Said What, Where, and When*, St. Martin's Griffin pub., 2006, p. 82.

the civil union of Narcissus and Sisyphus. Meanwhile, the science and technology necessary to feed the consumption compulsion will be driven by the ongoing quest of technologically advanced nations for military and economic advantage.

Human capacities have co-evolved along with an array of organizational, cultural, and political approaches to manage the inescapable difficulties of a world of conflicting value structures and uncertainties about the future. Democratic governance is one of these approaches. As an atheist, I hope I will be offending no one except perhaps Richard Dawkins when I say that religion is another. In adopting the goals of religion-dominion, perfectibility, transcendence, and so on-Transhumanists and human enhancement advocates continue to extend the Enlightenment commitment to applying rational means to the improvement of human affairs. Yet one cannot help but perceive a sort of emotional autism in a world view that sees, for example, transcendence in terms of the downloading of the contents of one's brain into networked computers, and which somehow misses the point that the ends of religion are important to the worldly affairs of humans because of the means they can cultivate for pursuing a moral life, not because of the rewards they deliver in the hereafter.

I have a friend who may or may not have a mild case of obsessive-compulsive disorder, who tells me that when the chaos in his house gets to be too much for him to bear, when he can no longer stand to close the drawers his spouse leaves open or pick up the stuff his kids leave on the floor he takes an anti-anxiety pill, which makes it all okay for a little while. This avenue of rearranging our atoms to achieve a better world will certainly be one that some, perhaps many, will follow. At the limit of relativism, one might well say that there is no difference between drugging ourselves into believing that everything is getting better, and everything actually getting better. But unless we posit a Matrix-like world where people live only in their heads and the world is run by machines who don't care about anything, this approach doesn't take us very far. We will still need people to make decisions about what is to be done in the world, and they will still have to handle their different values, interests, ways of understanding, and lack of knowledge about how the future will unfold. We will remain imperfect, ignorant, and apparently ever hopeful that perhaps the next technological revolution will be the one that can make us better.