TECHNOLOGY

The Case Against Perfection

What's wrong with designer children, bionic athletes, and genetic engineering

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Breakthroughs in genetics present us with a promise and a predicament. The promise is that we may soon be able to treat and prevent a host of debilitating diseases. The predicament is that our newfound genetic knowledge may also enable us to manipulate our own nature—to enhance our muscles, memories, and moods; to choose the sex, height, and other genetic traits of our children; to make ourselves "better than well." When science moves faster than moral understanding, as it does today, men and women struggle to articulate their unease. In liberal societies they reach first for the language of autonomy, fairness, and individual rights. But this part of our moral vocabulary is ill equipped to address the hardest questions posed by genetic engineering. The genomic revolution has induced a kind of moral vertigo.

Consider cloning. The birth of Dolly the cloned sheep, in 1997, brought a torrent of concern about the prospect of cloned human beings. There are good medical reasons to worry. Most scientists agree that cloning is unsafe, likely to produce offspring with serious abnormalities. (Dolly recently died a premature death.) But suppose technology improved to the point where clones were at no greater risk than naturally conceived offspring. Would human cloning still be objectionable? Should our hesitation be moral as well as medical? What, exactly, is wrong with creating a child who is a genetic twin of one parent, or of an older sibling who has tragically died—or, for that matter, of an admired scientist, sports star, or celebrity?

Some say cloning is wrong because it violates the right to autonomy: by choosing a child's genetic makeup in advance, parents deny the child's right to an open future. A similar objection can be raised against any form of bioengineering that allows parents to select or reject genetic characteristics. According to this argument, genetic enhancements for musical talent, say, or athletic prowess, would point children toward particular choices, and so designer children would never be fully free.

At first glance the autonomy argument seems to capture what is troubling about human cloning and other forms of genetic engineering. It is not persuasive, for two reasons. First, it wrongly implies that absent a designing parent, children are free to choose their characteristics for themselves. But none of us chooses his genetic inheritance. The alternative to a cloned or genetically enhanced child is not one whose future is unbound by particular talents but one at the mercy of the genetic lottery.

Second, even if a concern for autonomy explains some of our worries about made-to-order children, it cannot explain our moral hesitation about people who seek genetic remedies or enhancements for themselves. Gene therapy on somatic (that is, nonreproductive) cells, such as muscle cells and brain cells, repairs or replaces defective genes. The moral quandary arises when people use such therapy not to cure a disease but to reach beyond health, to enhance their physical or cognitive capacities, to lift themselves above the norm.

Like cosmetic surgery, genetic enhancement employs medical means for nonmedical ends—ends unrelated to curing or preventing disease or repairing injury. But unlike cosmetic surgery, genetic enhancement is more than skin-deep. If we are ambivalent about surgery or Botox injections for sagging chins and furrowed brows, we are all the more troubled by genetic engineering for stronger bodies, sharper memories, greater intelligence, and happier moods. The question is whether we are right to be troubled, and if so, on what grounds.

In order to grapple with the ethics of enhancement, we need to confront questions largely lost from view—questions about the moral status of nature, and about the proper stance of human beings toward the given world. Since these questions verge on theology, modern philosophers and political theorists tend to shrink from them. But our new powers of biotechnology make them unavoidable. To see why this is so, consider four examples already on the horizon: muscle enhancement, memory enhancement, growth-hormone treatment, and reproductive technologies that enable parents to choose the sex and some genetic traits of their children. In each case what began as an attempt to treat a disease or prevent a genetic disorder now beckons as an instrument of improvement and consumer choice.

Muscles. Everyone would welcome a gene therapy to alleviate muscular dystrophy and to reverse the debilitating muscle loss that comes with old age. But what if the same therapy were used to improve athletic performance? Researchers have developed a synthetic gene that, when injected into the muscle cells of mice, prevents and even reverses natural muscle deterioration. The gene not only repairs wasted or injured muscles but also strengthens healthy ones. This success bodes well for human applications. H. Lee Sweeney, of the University of Pennsylvania, who leads the research, hopes his discovery will cure the immobility that afflicts the elderly. But Sweeney's bulked-up mice have already attracted the attention of athletes seeking a competitive edge. Although the therapy is not yet approved for human use, the prospect of genetically enhanced weight lifters, home-run sluggers, linebackers, and sprinters is easy to imagine. The widespread use of steroids and other performance-improving drugs in professional sports suggests that many athletes will be eager to avail themselves of genetic enhancement.

Suppose for the sake of argument that muscle-enhancing gene therapy, unlike steroids, turned out to be safe—or at least no riskier than a rigorous weight-training regimen. Would there be a reason to ban its use in sports? There is something unsettling about the image of genetically altered athletes lifting SUVs or hitting 650-foot home runs or running a three-minute mile. But what, exactly, is troubling about it? Is it simply that we find such superhuman spectacles too bizarre to contemplate? Or does our unease point to something of ethical significance?

It might be argued that a genetically enhanced athlete, like a drug-enhanced athlete, would have an unfair advantage over his unenhanced competitors. But the fairness argument against enhancement has a fatal flaw: it has always been the case that some athletes are better endowed genetically than others, and yet we do not consider this to undermine the fairness of competitive sports. From the standpoint of fairness, enhanced genetic differences would be no worse than natural ones, assuming they were safe and made available to all. If genetic enhancement in sports is morally objectionable, it must be for reasons other than fairness.

Memory. Genetic enhancement is possible for brains as well as brawn. In the mid-1990s scientists managed to manipulate a memory-linked gene in fruit flies, creating flies with photographic memories. More recently researchers have produced smart mice by inserting extra copies of a memory-related gene into mouse embryos. The altered mice learn more quickly and remember things longer than normal mice. The extra copies were programmed to remain active even in old age, and the improvement was passed on to offspring.

Human memory is more complicated, but biotech companies, including Memory Pharmaceuticals, are in hot pursuit of memory-enhancing drugs, or "cognition enhancers," for human beings. The obvious market for such drugs consists of those who suffer from Alzheimer's and other serious memory disorders. The companies also have their sights on a bigger market: the 81 million Americans over fifty, who are beginning to encounter the memory loss that comes naturally with age. A drug that reversed age-related memory loss would be a bonanza for the pharmaceutical industry: a Viagra for the brain. Such use would straddle the line between remedy and enhancement. Unlike a treatment for Alzheimer's, it would cure no disease; but insofar as it restored capacities a person once possessed, it would have a remedial aspect. It could also have purely nonmedical uses: for example, by a lawyer cramming to memorize facts for an upcoming trial, or by a business executive eager to learn Mandarin on the eve of his departure for Shanghai.

Some who worry about the ethics of cognitive enhancement point to the danger of creating two classes of human beings: those with access to enhancement technologies, and those who must make do with their natural capacities. And if the enhancements could be passed down the generations, the two classes might eventually become subspecies—the enhanced and the merely natural. But worry about access ignores the moral status of enhancement itself. Is the scenario troubling because the unenhanced poor would be denied the benefits of bioengineering, or because the enhanced affluent would somehow be dehumanized? As with muscles, so with memory: the fundamental question is not how to ensure equal access to enhancement but whether we should aspire to it in the first place.

Height. Pediatricians already struggle with the ethics of enhancement when confronted by parents who want to make their children taller. Since the 1980s human growth hormone has been approved for children with a hormone deficiency that makes them much shorter than average. But the treatment also increases the height of healthy children. Some parents of healthy children who are unhappy with their stature (typically boys) ask why it should make a difference whether a child is short because of a hormone deficiency or because his parents happen to be short. Whatever the cause, the social consequences are the same.

In the face of this argument some doctors began prescribing hormone treatments for children whose short stature was unrelated to any medical problem. By 1996 such "off-label" use accounted for 40 percent of human-growth-hormone prescriptions. Although it is legal to prescribe drugs for purposes not approved by the Food and Drug Administration, pharmaceutical companies cannot promote such use. Seeking to expand its market, Eli Lilly & Co. recently persuaded the FDA to approve its human growth hormone for healthy children whose projected adult height is in the bottom one percentile—under five feet three inches for boys and four feet eleven inches for girls. This concession raises a large question about the ethics of enhancement: If hormone treatments need not be limited to those with hormone deficiencies, why should they be available only to very short children? Why shouldn't all shorter-than-average children be able to seek treatment? And what about a child of average height who wants to be taller so that he can make the basketball team?

Some oppose height enhancement on the grounds that it is collectively self-defeating; as some become taller, others become shorter relative to the norm. Except in Lake Wobegon, not every child can be above average. As the unenhanced began to feel shorter, they, too, might seek treatment, leading to a hormonal arms race that left everyone worse off, especially those who couldn't afford to buy their way up from shortness.

But the arms-race objection is not decisive on its own. Like the fairness objection to bioengineered muscles and memory, it leaves unexamined the attitudes and dispositions that prompt the drive for enhancement. If we were bothered only by the injustice of adding shortness to the problems of the poor, we could remedy that unfairness by publicly subsidizing height enhancements. As for the relative height deprivation suffered by innocent bystanders, we could compensate them by taxing those who buy their way to greater height. The real question is whether we want to live in a society where parents feel compelled to spend a fortune to make perfectly healthy kids a few inches taller.

Sex selection. Perhaps the most inevitable nonmedical use of bioengineering is sex selection. For centuries parents have been trying to choose the sex of their children. Today biotech succeeds where folk remedies failed.

One technique for sex selection arose with prenatal tests using amniocentesis and ultrasound. These medical technologies were developed to detect genetic abnormalities such as spina bifida and Down syndrome. But they can also reveal the sex of the fetus—allowing for the abortion of a fetus of an undesired sex. Even among those who favor abortion rights, few advocate abortion simply because the parents do not want a girl. Nevertheless, in traditional societies with a powerful cultural preference for boys, this practice has become widespread.

Sex selection need not involve abortion, however. For couples undergoing *in vitro* fertilization (IVF), it is possible to choose the sex of the child before the fertilized egg is implanted in the womb. One method makes use of pre-implantation genetic diagnosis (PGD), a procedure developed to screen for genetic diseases. Several eggs are fertilized in a petri dish and grown to the eight-cell stage (about three days). At that point the embryos are tested to determine their sex. Those of the desired sex are implanted; the others are typically discarded. Although few couples are likely to undergo the difficulty and expense of IVF simply to choose the sex of their child, embryo screening is a highly reliable means of sex selection. And as our genetic knowledge increases, it may be possible to use PGD to cull embryos carrying undesired genes, such as those associated with obesity, height, and skin color. The science-fiction movie *Gattaca* depicts a future in which parents routinely screen embryos for sex, height, immunity to disease, and even IQ. There is something troubling about the *Gattaca* scenario, but it is not easy to identify what exactly is wrong with screening embryos to choose the sex of our children.

One line of objection draws on arguments familiar from the abortion debate. Those who believe that an embryo is a person reject embryo screening for the same reasons they reject abortion. If an eight-cell embryo growing in a petri dish is morally equivalent to a fully developed human being, then discarding it is no better than aborting a fetus, and both practices are equivalent to infanticide. Whatever its merits, however, this "pro-life" objection is not an argument against sex selection as such.

The latest technology poses the question of sex selection unclouded by the matter of an embryo's moral status. The Genetics & IVF Institute, a for-profit infertility clinic in Fairfax, Virginia, now offers a sperm-sorting technique that makes it possible to choose the sex of one's child before it is conceived. X-bearing sperm, which produce girls, carry more DNA than Y-bearing sperm, which produce boys; a device called a flow cytometer can separate them. The process, called MicroSort, has a high rate of success.

If sex selection by sperm sorting is objectionable, it must be for reasons that go beyond the debate about the moral status of the embryo. One such reason is that sex selection is an instrument of sex discrimination—typically against girls, as illustrated by the chilling sex ratios in India and China. Some speculate that societies with substantially more men than women will be less stable, more violent, and more prone to crime or war. These are legitimate worries—but the sperm-sorting company has a clever way of addressing them. It offers MicroSort only to couples who want to choose the sex of a child for purposes of "family balancing." Those with more sons than daughters may choose a girl, and vice versa. But customers may not use the technology to stock up on children of the same sex, or even to choose the sex of their firstborn child. (So far the majority of MicroSort clients have chosen girls.) Under restrictions of this kind, do any ethical issues remain that should give us pause?

The case of MicroSort helps us isolate the moral objections that would persist if muscle-enhancement, memory-enhancement, and height-enhancement technologies were safe and available to all.

It is commonly said that genetic enhancements undermine our humanity by threatening our capacity to act freely, to succeed by our own efforts, and to consider ourselves responsible—worthy of praise or blame—for the things we do and for the way we are. It is one thing to hit seventy home runs as the result of disciplined training and effort, and something else, something less, to hit them with the help of steroids or genetically enhanced muscles. Of course, the roles of effort and enhancement will be a matter of degree. But as the role of enhancement increases, our admiration for the achievement fades—or, rather, our admiration for the achievement shifts from the player to his pharmacist. This suggests that our moral response to enhancement is a response to the diminished agency of the person whose achievement is enhanced.

Though there is much to be said for this argument, I do not think the main problem with enhancement and genetic engineering is that they undermine effort and erode human agency. The deeper danger is that they represent a kind of hyperagency—a Promethean aspiration to remake nature, including human nature, to serve our purposes and satisfy our desires. The problem is not the drift to mechanism but the drive to mastery. And what the drive to mastery misses and may even destroy is an appreciation of the gifted character of human powers and achievements.

To acknowledge the giftedness of life is to recognize that our talents and powers are not wholly our own doing, despite the effort we expend to develop and to exercise them. It is also to recognize that not everything in the world is open to whatever use we may desire or devise. Appreciating the gifted quality of life constrains the Promethean project and conduces to a certain humility. It is in part a religious sensibility. But its resonance reaches beyond religion.

It is difficult to account for what we admire about human activity and achievement without drawing upon some version of this idea. Consider two types of athletic achievement. We appreciate players like Pete Rose, who are not blessed with great natural gifts but who manage, through striving, grit, and determination, to excel in their sport. But we also admire players like Joe DiMaggio, who display natural gifts with grace and effortlessness. Now, suppose we learned that both players took performance-enhancing drugs. Whose turn to drugs would we find more deeply disillusioning? Which aspect of the athletic ideal—effort or gift—would be more deeply offended?

Some might say effort: the problem with drugs is that they provide a shortcut, a way to win without striving. But striving is not the point of sports; excellence is. And excellence consists at least partly in the display of natural talents and gifts that are no doing of the athlete who possesses them. This is an uncomfortable fact for democratic societies. We want to believe that success, in sports and in life, is something we earn, not something we inherit. Natural gifts, and the admiration they inspire, embarrass the meritocratic faith; they cast doubt on the conviction that praise and rewards flow from effort alone. In the face of this embarrassment we inflate the moral significance of striving, and depreciate giftedness. This distortion can be seen, for example, in network-television coverage of the Olympics, which focuses less on the feats the athletes perform than on heartrending stories of the hardships they have overcome and the struggles they have waged to triumph over an injury or a difficult upbringing or political turmoil in their native land.

But effort isn't everything. No one believes that a mediocre basketball player who works and trains even harder than Michael Jordan deserves greater acclaim or a bigger contract. The real problem with genetically altered athletes is that they corrupt athletic competition as a human activity that honors the cultivation and display of natural talents. From this standpoint, enhancement can be seen as the ultimate expression of the ethic of effort and willfulness—a kind of high-tech striving. The ethic of willfulness and the biotechnological powers it now enlists are arrayed against the claims of giftedness.

The ethic of giftedness, under siege in sports, persists in the practice of parenting. But here, too, bioengineering and genetic enhancement threaten to dislodge it. To appreciate children as gifts is to accept them as they come, not as objects of our design or products of our will or instruments of our ambition. Parental love is not contingent on the talents and attributes a child happens to have. We choose our friends and spouses at least partly on the basis of qualities we find attractive. But we do not choose our children. Their qualities are unpredictable, and even the most conscientious parents cannot be held wholly responsible for the kind of children they have. That is why parenthood, more than other human relationships, teaches what the theologian William F. May calls an "openness to the unbidden."

May's resonant phrase helps us see that the deepest moral objection to enhancement lies less in the perfection it seeks than in the human disposition it expresses and promotes. The problem is not that parents usurp the autonomy of a child they design. The problem lies in the hubris of the designing parents, in their drive to master the mystery of birth. Even if this disposition did not make parents tyrants to their children, it would disfigure the relation between parent and child, and deprive the parent of the humility and enlarged human sympathies that an openness to the unbidden can cultivate.

To appreciate children as gifts or blessings is not, of course, to be passive in the face of illness or disease. Medical intervention to cure or prevent illness or restore the injured to health does not desecrate nature but honors it. Healing sickness or injury does not override a child's natural capacities but permits them to flourish.

Nor does the sense of life as a gift mean that parents must shrink from shaping and directing the development of their child. Just as athletes and artists have an obligation to cultivate their talents, so parents have an obligation to cultivate their children, to help them discover and develop their talents and gifts. As May points out, parents give their children two kinds of love: accepting love and transforming love. Accepting love affirms the being of the child, whereas transforming love seeks the well-being of the child. Each aspect corrects the excesses of the other, he writes: "Attachment becomes too quietistic if it slackens into mere acceptance of the child as he is." Parents have a duty to promote their children's excellence.

These days, however, overly ambitious parents are prone to get carried away with transforming love—promoting and demanding all manner of accomplishments from their children, seeking perfection. "Parents find it difficult to maintain an equilibrium between the two sides of love," May observes. "Accepting love, without transforming love, slides into indulgence and finally neglect. Transforming love, without accepting love, badgers and finally rejects." May finds in these competing impulses a parallel with modern science: it, too, engages us in beholding the given world, studying and savoring it, and also in molding the world, transforming and perfecting it.

The mandate to mold our children, to cultivate and improve them, complicates the case against enhancement. We usually admire parents who seek the best for their children, who spare no effort to help them achieve happiness and success. Some parents confer advantages on their children by enrolling them in expensive schools, hiring private tutors, sending them to tennis camp, providing them with piano lessons, ballet lessons, swimming lessons, SAT-prep courses, and so on. If it is permissible and even admirable for parents to help their children in these ways, why isn't it equally admirable for parents to use whatever genetic technologies may emerge (provided they are safe) to enhance their children's intelligence, musical ability, or athletic prowess?

The defenders of enhancement are right to this extent: improving children through genetic engineering is similar in spirit to the heavily managed, high-pressure child-rearing that is now common. But this similarity does not vindicate genetic enhancement. On the contrary, it highlights a problem with the trend toward hyperparenting. One conspicuous example of this trend is sports-crazed parents bent on making champions of their children. Another is the frenzied drive of overbearing parents to mold and manage their children's academic careers.

As the pressure for performance increases, so does the need to help distractible children concentrate on the task at hand. This may be why diagnoses of attention deficit and hyperactivity disorder have increased so sharply. Lawrence Diller, a pediatrician and the author of *Running on Ritalin*, estimates that five to six percent of American children under eighteen (a total of four to five million kids) are currently prescribed Ritalin, Adderall, and other stimulants, the treatment of choice for ADHD. (Stimulants counteract hyperactivity by making it easier to focus and sustain attention.) The number of Ritalin prescriptions for children and adolescents has tripled over the past decade, but not all users suffer from attention disorders or hyperactivity. High school and college students have learned that prescription stimulants improve concentration for those with normal attention spans, and some buy or borrow their classmates' drugs to enhance their performance on the SAT or other exams. Since stimulants work for both medical and nonmedical purposes, they raise the same moral questions posed by other technologies of enhancement.

However those questions are resolved, the debate reveals the cultural distance we have traveled since the debate over marijuana, LSD, and other drugs a generation ago. Unlike the drugs of the 1960s and 1970s, Ritalin and Adderall are not for checking out but for buckling down, not for beholding the world and taking it in but for molding the world and fitting in. We used to speak of nonmedical drug use as "recreational." That term no longer applies. The steroids and stimulants that figure in the enhancement debate are not a source of recreation but a bid for compliance—a way of answering a competitive society's demand to improve our performance and perfect our nature. This demand for performance and perfection animates the impulse to rail against the given. It is the deepest source of the moral trouble with enhancement.

Some see a clear line between genetic enhancement and other ways that people seek improvement in their children and themselves. Genetic manipulation seems somehow worse—more intrusive, more sinister—than other ways of enhancing performance and seeking success. But morally speaking, the difference is less significant than it seems. Bioengineering gives us reason to question the low-tech, high-pressure child-rearing practices we commonly accept. The hyperparenting familiar in our time represents an anxious excess of mastery and dominion that misses the sense of life as a gift. This draws it disturbingly close to eugenics.

The shadow of eugenics hangs over today's debates about genetic engineering and enhancement. Critics of genetic engineering argue that human cloning, enhancement, and the quest for designer children are nothing more than "privatized" or "free-market" eugenics. Defenders of enhancement reply that genetic choices freely made are not really eugenic—at least not in the pejorative sense. To remove the coercion, they argue, is to remove the very thing that makes eugenic policies repugnant.

Sorting out the lesson of eugenics is another way of wrestling with the ethics of enhancement. The Nazis gave eugenics a bad name. But what, precisely, was wrong with it? Was the old eugenics objectionable only insofar as it was coercive? Or is there something inherently wrong with the resolve to deliberately design our progeny's traits?

James Watson, the biologist who, with Francis Crick, discovered the structure of DNA, sees nothing wrong with genetic engineering and enhancement, provided they are freely chosen rather than state-imposed. And yet Watson's language contains more than a whiff of the old eugenic sensibility. "If you really are stupid, I would call that a disease," he recently told *The Times* of London. "The lower 10 percent who really have difficulty, even in elementary school, what's the cause of it? A lot of people would like to say, 'Well, poverty, things like that.' It probably isn't. So I'd like to get rid of that, to help the lower 10 percent." A few years ago Watson stirred controversy by saying that if a gene for homosexuality were discovered, a woman should be free to abort a fetus that carried it. When his remark provoked an uproar, he replied that he was not singling out gays but asserting a principle: women should be free to abort fetuses for any reason of genetic preference—for example, if the child would be dyslexic, or lacking musical talent, or too short to play basketball.

Watson's scenarios are clearly objectionable to those for whom all abortion is an unspeakable crime. But for those who do not subscribe to the pro-life position, these scenarios raise a hard question: If it is morally troubling to contemplate abortion to avoid a gay child or a dyslexic one, doesn't this suggest that something is wrong with acting on any eugenic preference, even when no state coercion is involved?

Consider the market in eggs and sperm. The advent of artificial insemination allows prospective parents to shop for gametes with the genetic traits they desire in their offspring. It is a less predictable way to design children than cloning or pre-implantation genetic screening, but it offers a good example of a procreative practice in which the old eugenics meets the new consumerism. A few years ago some Ivy League newspapers ran an ad seeking an egg from a woman who was at least five feet ten inches tall and athletic, had no major family medical problems, and had a combined SAT score of 1400 or above. The ad offered $50,000 for an egg from a donor with these traits. More recently a Web site was launched claiming to auction eggs from fashion models whose photos appeared on the site, at starting bids of $15,000 to $150,000.

On what grounds, if any, is the egg market morally objectionable? Since no one is forced to buy or sell, it cannot be wrong for reasons of coercion. Some might worry that hefty prices would exploit poor women by presenting them with an offer they couldn't refuse. But the designer eggs that fetch the highest prices are likely to be sought from the privileged, not the poor. If the market for premium eggs gives us moral qualms, this, too, shows that concerns about eugenics are not put to rest by freedom of choice.

A tale of two sperm banks helps explain why. The Repository for Germinal Choice, one of America's first sperm banks, was not a commercial enterprise. It was opened in 1980 by Robert Graham, a philanthropist dedicated to improving the world's "germ plasm" and counteracting the rise of "retrograde humans." His plan was to collect the sperm of Nobel Prize-winning scientists and make it available to women of high intelligence, in hopes of breeding supersmart babies. But Graham had trouble persuading Nobel laureates to donate their sperm for his bizarre scheme, and so settled for sperm from young scientists of high promise. His sperm bank closed in 1999.

In contrast, California Cryobank, one of the world's leading sperm banks, is a for-profit company with no overt eugenic mission. Cappy Rothman, M.D., a co-founder of the firm, has nothing but disdain for Graham's eugenics, although the standards Cryobank imposes on the sperm it recruits are exacting. Cryobank has offices in Cambridge, Massachusetts, between Harvard and MIT, and in Palo Alto, California, near Stanford. It advertises for donors in campus newspapers (compensation up to $900 a month), and accepts less than five percent of the men who apply. Cryobank's marketing materials play up the prestigious source of its sperm. Its catalogue provides detailed information about the physical characteristics of each donor, along with his ethnic origin and college major. For an extra fee prospective customers can buy the results of a test that assesses the donor's temperament and character type. Rothman reports that Cryobank's ideal sperm donor is six feet tall, with brown eyes, blond hair, and dimples, and has a college degree—not because the company wants to propagate those traits, but because those are the traits his customers want: "If our customers wanted high school dropouts, we would give them high school dropouts."

Not everyone objects to marketing sperm. But anyone who is troubled by the eugenic aspect of the Nobel Prize sperm bank should be equally troubled by Cryobank, consumer-driven though it be. What, after all, is the moral difference between designing children according to an explicit eugenic purpose and designing children according to the dictates of the market? Whether the aim is to improve humanity's "germ plasm" or to cater to consumer preferences, both practices are eugenic insofar as both make children into products of deliberate design.

A number of political philosophers call for a new "liberal eugenics." They argue that a moral distinction can be drawn between the old eugenic policies and genetic enhancements that do not restrict the autonomy of the child. "While old-fashioned authoritarian eugenicists sought to produce citizens out of a single centrally designed mould," writes Nicholas Agar, "the distinguishing mark of the new liberal eugenics is state neutrality." Government may not tell parents what sort of children to design, and parents may engineer in their children only those traits that improve their capacities without biasing their choice of life plans. A recent text on genetics and justice, written by the bioethicists Allen Buchanan, Dan W. Brock, Norman Daniels, and Daniel Wikler, offers a similar view. The "bad reputation of eugenics," they write, is due to practices that "might be avoidable in a future eugenic program." The problem with the old eugenics was that its burdens fell disproportionately on the weak and the poor, who were unjustly sterilized and segregated. But provided that the benefits and burdens of genetic improvement are fairly distributed, these bioethicists argue, eugenic measures are unobjectionable and may even be morally required.

The libertarian philosopher Robert Nozick proposed a "genetic supermarket" that would enable parents to order children by design without imposing a single design on the society as a whole: "This supermarket system has the great virtue that it involves no centralized decision fixing the future human type(s)."

Even the leading philosopher of American liberalism, John Rawls, in his classic *A Theory of Justice* (1971), offered a brief endorsement of noncoercive eugenics. Even in a society that agrees to share the benefits and burdens of the genetic lottery, it is "in the interest of each to have greater natural assets," Rawls wrote. "This enables him to pursue a preferred plan of life." The parties to the social contract "want to insure for their descendants the best genetic endowment (assuming their own to be fixed)." Eugenic policies are therefore not only permissible but required as a matter of justice. "Thus over time a society is to take steps at least to preserve the general level of natural

abilities and to prevent the diffusion of serious defects."

But removing the coercion does not vindicate eugenics. The problem with eugenics and genetic engineering is that they represent the one-sided triumph of willfulness over giftedness, of dominion over reverence, of molding over beholding. Why, we may wonder, should we worry about this triumph? Why not shake off our unease about genetic enhancement as so much superstition? What would be lost if biotechnology dissolved our sense of giftedness?

From a religious standpoint the answer is clear: To believe that our talents and powers are wholly our own doing is to misunderstand our place in creation, to confuse our role with God's. Religion is not the only source of reasons to care about giftedness, however. The moral stakes can also be described in secular terms. If bioengineering made the myth of the "self-made man" come true, it would be difficult to view our talents as gifts for which we are indebted, rather than as achievements for which we are responsible. This would transform three key features of our moral landscape: humility, responsibility, and solidarity.

In a social world that prizes mastery and control, parenthood is a school for humility. That we care deeply about our children and yet cannot choose the kind we want teaches parents to be open to the unbidden. Such openness is a disposition worth affirming, not only within families but in the wider world as well. It invites us to abide the unexpected, to live with dissonance, to rein in the impulse to control. A *Gattaca*-like world in which parents became accustomed to specifying the sex and genetic traits of their children would be a world inhospitable to the unbidden, a gated community writ large. The awareness that our talents and abilities are not wholly our own doing restrains our tendency toward hubris.

Though some maintain that genetic enhancement erodes human agency by overriding effort, the real problem is the explosion, not the erosion, of responsibility. As humility gives way, responsibility expands to daunting proportions. We attribute less to chance and more to choice. Parents become responsible for choosing, or failing to choose, the right traits for their children. Athletes become responsible for acquiring, or failing to acquire, the talents that will help their teams win.

One of the blessings of seeing ourselves as creatures of nature, God, or fortune is that we are not wholly responsible for the way we are. The more we become masters of our genetic endowments, the greater the burden we bear for the talents we have and the way we perform. Today when a basketball player misses a rebound, his coach can blame him for being out of position. Tomorrow the coach may blame him for being too short. Even now the use of performance-enhancing drugs in professional sports is subtly transforming the expectations players have for one another; on some teams players who take the field free from amphetamines or other stimulants are criticized for "playing naked."

The more alive we are to the chanced nature of our lot, the more reason we have to share our fate with others. Consider insurance. Since people do not know whether or when various ills will befall them, they pool their risk by buying health insurance and life insurance. As life plays itself out, the healthy wind up subsidizing the unhealthy, and those who live to a ripe old age wind up subsidizing the families of those who die before their time. Even without a sense of mutual obligation, people pool their risks and resources and share one another's fate.

But insurance markets mimic solidarity only insofar as people do not know or control their own risk factors. Suppose genetic testing advanced to the point where it could reliably predict each person's medical future and life expectancy. Those confident of good health and long life would opt out of the pool, causing other people's premiums to skyrocket. The solidarity of insurance would disappear as those with good genes fled the actuarial company of those with bad ones.

The fear that insurance companies would use genetic data to assess risks and set premiums recently led the Senate to vote to prohibit genetic discrimination in health insurance. But the bigger danger, admittedly more speculative, is that genetic enhancement, if routinely practiced, would make it harder to foster the moral sentiments that social solidarity requires.

Why, after all, do the successful owe anything to the least-advantaged members of society? The best answer to this question leans heavily on the notion of giftedness. The natural talents that enable the successful to flourish are not their own doing but, rather, their good fortune—a result of the genetic lottery. If our genetic endowments are gifts, rather than achievements for which we can claim credit, it is a mistake and a conceit to assume that we are entitled to the full measure of the bounty they reap in a market economy. We therefore have an obligation to share this bounty with those who, through no fault of their own, lack comparable gifts.

A lively sense of the contingency of our gifts—a consciousness that none of us is wholly responsible for his or her success—saves a meritocratic society from sliding into the smug assumption that the rich are rich because they are more deserving than the poor. Without this, the successful would become even more likely than they are now to view themselves as self-made and self-sufficient, and hence wholly responsible for their success. Those at the bottom of society would be viewed not as disadvantaged, and thus worthy of a measure of compensation, but as simply unfit, and thus worthy of eugenic repair. The meritocracy, less chastened by chance, would become harder, less forgiving. As perfect genetic knowledge would end the simulacrum of solidarity in insurance markets, so perfect genetic control would erode the actual solidarity that arises when men and women reflect on the contingency of their talents and fortunes.

Thirty-five years ago Robert L. Sinsheimer, a molecular biologist at the California Institute of Technology, glimpsed the shape of things to come. In an article titled "The Prospect of Designed Genetic Change" he argued that freedom of choice would vindicate the new genetics, and set it apart from the discredited eugenics of old.

> To implement the older eugenics ... would have required a massive social programme carried out over many generations. Such a programme could not have been initiated without the consent and co-operation of a major fraction of the population, and would have been continuously subject to social control. In contrast, the new eugenics could, at least in principle, be implemented on a quite individual basis, in one generation, and subject to no existing restrictions.

According to Sinsheimer, the new eugenics would be voluntary rather than coerced, and also more humane. Rather than segregating and eliminating the unfit, it would improve them. "The old eugenics would have required a continual selection for breeding of the fit, and a culling of the unfit," he wrote. "The new eugenics would permit in principle the conversion of all the unfit to the highest genetic level."

Sinsheimer's paean to genetic engineering caught the heady, Promethean self-image of the age. He wrote hopefully of rescuing "the losers in that chromosomal lottery that so firmly channels our human destinies," including not only those born with genetic defects but also "the 50,000,000 'normal' Americans with an IQ of less than 90." But he also saw that something bigger than improving on nature's "mindless, age-old throw of dice" was at stake. Implicit in technologies of genetic intervention was a more exalted place for human beings in the cosmos. "As we enlarge man's freedom, we diminish his constraints and that which he must accept as given," he wrote. Copernicus and Darwin had "demoted man from his bright glory at the focal point of the universe," but the new biology would restore his central role. In the mirror of our genetic knowledge we would see ourselves as more than a link in the chain of evolution: "We can be the agent of transition to a whole new pitch of evolution. This is a cosmic event."

There is something appealing, even intoxicating, about a vision of human freedom unfettered by the given. It may even be the case that the allure of that vision played a part in summoning the genomic age into being. It is often assumed that the powers of enhancement we now possess arose as an inadvertent by-product of biomedical progress—the genetic revolution came, so to speak, to cure disease, and stayed to tempt us with the prospect of enhancing our performance, designing our children, and perfecting our nature. That may have the story backwards. It is more plausible to view genetic engineering as the ultimate expression of our resolve to see ourselves astride the world, the masters of our nature. But that promise of mastery is flawed. It threatens to banish our appreciation of life as a gift, and to leave us with nothing to affirm or behold outside our own will.

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