

Designer Babies

Ian Hunt

Just recently, the journal *Nature* published a report by some scientists who had placed a repeat of a gene for a brain chemical in some mice embryos. These genetically engineered mice learned more quickly and retained their learning longer as they grew up. Their enhanced learning ability was retained in adulthood and was passed on to their offspring. The scientists claimed that their study had identified a bio-chemical process, which is involved in learning and likely to be shared between humans and mice. This pointed to “the possibility that enhancement of learning and memory or even IQ is feasible through genetic engineering.”¹ My attention was caught, not so much by the scientists’ claim, but by the reaction of some leading ethicists in Britain.² The head of ethics at the British Medical Association reportedly said that “this discovery leads to the spectre of designer babies and the concept of children being rejected because they do not have these qualities.” Dr James Yeandel of Britain’s Human Fertilisation and Embryology Authority was reported as saying that “creating super-intelligent babies would be deeply unacceptable and would not be allowed in Britain.” A spokeswoman for an anti-abortion group called the research “an insult to humanity.”

I will suppose for the sake of argument that this bit of genetic engineering will (eventually) work on humans. I shall ask whether we can justify the hostile reaction to the possibility just cited that human beings could be engineered to learn and remember better. The proposed change would seem to be good for those who undergo it, since being able to learn more rapidly

© *Professional Ethics* 1999. Correspondence may be sent to Ian Hunt, Philosophy Department, Humanities Building, Flinders University of South Australia, Bedford Park, SA, 5042, Australia; e-mail: Ian.Hunt@flinders.edu.au.

and remember longer is, on the face of it, a good thing. So why is the possibility of such genetic engineering of human babies so alarming? Would such a bit of genetic engineering differ significantly from removing the gene for Huntington's chorea from an embryo, which could also be said to be good for the person that developed from it? Should we reject any kind of genetic engineering of human beings?

My intention here is to examine the ethical limits of the use of genetic modification of the human germ line to produce offspring with desired characteristics. I shall consider whether there are any arguments for limiting its use that would justify vehement opposition to it.

One argument for restricting genetic modification of germ line cells has been that its risks are too great to be acceptable. The claim is that modifying the genome of a baby may harm not only the baby but afflict indefinitely many subsequent generations. This argument has less force than is sometimes supposed but, as I shall show, it suggests that genetic modification of germ-line cells is impermissible where its reversal cannot be guaranteed.

I then put forward two further arguments for limiting genetic modification. I shall argue that parents are not entitled to modify the genome of their children in ways that those children may well come to reject, since parents do not own their children, and can only vicariously suffer the consequences of what they do to them. Finally, I shall argue that the greatest risk of genetic modification in our society is increased inequality of opportunity. I shall conclude that, given this, substantial improvements to the prospects of children through genetic modification must be available to all children if available to any.

My view of the ethical limits of genetic engineering of human beings—creating “designer babies”—will therefore fall somewhere between the permissive view of John Harris and the restrictive view of David Suzuki and Peter Knudtson. Harris can see no objection to allowing parents to design their children as they wish with respect to personal characteristics that do not matter, even with respect to gender. He does object to the inequity of only some people being able to afford “new breed” children with significant life advantages, but seems to assume that this will happen anyway, however deplorable it may be.³ Suzuki and Knudtson, on the other hand, seem to think that no tampering with the human germ line would be consistent with sound “genethical” principles.⁴

Somatic and Germ Cell Modification: Do These Morally Differ?

Suzuki claims that while genetic manipulation of somatic cells falls within the realm of personal choice, tinkering with human germ line cells does not. This is because somatic cells constitute the phenotypic expression of an individual's complete genetic blueprint. According to Darwinian theory, mutations of genes in somatic cells are not inherited. On the other hand, changes to germ line cells (sperm or ova) will affect any children that develop from them. Suzuki thinks that such changes could be permissible only with the consent of all members of society.⁵ In practice, this would amount to saying that it could not happen, since religious differences would mean that such unanimous consent could not be obtained in any foreseeable future.

But why should there be this wide moral gulf between two kinds of genetic modification? The reasons given appear to be twofold. The first is that germ line changes will change the human gene pool for the worse. The second is that, given inevitable limits on our knowledge of the effects of genetic modification, we have no right to make changes in the human germ line. For a mistake about the benefits of such changes could afflict not only those who wanted them but would be passed on to indefinitely many future generations.

In support of the first claim, Suzuki and Knudtson suggest that genetic engineering leads to three types of harmful change to the human gene pool. The first is reduction of diversity within the gene pool, the second removal of genes which are there only because they have beneficial effects, and the third is addition of genes that would have been present anyway if they had been beneficial. The second claim presupposes that modifications to germ line cells must be passed on to indefinitely many new generations and thus presupposes that such changes could not be reversed if we decided they should be. I shall consider each of these claims in turn.

Using the example of the gene for sickle cell anemia, Suzuki and Knudtson suggest that genes can have good effects combined with some genes in certain circumstances even though they have bad effects in other circumstances. This is so in the case of the gene for sickle cell anemia, as they take pains to show. When inherited from both parents, this gene produces debilitating, life-shortening anemia, whereas it produces increased resistance to the malaria parasite in individuals who inherit it from only one

parent. The gene can therefore spread and can be found in up to 30 % of individuals in malarial environments. Why, we might ask, would such genes be preserved at all, given natural selection, if they did not have beneficial effects that we would be unwise to throw away with their bad effects?

In general terms, however, we have no reason to suppose that natural selection produces a human gene pool that contains only genes that are at least beneficial in some circumstances, or in some combinations with other genes. Genes can persist even though they are not selected for in any circumstances in any combination. They may be harmless relics of our genetic ancestry. Or they may be like the gene for Huntington's chorea. This gene persists because it only harms people past their normal child bearing age, and so only marginally affects their reproductive success.

Suzuki and Knudtson suggest that genetic engineering would lead to a worrying reduction of diversity in the human gene pool. However, not every kind of diversity of genes contributes to the capacity of a gene pool to survive environmental changes. Too extreme diversity in the human gene pool might even make human beings incapable of interbreeding. Also, some reductions in diversity improve the capacity of the gene pool to survive environmental change. Many of our human ancestors might have lacked the capacity for speech, like our ape cousins. But the process that eliminated that diversity arguably made human beings better equipped to survive environmental change. I can therefore see no genetic harm in having that diversity eliminated. I can see harm in valuing only members of Mensa, for example, but can see no genetic (or moral) harm in a convergence of the range of performance in IQ tests toward those that today's Mensa members achieve.⁶

Although reduction of genetic diversity in a gene pool does not necessarily reduce its capacity to survive environmental changes, Suzuki and Knudtson are right to suggest that thoroughgoing convergence could make our gene pool less adaptable, as well as possibly reflecting appalling values. But if we cannot assume that any reduction in diversity is going to do this, this is only an argument for limiting genetic convergence. Resource constraints will limit any engineered genetic convergence so that it is less than thoroughgoing. And, if damaging convergence threatens despite these constraints, moral constraints may be imposed. I shall argue later that there should be moral as well as resource constraints on what genetic changes we allow. These constraints may be sufficient to prevent a dangerous reduction

in genetic diversity. Even if they will not suffice, it does not follow that we should cling to the present degree of diversity in our gene pool to underpin its capacity to survive environmental change. It follows only that we should impose the necessary restraint.

Genetic engineering, therefore, does not necessarily remove needed beneficial genes or damagingly reduce diversity in the human gene pool. I shall now show that, since not all beneficial mutations will inevitably occur in nature, it is legitimate to intervene in order to help improvements to arise. Natural selection cannot be seen as the vehicle through which a benevolent creator operates. Since natural selection is blind, not all genes that would provide overall benefits have already been selected for. Natural selection favours only a local optimum in reproductive success. Beneficial genes may not emerge because they could be reached only through a chain of mutations, some of which are harmful. Some mutations simply might not occur by chance.

We have some reason, perhaps, to be suspicious of my initial example of possible genetic improvement. The addition of an extra copy of a gene could, it seems, occur through a single mutation. And, if the experimenters are correct in surmising that the memory mechanism they modified is shared by species as far apart as mice and men, then this seemingly strongly beneficial mutation has had a rather long time to occur. But, even if it is as beneficial as it seems and it has had tens of millions of years to occur, it still may not have happened, simply by chance. We therefore should not reject genetic engineering sight unseen simply because to accept that it could lead to improvement would imply that the creator has done a less than perfect job.

On the other hand, mistakes in genetic engineering are possible, and this gives us reason to be cautious. It gives us reason to treat genetic modifications as though they were new drugs, subjecting them to animal trials and pilot human trials, initially on somatic cells. Nevertheless, if mistakes in genetically engineering somatic cells could be acceptable, despite their tragic consequences, why should we reject those on germ cells? There is one reason for rejecting it. In the case of germ cell modifications, the victim of the mistake is wronged in a way that a person who consciously decided to take the risks involved would not be. I think, however, that this argument is not decisive, since it would prohibit parental decisions on any matter affecting their children.

Suzuki and Knudtson suggest that the possibility of mistakes in the case of germ line modifications is especially frightful because it would visit uninvited consequences on not just one but countless new generations. But we cannot assume this unless we suppose that mistaken genetic modifications of germ line cells could not be undone. Even if addition of a gene was easier than its removal under technologies available when Suzuki and Knudtson wrote, it does not follow that reversible genetic engineering of the human germ line will forever be impossible.⁷ If it is not impossible, this argues for a prohibition of genetic engineering that is not demonstrably reversible rather than for a blanket prohibition.

It may be objected that we can only ever establish the technical possibility of reversing a genetic change. We may want to insist that we have more than a mere technical possibility of reversing an engineered change in the human germ line before permitting it. To take the example of introducing a repeat of a gene for a brain chemical to improve learning and memory, it may turn out that this produces people who quickly learn and remember vicious ways. These genetically engineered misfits may resist any attempt to have the change engineered out of their germ line. Thus, reversal of the change may be technically but not socially possible.

I do not think, though, that such a possibility provides a compelling reason to refuse genetically engineered change in germ cells. Even in a worst case scenario, where a genetically engineered misfit resists attempts to prevent transfer of a new gene to another generation, there is still only a remote chance that the bad gene would be passed on. After all, it usually takes two to pass on genes to a new generation, and genetically engineered misfits would surely have little chance of reproductive success. True, we would still have a personal tragedy, possibly compounded by forms of social ostracism, and this would give us good reason to avoid such outcomes. But, while we would be responsible for permitting genetic engineering that led to tragic outcomes, there is no real prospect that we would have responsibility for such tragedies among countless generations to come. There is therefore no reason to refuse genetic engineering of germ line cells if we are prepared to sanction tampering with somatic cells, where unforeseen and tragic outcomes are equally possible, and could be just as momentous.

May Parents Engineer Snub Noses and Dimpled Cheeks?

Asking whether we should “permit parents to determine things like gender, hair and eye colour, physique, height” and so on, Harris takes a relaxed view of it all.⁸ He claims that we should allow parents to choose such traits if they are not important. He asks “If it is not wrong to hope for a bouncing, brown eyed, curly haired, and bonny baby, can it be wrong, deliberately to ensure that one has just such a baby? If it would not be wrong for God or nature to grant such a wish, can it be wrong to grant it to oneself?”⁹ Of course, it is not wrong to hope for a boy or a girl, a brown eyed or blue eyed, blond or dark haired, baby. We look fondly on such parental expectations. Parents can also hope that their child will be a doctor, a professor, or prime minister. Such wishes can be expected, even respected. Yet we might think it wrong for parents deliberately to ensure that their career wishes for their children were fulfilled, or to grant such wishes for themselves, even if that is just what many parents do. Parents who try to determine their children’s careers do not sufficiently respect their children’s autonomy. Parents may encourage their children to take a path that they prefer rather than another, when both alternatives are acceptable, but they shouldn’t make their children take any particular path, just because they wish it.

An embryo, of course, is incapable of choosing for itself the eye or hair colour of the baby that develops from it. Parents who ensure that their child takes one career rather than another can be said to override their child’s autonomy, but choosing a baby’s eye colour can hardly override the embryo’s autonomy, since it does not have any. This is true, but such actions can still fail to respect or acknowledge adequately the autonomy of the child-to-be.

Consider what we expect of parents whose child ends up in a coma as a result of a car accident. The child in a coma clearly cannot make its own decisions. Therefore, while it is in the coma, the parents would not be overriding their child’s autonomy if they made decisions on his or her behalf. We would expect, for example, that the parents would take care of the child’s property. But if they went further, by deciding to renovate their child’s home with a colour scheme and fittings that they fancied, we would condemn this as failing to respect the autonomy of their child. In managing a child’s affairs, we expect parents to pay regard to what the child would

want, and confine decisions that they make on their child's behalf to matters vital to its well-being.

One difference between this case and that of a yet to be born child is that the child in the coma is a pre-existing person with his or her own preferences. In making decisions on their child's behalf, the parents can take into account what their child has wanted in the past. The child may still object to their decisions when he or she emerges from the coma, perhaps because the parents have illusions about their child, or possibly because the child emerges from the coma as a new person. But the yet-to-be-born child has no preferences that parents could take into account when acting on its behalf.

Yet an embryo may develop into a person with preferences of his or her own. And, in the case of the child in a coma, we expect of parents more than just respect for what they know their child would want. They also should not take decisions in relatively unimportant matters that the child might well object to, even when they have no idea what their child might want in such matters. I suggest that we are equally entitled to object to decisions by parents in unimportant matters if the child yet-to-be-born might well come to reject those decisions. In weighing whether to make their child snub-nosed because they would find that adorable, parents should pause to consider the possibility that the child might grow up to detest her snub-nose, and say how much she hated her parents for imposing it on her. The point here is not just that the child dislikes what the parents decide. Children may dislike their names, for example, but they must have one from birth. Parents must make a decision in the child's interests, though they should still be careful and, rather than simply take their own wishes into account, consider also that the child has to live with its given name. The point, rather, is that decisions on trivial features of a child are not ones that the parents must take in their child's interests, for better or worse, but ones that they take to get what they themselves want, even though they can only vicariously suffer any of its consequences. Such decisions do not sufficiently acknowledge that the child will one day be an autonomous person.

Yet, if we accept this, will we not put parents in a position where they could be condemned if they do, and condemned if they don't? If they leave their child with a longish nose, might not the child grow up to say that it would have loved a snub-nose instead, and ask them accusingly "Why didn't you give me a snub-nose when you had the chance?"

One inadequate response to this would be to say that we may blame parents for actively intervening to determine their child's looks but not for omitting to do so. This would work only if there is a difference between acting and omitting to act that is, in itself, morally relevant. I shall not review here all the attempts to make sense of the distinction in the hope of sustaining the claim that there is some inherent moral difference between actions and omissions.¹⁰ But the following example shows why I think these attempts are doomed to failure.

It seems intuitively true that I am obliged not to drop rocks on a person clinging to a ledge on a cliff face below me, but need not be obliged to rescue that person. This intuition seems to follow from the principle that I am obliged not to harm others, if I am able to do so without prohibitive cost to myself. For it is hard to imagine how I could be unable not to drop rocks on a person clinging to a cliff ledge below, or how the cost of refraining from doing so could be prohibitive. And it is easy to imagine how I might not have the skills required to rescue the person without prohibitive risk to my own life, especially if I have given no special undertaking to take such risks, as a member of a rescue team might have. But what if I am also trapped on the cliff, and will die there unless I take a path to the top that will inevitably dislodge rocks on the person trapped below? Alternatively, what if I am on the top of the cliff and have a rope that I can easily anchor on a tree and drop within reach of the person below? In these circumstances, the cost of refraining from dropping rocks on the person below might well be prohibitive, while the cost of rescue would be so slight as to make any failure to rescue inexcusable. I see no plausibility in the idea that parents can escape responsibility for the traits their child has simply because they omitted to change them.

There is, however, a way out of the dilemma that has the same effect. If it is wrong for parents to intervene in unimportant matters concerning their child, we could prohibit such actions. Parents would then have a perfectly reasonable response to the accusation "Why didn't you give me a snub-nose?" They could say that they should no more be blamed for something prohibited than for what formerly was impossible. Children might nowadays complain that their parents gave them a snub-nose, but it is hard to take such complaints all that seriously when parents would only have had the option of not having a child at all. Prohibiting genetic engineering that would make parents responsible for trivial traits of their children would equally make it

hard to take such complaints seriously. So, I propose that, contrary to Harris' permissive attitude, we should prohibit trivial genetic engineering.

This prohibition would be justified on the ground that respect for a future autonomous status requires parents not to impose their fancies on their children. For parents to take it upon themselves to determine their child's eye or hair colour is to treat their child as if it were a piece of property or plaything. Parents may ensure that they have a blue-eyed, blond, Barbie doll, but should not be allowed to tamper with the lottery of sexual reproduction merely to satisfy their wish that they have a blond, blue-eyed, child.

There is an additional reason for prohibiting such uses of genetic engineering that Harris does not notice, surprisingly given his professed concern over inequities that could flow from differential access to the ability to have children who belong to the "new breed."¹¹ This is that resources for genetic engineering are likely to remain limited for the foreseeable future, and we have an obligation to ensure that they are devoted to more serious purposes than determining whether a child looks the way its parents want. Such considerations already justify hospital policies that prevent allocation of scarce medical resources to merely cosmetic surgery.

Harris claims that traits such as hair or eye colour "are important or they are not." However, we must consider not only the direct cost (or benefit) of changing a gene but also its opportunity cost. The expected direct cost (or benefit) of determining eye colour may be slight, but the opportunity cost of diverting resources to such ends from more important genetic engineering may be enormous. To see this, imagine the feelings of anxious parents-to-be upon being informed by a future centre for genetic engineering that their access to a procedure for removing the gene for severe muscular dystrophy depends on the outcome of a lottery, because demand for snub noses and curly hair has been greater than expected. For the foreseeable future, scarce medical resources in genetic engineering should be allocated to serve vital interests of yet to be born children. To ensure this, and to affirm that children are their own persons and not the property of their parents, we should prohibit genetic engineering of human embryos for trivial ends. I shall now turn to consider the ethical limits of making genetic changes that are not trivial but would significantly affect the interests of the children who undergo them.

Removing Threats to Life and Enhancing Capabilities

Jonathan Glover claims that we should accept the removal of genetic “defects,” which can be called “negative” genetic engineering. He claims that there can be no reason against it. However, he recognizes that whether it is acceptable to “improve” people in significant ways through genetic engineering is more disputed. Glover asks whether the line between negative and positive genetic engineering marks the boundaries of what is morally acceptable.¹²

I doubt that there is a useful distinction between negative and positive genetic engineering. After all, to remove a defect from a human genome is surely to improve it. But I think Glover is after a useful distinction. It is between removing genetic threats to life and functioning, on the one hand, and genetically enhancing human capabilities, on the other hand. The first, like medical treatments in general, is not likely to be sought by everyone or, indeed, by anyone, unless they suffer from the life threatening or disabling condition. Genetic threats to life range from a gene for the a-encephalic condition, through genes for muscular dystrophy and Huntington’s chorea, to homozygous genes for sickle-cell anemia. In addition there can be threats to functioning that are nowadays not so life threatening, such as congenital blindness or autism. Threats to life can be relatively severe and, because of that, usually relatively rare. It would probably not take vast resources to deal with every known case of such conditions. Nor would it take much more to deal also with possible genetic causes of severely reduced functioning, such as autism. One day we could, perhaps, respond to these rare conditions either by trying to “infect” somatic cells with an alternative gene, accompanied with instructions to express that gene instead of the defective one, or trying to alter the sperm or ova of those afflicted, so that future generations are not.

Such treatments would no more devalue the “essence” of a person who had the problem than any other medical treatment. Since we do not identify people with their conditions, no matter how much their lives are marked by them, we can still value the people while refusing to value their condition. We would not rather that people with such conditions had never been born, but only that no more people should be born who would undergo suffering or loss of opportunity such as theirs.

On the other hand, everyone might seek some genetic improvement of important capabilities for their children. Glover is concerned about who would decide what changes would be made. But this is not my central concern. I shall take it that it would be unacceptable to force genetic “improvements” on people. This would rule out the first of Glover’s options, a central body for making decisions on genetic change. We are therefore looking only at the second or third of his options, either parental choice governed by regulation or a genetic “supermarket” with no regulation other than that involved in markets generally.¹³

To a degree, talk about capabilities avoids questions as to whether society has any right to support changes that produce this kind of person rather than that. Basic capabilities are called for in a wide, if not universal, range of life choices. In committing to improve those capabilities, we would not need to wonder whether the possible genetic basis of heterosexual inclinations is an “improvement” on some hypothetical gene for homosexual inclinations. We would be concerned rather with the impact of genetic engineering on capabilities such as those that Amartya Sen and Martha Nussbaum claim everyone deserves a decent measure of in a just society.¹⁴ Or at least, we would consider the genetic basis of such capabilities, and be asking when attempts to improve that basis would be morally acceptable.

The capabilities in question include autonomy, knowledge, liberty, material resources for life and action, a capacity for sexual satisfaction, a capacity to form a family, a capacity to form associations and participate in a community, and so on.¹⁵ These capabilities are the product of both nature and nurture. A change to our nature can only ever partially change them. And many genes would be involved in the genetic basis of any of them. Nevertheless, there might be a single gene to one aspect of the process of learning and remembering, as claimed by the experimenters who produced mice who could learn and remember better. There might also be a single gene responsible for aspects of sociability, whose absence is responsible for some cases of autism.

Whatever the limitations of genetically engineered improvements in our capabilities, and those are likely to be very considerable, an improvement like the one I began with is possible. A capacity for more rapid learning and longer retention would be an asset, other things being equal, in developing the capability for knowledge. How should such an asset be made available?

Should we establish genetic supermarkets, as Robert Nozick suggests, where individuals may purchase their preferred genetic modifications?¹⁶

Rationing significant genetic improvements to fundamental capabilities by capacity to pay would be outrageous. It would be an outrage compounding those outrages already involved in the rationing of many fundamental capabilities by capacity to pay. I shall not dwell on the outrage of world poverty, where large numbers go without a decent level of the necessities of life, although the resources that could lift them out of that poverty are in principle available. The example of genetic improvement of a fundamental capability that we have considered here concerns the capacity to acquire knowledge. The pertinent outrage here is access to education according to capacity to pay. Access to higher education in Australia, for example, is largely determined by parental background. And on a global scale, the wealth of nations determines the degree of access to education at all levels. If we are also to allocate genetically engineered improvements to learning and memory on the basis of parental or national wealth, we would only increase inequality of opportunity. Within nations, a supermarket in genetic improvements to fundamental capabilities would accentuate existing inequalities of opportunity in an area where these are already intolerable. In a global context, it could also lend new life to racism.

This does not mean that we must hand control over the allocation of resources for genetically engineered improvement to some central agency of experts who will pick out a favoured few for genetic improvement. Contrary to what many assume, a decentralized system does not have to be a market system. We have a market system only when people pay for what they want. But, in many cases, we allocate goods as gifts. Medical treatments of life threatening conditions such as heart attacks are not allocated by some central agency that selects some favoured few for treatment. Treatment of a heart attack in the Australian and most European medical systems is a gift from the community to its members. Up until recently, schooling and birthing support has also been a gift made to those who require it. I propose that any significant improvement in the genetic basis of fundamental capabilities should also be a gift to all who require it. It should be available to all, if available to any.

In saying this, I am not saying that justice demands that we make improvements to important capabilities whenever they become available. As noted above, justice arguably demands only that all have a decent measure

of such capabilities, and genetic improvements will inevitably go beyond what we consider to be a decent measure at any stage. Justice, therefore, does not demand that we make such improvements but only that we make them equitably. My claim is that justice demands that all have the opportunity to have important benefits, if any are permitted to have them.


Formulated in this way, the principle may seem open to Harris' objection to a "dog in the manger" principle of just allocation.¹⁷ Harris suggests that everyone will be denied important genetic modifications if we prohibit changes for only a few. He assumes that we cannot provide any improvements to all who might want them because resources for genetic engineering will be "scarce." But this is to mistake the kind of scarcity involved. Medical treatments may use vast amounts of resources. In the case of treatment of heart attacks, we are helped by the fact that only a small percentage of people suffer a heart attack at any time. But the only inherent scarcity of treatments for these is that they carry an opportunity cost. We could still offer treatment to everyone who needed it, even if the incidence of heart attacks doubled, provided we were prepared to divert resources from other uses. The same applies to child-birth support. We could cover an increased birth rate, provided we were willing to divert resources to that end. These resources are necessarily scarce only in the sense that they have an opportunity cost, not in the sense that there must be unmet need because meeting the need for all would be beyond the productive capacity of society.

The withdrawal of resources from public hospitals today does not bear witness to the fact that we can no longer afford to provide the gift of treatment to people with life-threatening disease. It only testifies to a tendency among policy makers to be unwilling to accept the opportunity cost of providing the resources required to meet medical needs. This says more about the prejudices of economic ideologists and the interests served by government policy than any inherent necessity to impose increasing rationing of goods. Similarly, considerations of scarcity do not entail that we should ration the use of genetic engineering so that there is significant unmet need. Rather, we should, for a start, ration resources for genetic engineering by not using them merely to satisfy parental whims. I have also claimed that justice requires that we should provide a few of the most promising procedures for genetic improvement universally rather than make available a much greater number of less important procedures to some but not all. Less significant improvements could be tested. They could, as Harris suggests, be allocated

“fairly” to a few by lottery. But if all improvements were allocated by lottery to a few, this would still leave some people unjustly disadvantaged.

It might be objected that a significant improvement made on a less than universal basis will spread rapidly so that it soon becomes a universal trait in any case. This might happen if there were strong natural selection against individuals who lack the improvement. However, at least in developed societies, individuals carrying the improvement would have little more reproductive success than those who lacked it would. This might become an object of concern among a new generation of eugenicists but, unless we allowed them to ensure the relative reproductive success of the “new breed,” it would take hundreds of years for an improvement to spread. It hardly seems just that the rest of society should have to wait so long to achieve equality with respect to any given genetic improvement. Even then inequality would remain. If we allocate improvements by capacity to pay, by the time an improvement spreads through the population, new improvements will have been purchased by those with the means to do so, thereby maintaining and intensifying inequalities of opportunity between rich and poor.¹⁸

Globally, the inequalities would be even more marked and more ugly. There is little sexual mixing between advanced and poorer nations, so that improvements allocated to those who can pay would take thousands of years to spread to poorer populations. The result would not only be a vastly more unjust world, but also a vastly more vicious one. Racists could not only point to imaginary superior qualities to justify their preference for one race over another, but could point to real genetic advantages available only to the races of advanced countries.

 Arguing for a global introduction of any tried and true genetic improvement, I am aware that the burden of resourcing this would be much greater than that required for its universal introduction within wealthy nations. This would mean that we could proceed only very slowly and selectively with making genetic improvements widely available, but this is what caution should dictate anyway.

Notes

1. A popular but detailed report is in *Time*, September 27, 1999, pp. 58-62. In the same issue, Stephen Jay Gould throws cold water on the idea that “intelligence” could be improved. Gould correctly claims that many genes are

involved in the genetic basis of “intelligence,” but the experimenters have reason to think that quicker learning and greater retention will improve performance in IQ tests.

2. As reported in the *Advertiser*, Friday, September 3rd, 1999. The discussion of the ethical implications of genetic engineering in the *Time* article is more even handed, see *Time*, September 27, 1999, pp. 63-4.

3. John Harris, *Clones, Genes, and Immortality: Ethics and the Genetic Revolution* (Oxford: Oxford U.P., 1998), pp. 226-7, pp. 230-37.

4. David Suzuki and Peter Knudtson, *Genethics: The Ethics of Engineering Life* (Sydney: Allen & Unwin, 1988), pp. 200-207.

5. *Op. Cit.*, p. 181.

6. Of course, by definition, many of these people would then not be members of Mensa, because their scores would not fall within the top 2% of IQ scores. As may already be apparent, I do not assume that performance in IQ tests is synonymous with “intelligence.” Nevertheless, if all human beings performed better at IQ tests, this would probably entail increased fitness and, at least, could do no harm.

7. Suzuki and Knudtson, *Genethics*, pp. 184-5. For new possibilities, see Cohen-Tannoudji M., and C. Babinet, “Beyond ‘knock-out’ mice: new perspectives for the programmed modification of the mammalian genome,” *Molecular Human Reproduction*. 4(10):929-38, 1998

8. Harris, *op. cit.*, p. 191.

9. Harris, *op. cit.*, p. 194.

10. A good collection on the issue is *Killing and Letting Die*, Second Edition, eds., Bonnie Steinbock and Alastair Norcross (New York: Fordham U.P., 1994). Jonathan Bennett has a detailed and persuasive refutation of the moral significance of the act/omission distinction in *The Act Itself* (Oxford: Clarendon Press, 1995).

11. Harris, *op. cit.*, p. 232-4.

12. Jonathan Glover, *What sort of people should there be?* (Harmondsworth: Penguin Books, 1984), pp. 30-32.

13. *Ibid.*, pp. 45-51.

14. See Amartya Sen, *Development as Freedom* (New York: Alfred A. Knopf, 1999), chapters 2 and 3 and Martha Nussbaum and Amartya Sen, eds., *The Quality of Life* (Oxford: Clarendon Press, 1993)

15. Martha Nussbaum discusses ten fundamental capabilities, which are the foundation of important “functionings,” in “Human Capabilities,” Martha Nussbaum and Glover, eds., *Women, Culture, and Development* (Oxford Clarendon Press, 1995).
16. Robert Nozick, *Anarchy, State, and Utopia* (Oxford: Basil Blackwell, 1974), p. 315n.
17. Harris, *op. cit.*, pp. 231-2.
18. I owe this point to Manuel Severa.