

# Genetic Enhancement: Misunderstood, Misrepresented, and Not Without Love

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*No discovery of the past century holds more promise—or raises more troubling ethical questions.*

Ever since the discovery of DNA, the concept of genetic modification and manipulation has captured the imagination of the general populace, providing the inspiration for such literary works as *A Brave New World*, films such as *Gattaca*, a host of superheroes, and even an episode of the *Simpsons*. Yet, genetic modification is quickly exiting the realm of fiction. Advancements in technology have provided new tools and techniques, such as the CRISPR-Cas9 system, that make genetic modification cheaper, more reliable, and more accurate. In fact, such strides have been made in the fields of genetic modification that a new gene therapy for cancer, known as CTL019, was unanimously recommended for approval by an FDA advisory panel earlier this month. Up until now, the discussion regarding the ethics of genetic enhancement has merely been a portion—albeit one of the most controversial portions—of the biomedical enhancement debate as a whole. The ceaseless progression of technology has brought humanity to a point where it must consider genetic enhancement separately from the wider biomedical enhancement debate, with *prima facie* idiosyncratic aspects that both excite and alarm many. The current debate concerning the ethics of genetic enhancement is often based on the fear that genetic enhancement is uniquely dangerous, leading critics such as Michael Sandel and Francis Fukuyama to present supposedly conclusive objections against genetic enhancement, without properly weighing the potential social costs and benefits, and without considering deontological reasons for enhancement.

## The Terrain of the Enhancement Debate

The terrain of the genetic enhancement debate is complicated, with both sides making a variety of arguments spanning consequentialist considerations, concerns with virtue, and even deontological objections. To further the discussion, we will first look at why genetic enhancement is treated uniquely and why it ultimately is not unique. Following the rejection of common arguments based on flawed information, the objections against enhancement presented by Michael Sandel and Francis Fukuyama will be examined. Michael Sandel objects to pursuing genetic enhancement because it does not demonstrate the virtue of “the appreciation of the given,” which ultimately leads to a variety of consequentialist considerations. Francis Fukuyama

objects to enhancement based on a much more complicated argument, an argument that eventually entangles itself. If the conclusive reasons are rejected, which I hope I provide sufficient evidence to refute, the potential risks of genetic enhancement must be laid out. The potential risks must then be weighed against the potential benefits. Ultimately, the debate must also consider concerns beyond consequentialism, and I present love as a virtue which may call for parents to genetic enhance their children.

While there does not exist a singular definition of enhancement, with definitions ranging from individual capacities to improvements in human well-being overall, for the purpose of the following discussion an enhancement is any intervention involving human action “that improves some capacity (or characteristic) that normal human beings ordinarily have or, more radically, that produces a new one,” or put simply, something that improves, augments, or makes better. Such a definition provides a basic distinction from what counts as therapy, which hopes to return someone to normal functionality. Currently, there are two types of genetic engineering which may be used for genetic enhancement: germline, which affects a developing zygote and all of its future descendants, and somatic, which involves the implantation of genetically modified material into a fully developed adult. Enhancements can be classified by what they improve into five categories:

- 1) Physical enhancements that improve speed, strength, and/or endurance
- 2) Cognitive enhancements that improve memory, information processing, and reasoning
- 3) Emotional enhancements that improve motivation, temperament, and various portions of the emotional quotient
- 4) Immune enhancements that improve the body's ability to prevent and fight disease
- 5) Senescent enhancements that improve both the longevity and the quality of later life.

While all of these types of enhancements can be achieved through various modes, such as drugs, for the purpose of this paper the focus will be on enhancements that involve direct interaction with the genetic material of an individual human, such as the selection of embryos for genotype, genetic engineering of embryos through insertion of genes from various sources, and the implantation of genetically engineered tissue or organs.

### **Clearing the Fog of Biomedical Enhancement Exceptionalism**

Many of the critics of enhancement fear consequences that they perceive are unique to genetic enhancement, a flawed belief that Allen Buchanan describes as “biomedical enhancement exceptionalism.” Critics of genetic enhancement fear that it is particularly dangerous because it alters DNA, affects our biology, has a higher risk of unintended consequences, and is irreversible. Unsurprisingly, none of the criticisms mentioned above is unique to genetic or biomedical enhancements. Enhancements in mobility have led to globalization, which has allowed for previously isolated groups to mix their genetics. Improvements in agriculture have provided for better nutrition, which has been shown to change, not only, the biology of an individual, but also of her descendants. Nearly all advancements have unintended consequences: globalization led to the rapid spread of diseases, and advancements in science have provided humans with the ability to annihilate themselves in a nuclear war. The objection that genetic enhancements are uniquely dangerous because they are irreversible is flawed because not only is it possible to suppress the expression of a gene with drugs, or simply to reverse the modification with more genetic engineering, but many historical enhancements are for all practical purposes irreversible, e.g. society would find it very difficult to give up literacy, one of our greatest cognitive enhancements. All three of the most common objections to genetic enhancement— that it alters biology, has unintended consequences and is irreversible —are intimately tied to the incorrect “Extreme Connectedness Assumption”.

The “Extreme Connectedness Assumption” stems from the fact that rarely does one gene affect one trait or aspect of a person, as many genes affect a variety of different traits or aspects at different stages of development. Tampering with the genetics of one individual in the hopes of achieving a specific reaction at one stage of development will, as the Extreme Connectedness Assumption asserts, negatively affect other stages of development for that individual or her descendants. The Extreme Connectedness Assumption is essentially concerned that what is good in humanity will be lost when humans attempt to fix what is bad. Now, it is undeniable that human error exists, and that in the course of striving for genetic enhancement humans may inadvertently discover connections about specific genetics through negative consequences, but the risk of man’s hubris destroying human nature entirely is significantly less than Fukuyama believes. The Extreme Connectedness Assumption is commonly presented in three forms: the Master Engineer, the House of Cards, and the Seamless Web. The Master Engineer analogy holds that evolution has created a well balanced and optimal

final product. The Master Engineer analogy is far from based on scientific fact and is based more on intelligent design than a firm understanding of evolution. Evolution does not have an end goal but is driven by environmental pressures that for humans have changed radically in a relatively short period of time in our evolutionary history. Evolution has also failed to make an optimally designed human, as seen by a number of design flaws such as the fact that food travels through the pharynx along with an individual’s breathe, a design that unnecessarily raises the risk of choking by making choking possible. Perhaps most importantly, though, evolution selects for traits that improve reproductive fitness and not anything that may lead to human wellbeing, which means that there is no evolutionary pressure to eliminate genetic factors that lead to diseases prevalent in the later stages of life. The second analogy takes the fact that humans are simply cobbled together haphazardly by evolution and contend that then perhaps human nature is so fragile that genetic interventions “may cause the House of Cards to collapse”. Buchanan cleverly points out that if that is the case, it may be better to enhance humans so that they are not so fragile. The creatures produced by evolution are also not so interconnected that any intervention will cause the whole “Seamless Web” to unravel, because evolution favors creatures designed with modules, i.e., subsystems where damage can be contained; redundancies, both within a particular module, and as a whole, to ensure certain capacities; and canalization, or the appearance of specific traits even with variances in genetics and environments.

### **The Supposedly Conclusive Deterrents**

While many of the objections against genetic enhancement are not unique to genetic enhancements per se, some of the arguments presented by critics of biomedical enhancements as a whole are most powerful when applied to genetic enhancements. Many anti-enhancers follow a “conclusive reasons view,” holding that there are reasons to oppose genetic enhancement in principle, regardless of whether the benefits outweigh the costs (an approach Buchanan calls the “Balancing Approach”). The most famous of these conclusive objections comes from the virtue theorist Michael Sandel, who holds that genetic enhancement not only shows the vice of “the drive to mastery” but can also lead to the disappearance of the virtue of “appreciation of the given,” and the noted social philosopher Francis Fukuyama, who holds the much more deontological fear that genetic enhancement will change human nature and thus change individual rights.

## Sandel's Attack: Consequentialism Wrapped in Virtue Ethics

In his book *The Case Against Perfection*, Michael Sandel attempts to articulate what he considers to be the source of many individuals' discomfort with genetic enhancement, a task that is made all the more difficult because he believes that the enhancement debate cannot be "fully captured by the familiar categories of autonomy and rights, on the one hand, and the calculation of costs and benefits, on the other," and instead attempts to apply a theory of virtue to the issue. Sandel argues that attempts to enhance humans through biomedical means show "a Promethean aspiration to remake nature, including human nature, to serve our purposes, and satisfy our desires ... the drive to mastery." The drive to mastery may ultimately lead to total mastery, Sandel fears, which will not only lead to "hyperparenting" driven by tainted love, but also burden parents with a new responsibility to correctly choose their child's genetics. Sandel provides no evidence for this nearly consequentialist fear that the "drive to mastery" exists or that enhancement will lead to hyperparenting. He also holds that humans should forgo any attempts at enhancement because they lack the character strength to engage in enhancement. Allen Buchanan rails against such a prohibition, arguing that if humans lack the moral integrity to not fall to the vices that may arise from enhancement, then perhaps we should enhance the morality of individuals. Many of Sandel's most powerful objections rely on negative changes to society caused by the loss of the "appreciation of the given," consequences that will be discussed later on.

## Fukuyama's Tangled Net

Francis Fukuyama, in his book *Our Posthuman Future*, calls for the heavy regulation of many biomedical enhancements, but is particularly fearful of genetic enhancement as it may change human nature, a change that would affect "our notions of justice, morality and the good life." Fukuyama fears that genetic engineering will "cause us to in some way to lose our humanity," specifically "Factor X," the "essential human quality" that "is worthy of a certain minimal level of respect." Factor X is presented as something that arises from the complexity of humans and the interactions of qualities such as reason, emotion and moral choice. The complexity of Factor X opens the possibility that genetic engineering will give rise to either or both of two situations that Fukuyama fears, that the moral status of individuals may be threatened or that what is "good" for humanity as a whole will change, both of which seem significantly less likely in light of the rejection of the Extreme Connectedness Assumption.

Fukuyama's first fear, embodied in Adolf Huxley's *A Brave New World*, is based on rather untenable philosophical ideas. Fukuyama argues that there is a difference in the moral status of an embryo, an infant, and a full grown adult, but that the potential for all of these to become full grown adults sets them apart from other creatures without discussing what differentiates these examples. The discussion of the moral status of an embryo has been hotly contended for years, and a conclusive argument will not be made here. However, using such an example as a basis for differentiating moral status merely shows how difficult it can be to assign moral status to someone or something based on specific characteristics of that individual or creature. If a postperson, a person so developed that he or she would have a higher moral status than current humans, were to emerge, it would have to be so radically different from even the most gifted of humans that it would be obvious that it was something entirely different, however, exactly what such a postperson would look like is heavily debated and will likely not be known unless a postperson is encountered. Buchanan holds that it is unclear exactly how the emergence of a being with a higher moral status would practically harm existing beings, if such a being were to ever appear. In fact, a much more practical concern would be that enhanced individuals would hold delusions of a higher moral status, a concern that will be addressed later on. Fukuyama's fear is truly grounded in the Extreme Connectedness Assumptions' taint on Factor X. If one portion of Factor X is lost, for example consciousness while sleeping, one does not become less of a person; similarly, if one capacity, even something as extreme as the capacity for moral thought, is increased, one will simply be an enhanced human. Fukuyama's second fear is that human nature may be changed. According to Fukuyama, human nature is the basis for what humans value, and by extension morals can be discovered from reflecting on human nature, a stance known as normative essentialism. While a change in human nature may change the rights that humans have, Fukuyama fears that it is more likely that what is good for humans will change. If humans do not feel pain and suffering, then they will no longer value things like sympathy and compassion; without these, human relationships will be altered and what is 'the good life' will change. Fukuyama's fear, however, suffers from two flaws. The first is the aforementioned Extreme Connectedness Assumption. The second is that he appears to ignore the possibility that enhanced humans, even posthumans, can discover what is good for them rather than simply dying out from any change. It is also important to consider the possibility that genetic enhancements may be needed to maintain what humans currently consider good in the face of changing environmental pressures,

sometimes even caused by other enhancements. As his argument currently stands, Fukuyama's objections to genetic enhancement become more entangled and are incapable to function as a net of conclusive reasons to restrict pro-enhancers. IV. The Consequentialist Bombardment

Objections to genetic enhancement in principle, such as the virtue concerns of Sandel and the deontological concerns of Fukuyama, are often accompanied by concerns about consequentialist risks and costs. These consequentialist objections may stem from the core objections, as is the case with Sandel, or be presented as additional considerations, as is the case with Fukuyama. Unlike the conclusive reasons presented above, which I hope I have weakened to mere concerns to be weighed, the consequentialist objections were presented as risks to be considered against the potential benefits of genetic enhancement. The consequentialist objections to genetic enhancement often either present fears of (1) changes to social practices that either teach or are reliant on specific values, such as sports and the family unit respectively, that are necessary to the good life, (2) changes to social institutions that would in the end negatively affect humanity as a whole, or (3) the combination of the two in the infamous case of the "designer baby." All three concerns are highly unlikely in a liberal pluralistic society such as the United States.

### **The Assault on Traditional Values**

Anti-enhancers commonly hold that genetic enhancement will alter the values of society necessary for the "good life." Sandel specifically fears for social practices that teach the "appreciation of the given," such as sports or music. Both music and sports teach individuals to appreciate the natural talents of individuals, such as how individuals appreciate a singer's voice. Sandel fears that enhancements will diminish this appreciation or change it entirely, in the same way that amplification has changed what parts of music are appreciated, as seen in the shift of popularity of opera singers to unique sounding pop singers. However, such a change would have happened through other innovations, such as recording making the need to fill a stadium with music unnecessary as one can listen from home. It is likely that enhancements other than genetic enhancements will change these social practices in similar ways. It is also possible that just as other enhancements, such as literacy, globalization and science have created new social practices, so too will new practices emerge following genetic enhancements. These innovations, anti-enhancers may argue, would alter institutions that are reliant on certain values such as the family unit. Many critics of genetic enhancements fear that the family

unit will be fundamentally changed in a variety of ways, but for now we will look at only two such ways.

First, Michael Sandel expressly fears that the combination of the "drive to mastery" and genetic engineering will lead parents to "overreach, to express and entrench attitudes at odds with the norm of unconditional love," i.e., to "hyperparent". Sandel fears if parents have the ability to design their child, they will not love their child, but rather treat them as a machine. This fear is, however, supported by no evidence. The fear also seems counterintuitive, as while an individual may love her child, it is not morally wrong to want the child to be healthy and intelligent, because what we ultimately love is the particular person and not the set of properties they possess. The second fear is that designing a child will make that child less responsible for himself, and more under the influence of his parents. While today children may rebel against the decisions about her future that her parents made, genetic engineering would be similar to "giving your child a tattoo," that is, the enhancement would never go away and, worse than any tattoo, would be passed on. However, one's genetics are not a set plan of one's life and "mastery of human biology wouldn't be mastery of the human condition." It is also interesting to note that genetic enhancement holds the possibility of making children less under the control of their parents, as an enhanced child may achieve rationality earlier than an unenhanced child.

### **A Palpable Hit Deflected**

Anti-enhancers often express the fear that social institutions will be negatively affected by genetic enhancement, most notably that genetic enhancement will make the unenhanced worse off than before. Critics worry that if the entirety of a society is not genetically enhanced, then the enhanced may seek to subjugate the unenhanced, what Buchanan refers to as the "Practical Worry." The "practical worry" is the basis for a variety of dystopian stories, reflects a disdain for previous practices such as ethnic slavery, and drives Buchanan's argument for a government-provided basic level of enhancement. However, the "practical worry" is less worrisome than Buchanan thinks. After centuries of slavery and racial discrimination, some societies have emerged that value the equality of all, regardless of individual status. In fact, it can easily be pointed out that individuals in the third world are not as enhanced as members of the first world, yet many in the United States work to help those who are less fortunate through charity programs. Sandel, in response, may argue that total control will reduce social solidarity, and so those who can remove themselves from the control of chance will not wish to help those who are still subject to chance. While this may be true, current charity and the improvements to

morality that may come from enhancements to intelligence or memory will likely not make this the case.

### **What Will Kill Diversity: The Designer Baby**

Critics of enhancement hold that the “ultimate prize of modern genetic technology will be the “designer baby.”” Beyond the already stated issues that genetically engineered children will have on the parent-child relationship, many fear the emergence of an “ideal” child, an ideal that may be pursued by parents. An ideal child would not only increase the risk that the unenhanced will be dominated by the enhanced, but it may lead to a modern-day eugenics that would limit genetic diversity. While today there is a strong aversion to coercive government-funded eugenics, Sandel worries that just as the old eugenics set up an ideal that individuals were measured against, so will the new eugenics, with the only difference being that the model will be dictated by the market. I am not overly concerned with this objection, particularly in a heterogeneous and liberal society such as ours. The ideal that was pursued by the Nazi eugenics program, the Aryan with chiseled muscles and masculine features, differs greatly from the eastern ideal of bishonen, a man or boy with beauty that transcends gender, and the early western ideal during the 1800s, which included a large gut to show wealth. Ideals vary by culture and age, and in a pluralistic society concern for one model, market-mandated or otherwise, is unlikely.

### **The Consequentialist Defense of the Enhancement Enterprise**

The myriad of potential negative consequences are not intended to be conclusive reasons for prohibition against genetic enhancement, but rather risks to be considered when deciding if it would be ethical to engage in genetic enhancements. The possible negative consequences that are provided as objections to genetic enhancement have to be weighed against the possible benefits that humanity may reap from genetic enhancements. Critics who address these possible benefits often minimize their value by either presenting them as zero-sum goods or by ignoring the possibility that genetic enhancements may be necessary to prevent a decrease in the well being of the human condition.

### **The Anvil of Network Effects**

Anti-enhancers often hold the assumption that genetic enhancements are zero-sum goods, for instance, that the reason it is beneficial for a child to be more intelligent than she would be naturally would be to take a spot at Harvard, a spot that another child would have taken. Many of the enhancements

mentioned, such as intelligence, are not zero-sum, but instead have a “network effect,” the benefits of the enhancements increase the more individuals who have the enhancements. Literacy, for example, has very noticeable network effects; while one literate individual may be able to record his thoughts, two literate individuals can communicate through writing, and a society of literate individuals can store and pass along large amounts of information. Network effects also will play a large part in how genetic enhancements may be able to help maintain the quality of life humans currently enjoy. Some benefits from enhancement will not be limited to network effects. If an individual is more productive because he has a better immune system, higher intelligence, or has a longer productive period of life the consumer of whatever good that enhanced individual produces may benefit. However, the benefits of enhancement do not have to be limited to improvements, but may include maintain the *status quo*.

### **The Conservative Hammer**

Humans evolved in a radically different environment than they live today, and enhancements may be necessary to survive or sustain the quality of life humans enjoy currently in this radically different environment. Enhancements in mobility have led to globalization, which has lead individuals to become exposed to new pandemics that early humans would never have experienced and modern humans may not survive without immune system enhancements. Immune system enhancements would also benefit from network effects, in the exact same way that vaccines benefit from “herd immunity.” Other enhancements, such as those involving medical technology, have expanded the human lifespan far beyond the age of reproductive fitness and so have expanded how long individuals suffer from the burdens of old age, diminishing overall quality of life. As natural selection only affects traits that aid reproductive fitness, there are no pressures to improve the quality of life in old age without genetic engineering. Some critics claim that enhancement should not be pursued because it will detract from advancements in therapy, which are beneficial to all rather than just those who can afford enhancements. It is important to consider, however, that cognitive enhancements may allow individuals to make advances in therapy that never would have occurred otherwise or even that enhancements could be used as therapy. The possible benefits to individuals and society as a whole from genetic enhancement is nearly limitless, and it is possible that not all the possibilities will be considered until enhancements are used.

## Love's Role in the Battle for Enhancement

Genetic enhancements obviously carry with them a wide range of potential benefits and costs, however, both Fukuyama and Sandel adamantly hold that simple cost/benefit analysis does not appropriately consider everything at stake in the enhancement debate. I agree. As no conclusive reason to oppose genetic enhancement exists, parents have an obligation to consider genetic enhancement as a possibility to ensure the flourishing of their child. A parent has a duty to encourage the flourishing of her child to the best of their ability, both in terms of means and knowledge. While some may argue that such a duty does not exist, it is easy to demonstrate and to argue for it in terms of respect for persons. Suppose that a multimillionaire lives in a mansion and has a personal chef who has earned several Michelin stars, but has a child who lives in a separate, smaller house more suited for those right above the poverty line. The child does not live in abject poverty, but is only provided basic sustenance, lacks the luxury of air conditioning, and has barely enough clothing. Suppose the parents do not believe that this treatment will teach the child any valuable lessons that will help him flourish in the future, but would rather simply provide the bare minimum to remove the child from their life without upsetting relatives who know of the child, damaging public their public image, or running afoul of the law. Most would instinctually say that the parents are not fulfilling a moral obligation, but have difficulty articulating their objections in terms of violations of rights. Such an argument that instinctive moral objections, in the form of disgust, should be considered separate from discussions of rights is used by critics of enhancement, such as Sandel. It could also be said that to respect the dignity of the child's potential for personhood requires that the parents or guardians seek to foster that personhood so that the child may flourish in the future. As it would be unjust to force a parent to genetically engineer her child, by not respecting their personhood, the moral obligation to genetically engineer a child falls to the parents. Sandel discusses such a responsibility emerging and cries out that it burdens the parent to make the correct decision, a burden that did not exist before. However, this burden is not nearly as heavy as Sandel believes. No human is perfect (yet), and there are no expectations that parents will be perfect. The duty of a parent is to help his or her child to the best of her ability and knowledge, and that does allow for a parent to be wrong about what may help her child in the future. For example, no one believes that parents who encouraged and supported their child's training in phrenology or programming with card punches has failed to ensure their child's flourishing on the grounds that it was not possible for the parents to know that such occupations would

disappear because of the changing world. Similarly, one cannot claim that parents before the rise of modern medicine failed their children for leeching them in the hopes of curing a serious ailment. The parent's duty is to ensure that her child has the best possible chance of flourishing in the child's lifetime.

While the ability to alter every aspect of a child's genetics is still several years away, it is significantly closer than when Michael Sandel and Francis Fukuyama wrote their works. Sandel and Fukuyama are merely two opponents of genetic enhancement, but as it stands there are no conclusive reasons to prohibit genetic enhancement for reasons based in deontology or virtue theory. There are potential risks that may come from pursuing genetic enhancement, but all innovations carry risks that must be weighed against the potential benefits. The reasons for considering genetic enhancement are not merely limited to the benefits it may bring to an individual and society, but include reasons as simple as the moral duty of a parent to help her child thrive.

The genetic enhancement debate is one that is quickly going to come to the forefront of policy debate, an intense and fierce debate that may come to affect the very structure of society. A debate so important should not be plagued by views spawned from ignorance, such as biomedical exceptionalism. It is also important to note that while critics such as Sandel and Fukuyama may present conclusive reasons against enhancement, these reasons rarely carry the philosophical weight their authors seem to believe they do. As a truly conclusive reason does not exist, the decision to pursue genetic enhancement must be made by comparing concerns. The ethical debate must consider the potential risks and benefits, but should not be limited to simply cost/benefit analysis. The debate concerning genetic enhancement should consider the possibility of a virtue calling for genetic enhancement, a virtue as uniquely human as love. A parent should consider the potential benefits from a place of love, a love for a child that should be loved regardless of which traits are chosen and which are not.

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