

LIBERAL EUGENICS

Nicholas Agar

Francis Galton took the name for his new science of improving human stock from the Greek *eugenes* or 'good in birth'. It is hard to think of an enterprise less fortunate in birth.¹ Eugenists throughout Europe and North America harnessed misguided views about human worth to mistaken theories of human heredity. Various combinations of encouragement for the fit and discouragement for the unfit manifestly failed to produce the perfect citizen and Galton's project was abandoned.

Recent advances in the understanding of human heredity offered by the new genetics have prompted a revival in eugenics. While old fashioned authoritarian eugenists sought to produce citizens out of a single centrally designed mould, the distinguishing mark of the new liberal eugenics is state neutrality.² Access to information about the full range of genetic therapies will allow prospective parents to look to their own values in selecting improvements for future children. Authoritarian eugenists would do away with ordinary procreative freedoms. Liberals instead propose radical extensions of them.

There are differing views on how wide these new freedoms should be. James Watson, former head of the Human Genome Project, thinks that prospective parents should use available technologies to choose from a very wide range of offspring characteristics. He finds no problem with the selection of traits such as sexual orientation and musical ability. According to Watson "[i]f you could find the gene which determines sexuality and a woman decides she doesn't want a homosexual child, well, let her [choose accordingly]."³ Liberals who are less gung-ho than Watson face a tough job in arguing for constraints on individual choice. As we will see, popular suggestions such as the avoidance of disease or the securing of quality of life threaten to smuggle into individual choices substantive views about human worth. If so, citizens will end up being engineered in accordance with a dominant set of values after all, and the new eugenics will collapse into the eugenics of old.

I argue that respect for the life plans of future persons can constrain parental choice in a way that sharply distinguishes the new eugenics

from its ugly ancestor. To help demonstrate this I compare genetic engineers' access to *life plans* with their access to capacities, the properties of persons that help determine success in life plans. I suggest that a program of systematic life plan modification is beyond the reach of genetic engineers and that this inability imposes restrictions on other types of enhancement. A eugenics program appropriately sensitive to the range of potential life plans of future persons will not seek to enhance capacities with any one life plan in mind. Such a program will have the dual assets of tailoring candidate improvements to the needs of those who bear them and shielding societies from the shaping effects of dominant values.

GOODS OF GENETIC ENGINEERING

The weirdness of the idea of genetic engineering makes sober moral assessment difficult. Before we can get to grips with liberal arguments we need to make the topic tractable to morality. I will use the notion of a *good of genetic engineering* to describe any way of shaping persons, or producing new types of persons by modifying or rearranging genes.

Goods of genetic engineering may be produced by a variety of techniques.⁴ Current technology allows the testing of foetal DNA for genes linked with diseases such as cystic fibrosis and Huntington's. A sufficiently serious prognosis may prompt a decision to abort. Here the good of genetic engineering is applied in a negative way, presumably cancelling out the wrong of the life that would have been lived.⁵

Other techniques might one day allow us to respond more creatively to information about genes. Human beings carry around huge resources of genetic variation; a baby girl possesses around 600,000 potentially fertilizable eggs and a man can produce around 12 trillion sperm in his lifetime.⁶ The techniques of preimplantation genetics may allow the DNA of some subset of these sex cells to be inspected. As we increase the size of our sample we boost the chance that we will find the desired combination of genes.

The distant future holds the promise of still greater freedom in selecting traits. Rather than hunting out disease-free Marie Curies and Brian Laras in naturally produced DNA, twenty fifth century genetic engineers may be able to directly intervene in the genomes of existing individuals, splicing in genes for desired traits and snipping out those not similarly favored.

At some point in our speculation about the likely size and makeup of the category of goods of genetic engineering we move from reasonable extrapolation of existing technologies to science fiction. The most fantasized about improvements may be forever beyond science's reach. Genes for Einsteinian intelligence, Austenian sensitivity to social detail

and Wildean wit may be impossible to find, or once found, they may be impossible to manipulate. Informed scientific opinion includes a wide spectrum of views about the potential for the new genetics to support any manner of eugenic policy.⁷ In this paper, for largely pragmatic reasons, I side with those who take a generous view of scientific possibilities. Science so often confounds the best predictions and we should not risk finding ourselves unprepared for the genetic engineer's equivalent of Hiroshima. Better to have principles covering impossible situations than no principles for situations that are suddenly upon us.

There are two kinds of arrangements of goods of genetic engineering that deserve moral scrutiny. First, there is the internal arrangement. When worried about the internal arrangements of goods of genetic engineering we ask how their allocation to a given individual will promote the overall good of that individual. Second, there is the social arrangement. Here our concern is with the distribution of goods amongst different individuals and life plans in society. Will uneven allocation of goods drive some life plans out of existence or exaggerate economic inequalities?

The liberal eugenicist proposes that we arrive at the best internal and social arrangements by allowing informed prospective parents to be guided by their values in choosing enhancements.

Before I get to the details of the liberal position I make a more general point. Any acceptable program of genetic engineering offering a wide variety of goods surely lies some distance in the future. Evolutionary theorists have long known that a random mutation to a gene is unlikely either to be selectionally advantageous or to benefit its bearer. The many-trials-and-almost-as-many-errors process that is evolution by natural selection designs at great cost to its experimental subjects. Unless they are prepared to purchase improvements for a similar price in suffering genetic engineers must be sure that the chosen technique has a very high chance of giving the desired result.

TWO DISTINCTIONS IN SHAPING PEOPLE

The liberal position is arrived at by way of a rejection of the moral importance of two conventional distinctions in shaping people. First, there is the distinction between improving people by modifying their environments and improving them by modifying their genes. Liberals see no moral difference between eugenics and improvements to people by various manipulations of the environment.⁸ Parents are already free to improve intelligence and physical prowess by modifying environmental factors such as schooling or diet. The tools of genetic engineering may be novel, but in this respect they resemble experimental vitamin enriched diets or hothouse schooling. Here is a cautious John Robertson:

A case could be made for prenatal enhancement as part of parental discretion in rearing offspring. If special tutors and camps, training programs, even the administration of growth hormone to add a few inches in height are within parental rearing discretion, why should genetic interventions to enhance normal offspring traits be any less legitimate?⁹

Arguments for the moral parity of genetic and environmental engineering find support in modern understanding of the parallel developmental roles of gene and environment. Old fashioned eugenicists tended to radically overplay the importance of genes, or hereditary factors, in shaping people while underplaying the relevance of the environment. Investigators sought to trace the idleness or criminality they found running through many generations of the same family back to developmentally omnipotent 'bad' genes.¹⁰

This genetic determinist picture is mistaken. Traits of individuals result from the complex interaction of genes and environment.¹¹ A clone of Alexander the Great would not be copy of Alexander. Short of exactly replicating the womb of Olympias of Epirus and the Macedon of 4th century BC we would expect many of the clone's genes to express themselves in ways very different from the way they did in Alexander. Though a clone should resemble the donor of its DNA more closely than a conventionally produced child resembles its parent, the degree of similarity will be somewhat less than in the case of monozygotic twins reared in the same uterine and similar extrauterine environments.

Those interested in genetic explanations of traits must pay close attention to the impact of environmental variation on the expression of genes. Some genes produce a given phenotypic character in nearly all statistically standard contexts; others have effects that vary in response to seemingly inconsequential environmental changes. A certain trinucleotide repeat on chromosome 4 apparently leads to Huntington disease in any standard human environment. The story for putative genes for high intelligence or Dean Hamer's GAY1 will be much less straightforward, however.¹² Only 52% of genetically identical twins of homosexual men are themselves gay.¹³ This almost certainly means that in a significant subset of statistically normal environments GAY1 does not lead to gayness.¹⁴

Genetic explanations of traits are perfectly compatible with substantive and interesting environmental explanations of them. For simplicity's sake, take the old fashioned and surely mistaken explanation of male homosexuality in terms of close maternal bonds. This apparently paradigmatically environmental explanation of homosexuality can be conjoined with an appropriately modest genetic explanation of the kind offered by Hamer. No cautious environmentalist will hold that maternal closeness, without exception, leads to gayness. Separately, neither GAY1 nor a close

relationship to a mother will be causally sufficient. Jointly, acting against a statistically standard genomic and extra genomic background, they may make very likely a homosexual son.

The liberal linkage of eugenic freedom with parental discretion in respect of educationally or dietarily assisted improvement makes sense in the light of this modern understanding. If gene and environment are of parallel importance in accounting for the traits we currently possess, attempts to modify people by modifying either of them would seem to deserve similar scrutiny. It will turn out that some traits are more easily modifiable by changing genes; others will be more readily changed by altering a person's environment. Short of an argument that exposes a significant difference between the two sorts of trait, we should think of both types of modification in similar ways. There seems little reason to think that all morally scary changes will fall into one category or the other.

We come now to the second conventional distinction in shaping people. This distinction separates therapeutic goods of genetic engineering from eugenic goods. Therapeutic goods are those targeted at disease; the aim is for individuals functioning at a level considered normal for human beings. The purpose of eugenic goods is to produce individuals whose attributes go beyond what is considered normal.

The case for allowing prospective parents access to some therapeutic goods seems very strong indeed. Though gene therapy may potentially be a more effective means of combating diabetes than daily shots of insulin, it does not seem in a different moral category.¹⁵ Here is where the stand against eugenics is taken. If gene therapy is medicine then it should be restricted to the treatment of disease. It may be all very well to seek to correct flaws in the execution of divine or evolutionary design, but it's a different thing altogether to shape people according to our own designs.

Liberals are united in contempt for the above reasoning. They doubt that the notion of disease is up to the moral theoretic task the therapeutic/eugenic distinction requires of it.¹⁶ Philip Kitcher criticizes both social constructivist and objectivist biological functional accounts of disease. The first fails because it ends up doing nothing more than recapitulating dominant social prejudices. Homosexuality and left handedness were once viewed as diseases, and authoritarian eugenicists have, in general, been swift to apply the label 'disease' to phenotypes judged nonideal. The second sets goals for intervention that are likely often to be irrelevant to humans living in modern environments. There seems no reason why the discovery that traits such as freckles or acute musical perception have dubious natural selective pedigrees should make us place negative values on them.¹⁷

With the notion of disease out of the way no stable barrier separates the disease-oriented therapeutic intervention from eugenic intervention. Any interest in reducing suffering involves us in what Kitcher calls 'inescapable eugenics'.

The liberal juxtaposition of eugenics with education suggests a more suitable guide to the improving efforts of prospective parents. In allocating educational resources to an individual we do not limit ourselves to the avoidance of disease, rather we are concerned with the person's well-being, welfare or quality of life. So it should be with the goods of genetic engineering. Kitcher fashions an appropriately minimal liberal account of quality of life to guide prospective parents in selecting improvements:

The first [dimension] focuses on whether the person has developed any sense of what is significant and how the conception of what matters was formed. The second assesses the extent to which those desires that are central to the person's life plan are satisfied: Did the person achieve those things that mattered most? Finally, the third is concerned with the character of the person's experience, the balance of pleasure and pain.¹⁸

We would expect the varieties of internal arrangement produced by a liberal policy to conflict with concern for quality of life less often and less markedly than those produced by authoritarian eugenicists. Parents tend to pay closer attention to the well-being of their offspring than does a state pursuing some broad program of human stock improvement.

Direction to look out for quality of life will not be entirely idle, however. Some values worthy of protection in a liberal society could have a sad impact on future lives if adopted as guides to eugenic choice. Robertson worries about allowing the procreative expression of values shaped by successful struggle against intellectual or physical disabilities.¹⁹ Parents' ideological commitments can mislead them in other ways. According to a persistent caricature of evolutionary theory, natural selection can only build selfish and thrusting psychological dispositions into us. Two decades of work on various biological altruisms show this not to be the case; the genes of kin-helpers and discriminating cooperators fare better in the long term than those of shortsighted defectors. Over-individualistic parents are in danger of instituting a eugenic policy that matches the evolutionary parody. They will not temper the competitive urges of their offspring with kin and reciprocal altruisms. The resulting individuals are unlikely to see central desires satisfied in a world filled with psychological copies of themselves.²⁰

QUALITY OF LIFE AND THE SOCIAL ARRANGEMENTS
OF GOODS OF GENETIC ENGINEERING

Earlier I distinguished between internal and social arrangements of goods of genetic engineering. For the time being I will assume concern for quality of life can guide the liberal toward appropriate internal arrangements of these goods. I now want to illustrate how problems arise in connection with the social arrangement of goods of genetic engineering.

In order to see how the advent of genetic engineering threatens to change the rules of liberal social arrangement we need to distinguish between the demands of life plan roles, on the one hand, and demands of individuals that occupy those roles, on the other. This distinction plays little role prior to genetic engineering because of a widely shared liberal assumption that in meeting the needs of a life plan we also meet the needs of the individuals, present or future, actual or potential, who pursue that plan, and vice versa. The love of art is an important component of the life plans of many current members of society. Further, we know that it is likely to be included in the life plans of at least some future citizens. So, the state aims to distribute goods in a way that does not discriminate against the plan.

Genetic engineers threaten to separate individuals from life plans. If art loving is systematically engineered out of future individuals then we can meet the needs of all individuals present or future, actual or potential, without making any provision whatsoever for the love of art.

The threat posed by the potential separation of life plan roles and occupants extends more broadly than to the love of art or any other particular life plan. A powerful pragmatic justification for liberalism stands to be undermined. Current deep differences in views about the good life mean that we cannot allow any one view to shape institutions. The worry is that one generation's eugenic fashions in genetic enhancements may forever eliminate the diversity of life plans that feeds liberalism.

It should be noted that the separation of individuals from life plans need not concern us when dealing with some worries about the social arrangement of goods of genetic engineering. An often raised worry is that a market driven eugenics will end up meeting the needs of wealthy prospective parents whilst ignoring those of poorer prospective parents. As with education, imbalances in goods of genetic engineering promise to be self-perpetuating. I do not mean to downplay this concern. However, it differs importantly from the aforementioned problems of social distribution. We can take into account the preferences of *actual individuals* rather than of *vacated life plans*, and this allows a more conventional remedy. We may intervene in the market in human improvements to extend access to prospective parents belonging to poorer sections of society.

Back to our worry about the systematic emptying of life plans. Do we have any reason to think that a dramatic reduction in life plan diversity is anything more than a theoretical possibility? In contemporary liberal societies freely taken choices do not conform with a single idea of the good life. In liberal societies of the future, differing ideas about the best life plan will surely disrupt any centrally directed eugenic pattern.

Such reasoning has not impressed recent critics of liberal eugenics.²¹ They doubt that handing choice over to parents will stand in the way of the monopolizing tendencies of single ideas of the good. Some early twentieth century advocates of eugenics agreed with them.²² They did not see a conflict between centrally determined views of the good and what they took to be 'informed choice' about improvements. Many who recoiled at the more extreme proposed means of excluding the unfit from reproduction argued that sexual selection, with its mechanism of female mate choice, could be an essentially liberal means of shaping the race in accordance with a central blueprint. Women would be encouraged choose sexual partners with the appropriate mix of moral, intellectual and physical virtues.²³ Restrictive laws would therefore not be required to achieve the state's eugenic goals.

Here is where the injection of quality of life considerations into the liberal mix becomes especially dangerous. In spite of various legal protections, the range of life plans well adapted to a given liberal social environment is narrower than the range currently represented in it. Dominant conceptions of the good life can be relevant to individual decisions about enhancements not because they latch onto some independent facts about quality of life but because they in part constitute the environment in which the future person is to live. An individual who is not the object of prejudice stands to have a wider range of opportunities and therefore greater chance of leading a successful life, than one who is the object of prejudice.

Kitcher is sensitive to these concerns and urges that we do our best to combat prejudice. Even when our efforts are to no avail he still resists that idea that prejudice should play a role in eugenic decision-making. Kitcher advises that we should only use such tools as abortion when there is virtually no possibility for a worthwhile life. In a society that sets out to protect the diverse life plans of its citizens, challenges thrown up by the social environment to women, ethnic minorities or homosexuals do not have a substantial enough impact on quality of life to count.²⁴

This response is only partially effective. It is an often made point that natural selection satisfies rather than optimizes; a wing does not need to be perfect in order to give its possessor a high chance of evading predators, hunting down prey and thereby leaving descendants. If we restrict our attention to the analysis of foetal DNA followed by possible abortion a similarly satisficing approach on the part of parents

seems to make sense. The choice is after all between a baby with quality of life prospects slightly below the norm or no baby at all.

However, an optimizing approach becomes more attractive once we consider methods that open up a wider range of choice about enhancements. Our wide view of scientific possibilities encourages us to imagine a world in which parents can identify and insert genes for traits such as great diligence and acrobatic ability, at the same time eliminating genes for homosexuality and femaleness. Once genetic engineers are in a position to offer parents-to-be this range of choice why should they accept any reduction in quality of life prospects?

Support for this optimizing approach can be found if we return to the liberal parallel between educational and genetic enhancements. Parents will acknowledge that for most children there is a tolerably high chance of a life worth living regardless of what decisions are taken about special schooling or diet. Yet we allow substantial latitude to vary environmental inputs to further boost the expected quality of life.

What argumentative resources does the liberal have to ensure that the social distribution of goods of genetic engineering is not only fair to individuals but neutral between morally acceptable life plans? Singer and Wells suggest the formation of a body whose task is to monitor the choices of individuals, stepping in when imbalances arise.²⁵ Patterns of parental choices that threaten to eliminate a morally acceptable life plan might trigger action by this body. Even if this body understands itself as preserving the diversity that sustains liberalism such measures are problematic. The liberal resists the restriction of choice in order to protect a non liberal pattern of life plans. Can intervention to secure the favored liberal social balance of life plans be any different? Once we distinguish between life plan roles and life plan occupants it is hard to find victims of a series of optimizing parental choices.

In what follows I argue that it is correct to concentrate on internal rather than social distributions of goods of genetic engineering. Concern for future individuals will mandate capacity-enhancement that is neutral between a wide range of life plans and suboptimal with respect to any particular one. This internally justified neutrality will translate into a neutrality in respect of the social distribution of goods of genetic engineering.

IMPROVING CAPACITIES AND IMPROVING LIFE PLANS

The notion of a life plan is an important constituent of many accounts of quality of life. The first two dimensions of Kitcher's account require the formation and carrying out of central elements of a plan. The following

discussion contrasts attempts to improve life plans with attempts to improve capacities—those traits that help determine success in a plan.

Initially, liberals would seem capable of justifying either undertaking. There is no argument to show the global superiority of one life plan over all others, hence the barrier against substantive state directed eugenics programs. By the light of a given set of parental values, however, there certainly are better or worse life plans. Within certain limits, the eugenic choices of parents can presumably favor the values predominating in their life plans over those that predominate in others.

Concern that internal arrangements of goods of genetic engineering contribute to a future individual's well-being directs us to evaluate capacity enhancements relative to life plans. Many people have capacities that are barely adequate, or even outright inadequate, for their life plan. By engineering in the appropriate capacity-enhancements we may bring this collection closer to the optimum for the life plan.

We need to take a closer look at how changing genes might change these two sorts of properties of persons. In what follows I highlight a difference between causal chains that lead from gene to capacity, on the one hand, and causal chains that lead from gene to life plan, on the other. A note of caution. We should certainly not expect to place these chains into their own distinct natural kinds; the differences will be rather more blurry. Though these rough and ready categories may be inadequate as a base for scientific laws, I maintain that they will be well demarcated enough to ground ethical generalizations.

The following discussion of life plans and capacities sets out to establish that while some sophisticated future genetics may be able to predict how a given genotype will combine with a specified environment to produce some significant capacities, we cannot make a similar claim in respect of life plans. No amount of information is likely to enable us to pair genotypes with life plans. A corollary is that we will be unable to predict how changes to genes will change life plans.

I will rest much on the claim that significant environmental contributions to life plans are psychologically mediated. Essential to the possession of one life plan rather than some other is the recognition by an individual that certain things matter more than certain others. There must be a *decision* to devote oneself to the harmonica or a *realization* that one's family counts for more than one's spy novel collection. The mythical figure who spends his life unreflectively planted in front of the TV screen without ever having decided to do so has no life plan rather than one oriented toward TV soaps.

Though we must take psychological factors into consideration when describing the development of some capacities such as high intelligence,

this capacity is not psychologically filtered in quite the same way. I want now to get more precise about this difference.

Life plan decisions are both highly environmentally *sensitive* and environmentally *specific*. Environmental specificity comes into play in describing what life plans are available to a person. A plan can incorporate elements particular to cultural and natural environments. Many of the life plans available to a person who is born, lives and dies in urban North America are not available to a genetically identical twin who spends her life in the Thai highlands, and vice versa. The environmental sensitivity of life plans means that small changes to the environment can have far reaching consequences. Exposure to five minutes of a television medical drama may inspire someone to be a doctor. An early encounter with a rugby ball may lead to the generation of a life plan targeted at a sporting career, or it may not. It will be next to impossible to determine beforehand what factors will be relevant.

The points about environmental sensitivity apply doubly in modern liberal societies where a highly diverse range of life plans are on offer. Non liberal societies offer a smaller range of potential life plans to the individual. They therefore provide environments that reduce the variability resulting from this sensitivity.

There certainly are capacities that resemble life plans in terms of environmental sensitivity and specificity. It would be very difficult for a genetic engineer to select for great facility with shogi endgames. Environments that contain no shogi boards cannot be expected to give rise to individuals with highly refined shogi skills. Even in environments that are rich in shogi sets, a person with the native ability to become a great player may instead become highly proficient at chess or table tennis. Associating the game with a particularly grumpy uncle may be enough to ensure that no raw capacity is developed.

We can often work backwards from environmentally specific and sensitive capacities such as great shogi skill to find a capacity that is not psychologically mediated in the same way. Such capacities will be more proper targets for enhancement. Being intelligent or physically strong certainly requires specific gene/environment interactions. Many key environmental inputs will be psychologically filtered and without adequate schooling and nutrition, no combination of favorable genes will produce an intelligent person. Despite this I maintain that these more basic capacities are less environmentally specific and sensitive than many life plans. High intelligence is producible in a wide range of normal human environments and small changes to an environment are unlikely to block or bring about big changes to such a capacity.

We cannot make quite the same move in regard to life plans. There may, of course, be such things as proto-life plans, states that anticipate

the development of properly expressed plans. The problem lies in prediction grounded in such proto plans. They can be filled out in conjunction with a modern liberal environment in many different ways. A young child with a yearning for the outdoors may end up guiding tourists on white-water rafting expeditions, planning a government's environment policy or working as a fire-spotter in a remote forest location. Success in each of these life plans will require a different mix of capacities.

Might we direct life plans by first directing capacities? Sometimes capacities do influence life plans. The knowledge that one has a natural strength in a certain area can strongly bias a person toward a life plan that makes use of the strength. However, this is not always, or even reliably, the case. We can compare advantages generated by fortunate combinations of genes with those generated environmentally. A parent successfully following a certain vocation can offer a child an environment appropriate to the successful pursuit of the same vocation. Such parents are able to impart the appropriate knowledge, provide the right contacts and so on. In spite of this the daughters of lawyers are not always, or even typically, lawyers. Nor the sons of doctors, doctors.

THE EUGENIC DIFFERENCE PRINCIPLE

Were genetic engineers capable of both selecting life plans and enhancing capacities then good lives might be generated almost precisely to parental or social order. This is not the case, however. While a future genetics may allow the directed modification of some capacities, the directed generation of life plans is out of the question. We should therefore not set out to modify them. I now set out to show that conclusions about the inadvisability of seeking to shape life plans have consequences for capacity enhancement.

In what follows I draw a parallel between life-plan-respecting enhancement of capacities and John Rawls's theory of justice. Rawls's difference principle allows deviation from equal distribution of goods such as liberty and opportunity only when an unequal distribution helps everybody, most especially those occupying the worst off positions in society. We arrive at this account by asking what arrangements rational choosers would opt for if deprived of all information about their actual positions. The imagined rational contractor cannot choose her social position and so seeks to do best by the worst off.²⁶

The need for principles of justice is obvious once we observe the possibility of conflict between individuals pursuing different life plans. We see the need for similar principles governing the allocation of goods of genetic engineering, when we note how the allocation of goods to one potential life plan can impact on other potential life plans.

Capacity enhancements boosting an individual's chances of successfully pursuing a given life plan will often reduce that individual's chances of successfully pursuing alternative life plans. A stock market trader needs to marry quickness of decision with aggression. These traits would be harmful in a poet or painter for whom reflection is demanded. Any Olympic game brings together a wide range of exceptional physiques. Having a body suitable for one discipline tends to exclude other disciplines. Larger weightlifters would be well advised not to harbour serious ambitions in horse riding, equally equestrians should not expect to make the basketball team. At a higher level of abstraction, differing political philosophies favor potentially conflicting personality types. A communitarian will emphasize receptiveness to important local cultural traditions in the good life. Liberals may be more interested in a life plan that perhaps incorporates elements from a local culture but is capable of substantial independence from it.

We can return now to the liberal eugenicist's parallel between improvements stemming from environmental modification, and improvements stemming from modifying DNA.

Ideally capacity development is internally driven. When a person chooses for herself which capacities to improve, their development tends to be appropriately sensitive to her life plan. The resulting narrowing of the range of potential life plans will be an unavoidable part of the adapting of capacities to this chosen plan.

Both genetic engineering and parent-administered environmental engineering by education or nutrition are externally driven attempts to improve capacities. Externally driven capacity improvements can be divided into two categories. Education and diet can be selected by parents in a way that is sensitive to the child's life plan. Of course, in young children we will not find anything like a well defined, precisely worked out plan. Yet, almost from the beginning, there is something to guide parental efforts; some decisions about life plans have been taken. A nascent life plan may reveal itself in aversions to particular lessons or types of sporting activities. As a child's life plan fills out she will tend to take over much of the task of capacity development. Any remaining parental input will be more and more specifically targeted at the capacities required for the chosen plan.

In seeking to produce enhancements by modifying nutrition or education we can decide to act in a way that ignores the child's evolving life plan. Sometimes parents hope to live out unfulfilled components of their own life plans through their children. Enforced rigorous piano lessons or cricket training risk creating a mismatch between developed capacities and life plans.

Earlier I argued that the environmental specificity and sensitivity of life plans makes them inaccessible to genetic engineers. I suggest that this means that the manner of capacity-shaping possible for the genetic engineer necessarily falls into the second category of externally driven enhancement. The genetic engineer is forced to act in a way that ignores the individual's life plan.

Does this rule out any program of capacity-enhancement? I think not. However, in the light of the inaccessibility of life plans to genetic engineers I propose the following Rawlsian maximin constraint on capacity enhancement. Goods of genetic engineering must be allocated to an individual in a way that improves prospects associated with all possible life plans—most especially the worst off potential life plan.

Pursuit of the parallel between Rawlsian justice and genuine enhancement of life prospects allows us to respond to certain varieties of optimizing eugenics. One kind of optimizer advocates a policy resembling that of the utilitarian who countenances large gaps in the goods attaching to different positions in society to improve average or total social utility.²⁷ The optimizing eugenicist will accept significantly reduced prospects for a small range of life plans so long as this is compensated for by a significant boost in prospects attaching to a wider range of plans, or perhaps a huge boost for a single plan. The maximin constraint directs against this kind of reasoning. It would be wrong to gamble on future life plan choices. No capacity-enhancement will be acceptable unless it also boosts prospects associated with the least well served life plan. The aim is to equip the person-to-be no matter what life plan she opts for.

Perhaps we can do more than just influence probabilities that certain life plans will be chosen. The discovery and potential manipulation of genes for homosexuality may enable us to produce a population either devoid of gay life plans or alternatively containing exclusively gay life plans. Success in this undertaking would presumably have consequences for capacity enhancements. The elimination of the genetic basis of the life plan might justify our designing into a foetus enhancements that are incompatible with a gay life plan, whatever those enhancements might be. Note just what we would have to do in order to use quality of life considerations to justify such a move. We would need to do much more than identify and be capable of manipulating genes such as GAY1 that may contribute to male homosexuality. Even if Hamer is right about GAY1, the elimination of the gene by itself would not rule out a gay life plan. We would be required to find and appropriately modify any gene necessary for homosexuality. Since homosexuality is likely to be multiply environmentally and genetically realizable any such undertaking would require huge chunks of a genome to be excised.

I now anticipate a worry about the application of the eugenic maximin requirement. I observed that tailoring capacities to one life plan can disadvantage other plans. In some cases we will find life plans that are unusually well served by an individual's natural arrangement of capacities. Must the genetic engineer flatten these natural peaks in order to improve prospects associated with less well served plans? If so, the age of genetic engineering may have to do without the 'unbalanced' geniuses to whom history owes great works of art and scientific advances.

Concern for quality of life might support some smoothing out. Think again of the parallel with environmental advantages. Had a six-year-old Mozart mixed with children of his own age rather than performing musical exhibitions throughout Europe, we would probably not now have *The Marriage of Figaro* or *Don Giovanni*. He might, instead, have become a better adjusted adult. Eighteenth century child welfare officers, had there been such things, are likely to have used quality of life considerations to justify intervention in Mozart's upbringing. Twenty fifth century genetic engineers may use similar reasoning to modify some naturally produced genetic patterns.

Such a conclusion is not enforced, however. The maximin requirement applies to proposed *modifications* to a given array of potential and possible capacities. Improvements will need to be justified by their boosting prospects associated with the least well served plan. On finding that a potential person has a certain naturally endowed array of capacities we can leave it open to the parent not to intervene at all.

Earlier I sketched liberal arguments against the moral significance of the therapeutic/eugenic distinction. My Rawlsian approach makes it clear why interventions intuitively falling under the heading of therapeutic engineering often deserve more attention than those intuitively falling under the heading of eugenic engineering. The deficiencies targeted by therapeutic goods of genetic engineering impede a wide range of life plans. We have no blanket ban on modifications conventionally recognized as eugenic, however. There are likely to be ways in which we can both enhance and protect the diverse potential ends of future persons. Some improvements to physical abilities will be plan specific, thereby running the risk of ruling much out; others will support a rather wide range of plans. Adding extra centimeters to produce a better basketballer falls into the first category, increasing resistance to 'flu, more likely into the second category.

What of the fraught issue of the potential enhancement of intelligence? Uncertainty about the impact of our genetic interventions will be very important here; according to some estimates there are between 30,000 and 50,000 genes that feed into human intelligence.²⁸ Any intervention

will require good understanding of the vast tangle of gene/gene and gene/environment interactions.

However, once this information is obtained it is not clear that intelligence is the kind of capacity that should be enhanced. Two widely held views about intelligence will have different implications.

Advocates of general intelligence or *g* propose that there is some domain general cognitive ability that explains performance across a very wide range of tasks.²⁹ Differences in *g* explain differences in performance in areas ranging from mathematical skill, through musical ability to reading comprehension. If this is the true view of intelligence we might well look favorably on a program of enhancement. Boosting *g* promises to improve performance across a wide range of areas without ruling out any.

There is an alternative multiple intelligence defended by Howard Gardner according to which a range of distinct intelligence modules each accounts for performance in a relatively circumscribed area.³⁰ Musical intelligence will differ from mathematical intelligence which, in turn, will differ from social intelligence, and so on. This model of intelligence might require us to be considerably more choosy in our enhancing. Gardner indicates that some intelligences conflict. A study of intelligence development in children found a tendency under certain circumstances for superior artistic performance to interfere with certain spatial skills.³¹ If Gardner turns out to be right, and conflicts between intelligences are ubiquitous, we should be wary of any proposed intelligence enhancements.

Clearly there is much more to be said. However, I have offered a preliminary sketch of a eugenics program that is not opposed to the diversity of life plans that characterizes liberal societies. In ensuring that the internal arrangements of goods of genetic engineering do not rule out possible life plans we guarantee that these plans will continue to be represented in society. We therefore need not fear an ideologically uniform post-enhancement world.

Is this program really a liberal one? Some liberal eugenicists will complain about the limitations on the freedom of prospective parents, arguing that there is relatively little room to improve life plans in accordance with values. I have justified these restrictions by pointing to the liberty of prospective offspring. Eugenically choosy parents are likely to produce a mismatch between capacities and life plans. Enhancing in accordance with the maximin requirement promises to expand the range of genuine life plan choices for, and therefore liberty of, a future person.

Victoria University of Wellington

NOTES

1. Francis Galton, *Inquiries into Human Faculty and its Development* (London: J. M. Dent and Sons, 1883). For informative histories of eugenics see Daniel Kevles, *In the Name of Eugenics: Genetics and the Uses of Human Heredity* (Berkeley: University of California Press, 1985), and Diane B. Paul, *Controlling Human Heredity: 1865 to the Present* (New Jersey: Humanities Press, 1995).
2. Defenders of some version of liberal eugenics include Jonathan Glover, *What Sort of People Should There Be?* (Harmondsworth, Middlesex: Penguin, 1984), chapters 2 and 3; John Harris, *Wonderwoman and Superman: The Ethics of Human Biotechnology* (Oxford: Oxford University Press, 1992); Philip Kitcher, *The Lives to Come: The Genetic Revolution and Human Possibilities* (New York: Simon and Schuster, 1996); Robert Nozick, *Anarchy, State and Utopia* (Oxford: Blackwell, 1974), p. 315; John Robertson, *Children of Choice: Freedom and the New Reproductive Technologies* (Princeton: University of Princeton Press, 1994), and Peter Singer and Deane Wells, *The Reproduction Revolution: New Ways of Making Babies* (Oxford: University of Oxford Press, 1984).
3. Interview with Watson in London *Sunday Telegraph* 16th February 1997.
4. See Kitcher, *The Lives to Come*, chapter five, and Jeff Lyon and Peter Corner, *Altered Fates: Gene Therapy and the Retooling of Human Life* (New York: Norton, 1996), for descriptions of the various therapies.
5. See David Heyd, *Genethics: Moral Issues in the Creation of People* (Berkeley: University of California Press, 1992), for skepticism about this way of talking.
6. Jeff Lyon and Peter Corner, *Altered Fates*, p. 492.
7. James Watson, "A Personal View of the Project," in Daniel Kevles and Leroy Hood, eds., *The Code of Codes: Scientific and Social Issues in the Human Genome Project* (Cambridge, MA: Harvard University Press, 1992), occupies the scientifically ambitious end of the spectrum. Richard Lewontin, *Biology as Ideology: The Doctrine of DNA* (New York: Harper Perennial, 1992), is more pessimistic both about scientific and moral possibilities.
8. This argument can also be found in Harris, *Wonderwoman and Superman*; Singer and Wells, *The Reproduction Revolution*, and Glover, *What Sort of People Should There Be?*
9. Robertson, *Children of Choice*, p. 167.
10. See Paul, *Controlling Human Heredity*, chapter 3.
11. For discussions of the status of genetic explanations of traits given this interactionist picture of development see Kim Sterelny and Philip Kitcher, "The Return of the Gene," *Journal of Philosophy* 85 (1988).
12. For a popular presentation of Hamer's claim see Dean Hamer and Peter Copeland, *The Science of Desire: The Search for the Gay Gene and the Biology of Behavior* (New York: Simon & Schuster, 1994).
13. R. Grant Steen, *DNA and Destiny: Nature and Nurture in Human Behavior* (New York: Plenum, 1996), p. 194.

14. Finding evidence for a causal link will be only the first step. We will know very little about the exact developmental trajectory of the gene. Hamer confesses that he has no idea how GAY1 might produce its effect.

15. Some commentators argue that there is an important moral distinction between therapies targeted at somatic cell DNA and those targeted at germline DNA. The effects of somatic cell therapy die with the recipient of the therapy. Germline modifications are potentially heritable. For effective argument against the moral significance of such a distinction see John Harris, *Wonderwoman and Superman*, chapter 8.

16. For a recent attack on the distinction see Kitcher, *The Lives to Come*, chapter 9.

17. Kitcher, *The Lives to Come*, pp. 212-217.

18. Kitcher, *The Lives to Come*, p. 289.

19. Robertson, *Children of Choice*, p. 171.

20. See Gregory Kavka, "Upside Risks: Social Consequences of Beneficial Biotechnology," in Carl F. Cranor, ed., *Are Genes Us? The Social Consequences of the New Genetics* (New Jersey: Rutgers University Press, 1994). There is a complication here. Liberals disagree about the exact relationship between concern for quality of life and parental values. Kitcher writes as if the expression of parental values takes precedence. Prospective parents should be 'encouraged' or 'urged' to look to quality of life, taking it up into their values (Kitcher, *The Lives to Come*, p. 203). Robertson and Glover paint quality of life as imposing limits on the breadth of individual eugenic choice (Robertson, *Children of Choice*, chapter 7; Glover, *What Sort of People Should There Be?*, chapter 3). In a liberal society concern for quality of life will presumably leave some latitude for parents to be guided by their values.

21. See Robert Wright, "Archilles' Helix," *New Republic* (July 9, 1990), and Troy Duster, *Backdoor to Eugenics* (London: Routledge, 1990).

22. See Paul, *Controlling Human Heredity*, pp. 36-39.

23. Sexual selection may seem an inappropriate tool for the early twentieth century eugenicist. On the Darwinian model sexual selection often works against conventional natural selection. The peacock's feathers are paradigms of inefficient clumsiness selected only for their appeal to mates. Traits are best purely because they are widely thought to be best. In this way sexual selection falls far short of offering any guarantee of choice-independent value.

24. Kitcher, *The Lives to Come*, p. 200.

25. Singer and Wells, *The Reproduction Revolution*, p. 188.

26. John Rawls, *A Theory of Justice* (Cambridge, MA: Harvard University Press, 1971), *Political Liberalism* (New York: Columbia University Press, 1996).

27. Rawls, *A Theory of Justice*, sections 27, 28.

28. Lyon and Gorner, *Altered Fates*, p. 543.

29. For an account of this view see Mike Anderson, *Intelligence and Development: A Cognitive Theory* (New York: Blackwell, 1992).

30. Howard Gardner, *Frames of Mind: The Theory of Multiple Intelligences* (New York: Basic Books, 1983), *Multiple Intelligences: The Theory in Practice* (New York: Basic Books, 1993).

31. Gardner, *Multiple Intelligences*, p. 96.