# Liberalism and Human Genetic Enhancement

## – Greg Bognar –

**Abstract:** In this paper, I address the familiar argument that heritable genome editing will lead to a dystopian future in which there are two classes of human beings: an elite with enhanced mental and physical abilities and a vast underclass of ordinary humans who do not enjoy the advantages of genetic enhancement technologies. Contrary to previous discussions, however, I assume that this development takes place in a decent, liberal democratic state. This allows ideas from political theory to be applied to the argument. I begin by describing a possible pathway to the dystopian future, building on the ideas of knowledge resistance, social distrust, and cognitive biases that lead a large part of the population to reject beneficial genetic technology. Then I ask: How should a liberal state respond to the resulting inequalities? Does liberal political theory have the resources to give us some guidance? I examine the issues from the perspective of both distributive and relational egalitarianism.
**Keywords:** genetic enhancement, knowledge resistance, liberalism, egalitarianism

## 1. Introduction

Hegel famously said that the owl of Minerva spreads its wings only with the coming of the dusk. He meant that philosophical reflection comes only after events have unfolded. Philosophy is always late to the scene. But this is not always true. Sometimes philosophical debate runs ahead of events. This is the case when it comes to human genome editing and human genetic enhancement.

The philosophical debate on human genome editing had started long before the discovery of CRISPR/Cas-9, the introduction of the first treatments based on the editing of genes or the possibility of embryo selection on the basis of genetic screening tests.[1] In science fiction, it goes back even further. Sci-Fi writers warned against genetic engineering and worried about a dystopian future, in part based on the lessons of the eugenic movements in the first part of the twentieth century. More recently, however, some philosophers have taken a more optimistic view. They point out that there is nothing

Greg Bognar
Department of Philosophy & Stockholm Centre for Health Care Ethics
Stockholm University
greg.bognar@philosophy.su.se

[1] For recent overviews, see Almeida and Ranisch (2022); Anomaly (2024); Giubilini and Sanyal (2015) or the collection edited by Jotterand and Ienca (2024).

inherently wrong about enhancing our abilities and making our lives better by genetic means. What was wrong about the eugenics of the past has nothing to do with genetics itself, but with the denial of civil liberties and reproductive freedoms that illiberal states employed in pursuit of eugenic aims.

Much of the story about human genetic enhancement—the use of genetic technology to make humans healthier, more intelligent, longer-lived, more caring or athletic or beautiful, and the like—is still in the future. But the main arguments for and against are well established. No doubt new ideas will emerge and familiar ideas will be reexamined and reinterpreted in the light of scientific developments. Some arguments might be discarded and some dismissed ideas may be resurrected. Even if we are in for some surprises, the contours of the debate have been sketched.

In this paper, I want to focus on an old idea that has received relatively little attention in recent years as the focus of the debate has shifted from "categorical" or conceptual arguments to pragmatic and operational ones. It is based on the fear that heritable genome editing will fundamentally change human nature by creating a new kind of "superhuman" with enhanced intellectual and physical abilities, while access to genetic enhancement will be unequal and thus a large part of humanity will be left out from this development. As a result, humanity will split into two classes of human beings: a cadre of "wonderwomen" and "supermen" on the one hand, and a vast underclass of ordinary humans, on the other—an underclass whose members have lives that are, in comparison, poor, nasty, brutish, and short. Such a dystopian future was portrayed in the 1997 film, *Gattaca*, and Francis Fukuyama already wondered at the time: "What will happen to political rights once we are able to, in effect, breed some people with saddles on their backs, and others with boots and spurs?"[2]

I want to ask: Well, what would happen? And how might it happen? How could we get to this dystopian future in the first place? And once we are there, what should decent, liberal states do with the enormous inequalities? In what follows, I explore these questions. I begin by clarifying some of my assumptions in Section 2. Section 3 speculates on one way that societies can evolve towards this unequal future. Then, in Sections 4 and 5, I evaluate the consequent state of affairs from the perspective of distributive and relational egalitarianism, two leading theories in liberal political philosophy. I argue that they yield some surprising conclusions.

It should be stressed at the outset that the arguments in this paper are broad and necessarily impressionistic. My aim here, given the space constraints, can only be to sketch out the questions, rather than to arrive at determinate answers. Such answers must come from future work.

## 2. Background Assumptions

You might, not unreasonably, think that the idea of "some people with saddles on their backs and others with boots and spurs" is a bit far-fetched. *Brave New World*-like social hierarchies or people bred to be replacement organ repositories or pain-resistant

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[2] Fukuyama (2002): 10. The labels "wonderwoman" and "superman" were applied in this context by Harris (1992).

supersoldiers have always been regular features of discussions of genome editing, but they are hard to take seriously. (If you were an evil mastermind, wouldn't you find it cheaper, easier, less risky and much quicker just to build drones and other machines for war and industry, rather than to breed, feed, educate and control biological creatures that are vulnerable, susceptible to illness and disease, don't have replaceable parts, and are prone to rebellion?) Defenders of the *dystopian future scenario* (as I shall call it) could never provide a plausible account of how such an unequal social arrangement could come to pass—a story outlining how we would get from here to there. They could never produce a credible cost-benefit analysis to explain how or why the dystopian social institutions would be created and maintained.

On the other hand, a less radical version of the dystopian future scenario might be feasible and perhaps not entirely implausible. After all, we already live in a very unequal world. These inequalities are already putting a lot of pressure on the fabric of society, leading to the rise of authoritarianism and the retreat of liberal democracy. As the UN's 2019 *Human Development Report* points out, despite all the progress of previous decades, we are currently living in one of the most unequal times in history. Extreme poverty has receded, but new forms of inequality are emerging and existing power imbalances are exacerbating them. Inequalities of power and economic wealth can easily translate into entrenched political dominance. Novel technologies, including medical technologies, often accelerate social change.[3]

It is worth spelling out the background assumptions when speculating about the social consequences of novel technologies, especially when they differ in some ways from the usual starting points of garden-variety dystopian future arguments.

First, I assume that there exists a range of genetic enhancements that are safe, effective and widely available. They are not prohibitively costly for most of the population and there are no inequalities of access. The government may even promote and subsidize these technologies (for instance, as part of public health campaigns or standard prenatal, neonatal and maternal care). I make this assumption to avoid the sort of argument that establishes inequality in a somewhat circular way: if you assume that beneficial technologies are only available to a narrow elite, it's easier to make your way to a dystopian future where only the elites enjoy the benefits of these technologies, but once there, you will have failed to explain why governments have not attempted to prevent this outcome by banning these technologies, or broadening access to them, or attempting to reduce inequalities some other way.

Second, I assume that the enhancements we have in mind are the usual sort that are discussed in the literature: they boost cognitive abilities like general intelligence or creativity, optimize psychological traits like self-control, improve health by strengthening the immune system, increase life spans by slowing the aging process, and so on. They are, let me stress, assumed to be unquestionably beneficial for the individuals who choose them for themselves or whose parents choose them on their behalf before birth.

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[3]  As I argue elsewhere (Bognar 2012), advances in biomedical and genetic technology may lead to a new *knowledge-driven health transition*, on the analogy of the health transition that took place in the early modern period and opened up wide health gaps between the ruling class (aristocrats) and the rest of society. For the historical background, see Johansson (2010).

These technologies expand life expectancy, increase psychological, mental and physical well-being, and maintain health by preventing disease and disability.

Third, the use of these technologies has no coercive aspects.[4] Individuals and prospective parents choose them voluntarily and autonomously, without social or governmental pressure. Thus, I do not assume an oppressive, totalitarian society or powerful, malign political actors. Illiberal, authoritarian states could easily avoid wide inequalities due to genetic enhancements by simply compelling or coercing their citizens to use them (or prohibit them from using them). However, I start from a broadly liberal state, with periodic democratic elections, freedom of speech and the press, a broad range of civil liberties guaranteed to each citizen, and relatively well-functioning institutions, including health care and public health systems that are available to all. I assume that the state takes an interest in the well-being of its citizens and may even encourage them to take advantage of beneficial genetic enhancement technologies, but it does not paternalistically interfere with their choices and respects their autonomy and reproductive freedom. The government may use persuasion, financial or other incentives, nudges, and perhaps even offer some enhancements as part of routine health care, but it does not impose unwanted medical interventions. I shall call such a state a *decent* state and its government a decent government.

Fourth, I assume that the government regulates genetic technologies adequately and ensures their safety and efficacy. In addition, the widespread use of these technologies does not lead to any collective action problems or self-defeating social outcomes.[5]

In sum, I do not assume that the dystopian future scenario arises from unequal access or as a consequence of malign political or economic actors or forces. I do, however, make one crucial assumption about the imaginary society in which I test the argument. I assume that it is characterized by high levels of distrust towards authorities—including political, economic and scientific institutions. Politics is deeply polarized, and public and professional bodies and experts are distrusted by many people. There are segregated media environments catering to the interests and reinforcing the beliefs of different political tribes. In this respect, our test society is not unlike many with which we are familiar today in the Western world.

The assumption of low levels of social trust provides an entry point to a possible pathway towards the dystopian future scenario. Once the story is told, we can ask how the state should respond. But before addressing this question, I first map out the way we can get there.

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[4] That is, they are unlike the eugenic policies of the early twentieth century. However, I avoid the term due to disagreements of its use (and misuse) in the debate. For a useful discussion, see Veit et al. (2021).
[5] These are perhaps unrealistic assumptions. The more beneficial these technologies turn out to be, the more difficult it might be to enforce compliance with regulations, especially internationally. (On regulation, see also note 8.) There are also reasons to think that conflicts between individual and collective interests are likely to be the major sources of social problems when it comes to the use of new genetic technologies. I will, however, set these problems aside in this paper. For an early exploration, see Kavka (1994); see also Bognar (2012).

## 3. Knowledge Resistance

In recent years, increasing attention has been given to the phenomenon of *knowledge re-sistance*, a form of irrationality that involves resistance to available and relevant evidence. People who resist knowledge fail to draw the proper conclusions from the evidence to which they have access—or may even intentionally avoid evidence that supports a conclusion that they do not want to accept. Thus, knowledge resistance can refer to both resistance to evidence and avoidance of evidence.[6]

It is a commonplace observation that knowledge relies on trust. Most of what you know comes from the testimony of others—from the people you know or meet, from the news and other information sources that you read and watch. If you don't trust a source, you will not accept the information that it provides. If you know that a person is untrustworthy, you will tend not to believe her in important matters. If you have doubts about the reliability of a news source, you will tend not to believe the information that it presents, especially when it conflicts with information from reliable sources. Knowledge resistance typically applies to testimonial evidence, in which trust is especially important. Without trust, testimonies cannot fulfill their role of generating knowledge.

In an environment where there are many different sources of information, you have to make choices about the sources you trust. There is no guarantee that you will be able to find the reliable ones. Most people rely on the consumption patterns or recom-mendations of their social group—the people they interact with the most. But if members of your social group tend to use less reliable sources, it is going to be more difficult for you to find the more reliable ones, and the more fragmented your "epistemic environ-ment" is, the more difficult it is to make consumption choices on the basis of reliability. The problem is amplified in social environments with low levels of trust, since the social costs of going against your group's information consumption patterns are higher. In other words, a fragmented epistemic environment with low levels of trust is likely to lead to polarization and tribalism.

Knowledge resistance has been studied extensively in politics, since the phenome-non is most prevalent in connection to issues that are politically charged and also involve or depend on complex scientific evidence and expert testimony. Familiar examples are climate change, the link of mobile phone networks and other technological devices to illness, or vaccinations. Knowledge resistance may arise due to partisan political pref-erences, extreme overestimation or underestimation of risks, or a propensity to accept conspiracy theories.

Consider, for instance, the opposition to mRNA-based vaccines against COVID-19. In many countries, a large percentage of the population refused to get vac-cinated despite the risks of the ongoing pandemic. People not only underestimated the harms and risks of getting infected and developing complications, but many argued that mRNA-based vaccines have detrimental genetic effects, changing or damaging their genetic makeup. Despite the scientific evidence (and the hundreds of millions of people who had already been vaccinated without adverse health outcomes), they claimed that

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[6] For a recent collection on the topic, see Strömbäck et al. (2022). For a philosophical introduction, see Glüer and Wikforss (2022).

the vaccines were experimental and might have long-term side effects. Moreover, many people's opposition to the vaccines were driven by distrust of political authorities, science and the pharmaceutical industry.[7]

While different psychological processes may be at the root of the irrationality behind knowledge resistance, a common cause is *motivated reasoning*. Such reasoning is driven not by responses to epistemic reasons but by the agent's desires or other attitudes. If you engage in motivated reasoning, then the reason you come to believe some proposition is that you want to believe it, instead of accepting it by responding adequately to the evidence and evaluating it on the basis of the facts. Part of the opposition to mRNA-based vaccines might have come from political preferences, driven by distrust of authorities (primarily on the right side of the political divide) or distrust of the pharmaceutical industry (primarily on the left side of the political divide). But it's not implausible that at least in some cases there were deeper reasons: the fact that RNA and genes were involved might have evoked worries about changing human nature, beliefs about what is natural, or a bias towards precaution (more on these below). Motivated reasoning need not be politically motivated (for instance, by being based on the desire to identify with one's group). It can be based on more mundane beliefs and biases.

Return now to my test society with safe, effective, and widely available genetic enhancement technologies. These technologies enable citizens—and their descendants—to have higher intelligence, fewer diseases and disabilities, longer lives, and greater physical and mental well-being. The state, through its public health, human development and scientific agencies and institutions promotes and provides these beneficial technologies to the population while respecting civil liberties and personal autonomy. Alas, this society is characterized by low levels of trust in the government, public agencies and social institutions. These factors might create ideal conditions for knowledge resistance.

It is not difficult to imagine some of the reasons. First, the underlying science is complex. Apart from the few cases of single-gene diseases, target traits depend on the complicated interaction of many different genes as well as the interplay of genes and the environment. Thus, the details of the interventions are difficult to understand without specialized training in genetics and statistics. Patients and prospective parents will have to think hard about possible trade-offs. The complexity of the interventions is likely to keep many patients and parents away from them, especially if they already have low trust in the institutions that provide them.

Second, genome editing is going to be highly regulated by governments and professional bodies. The "genetic supermarket" that is proposed by some defenders of human enhancement is almost certainly a fantasy.[8] Governments will take an active role in ensuring efficacy, safety, and perhaps affordability. There are going to be complex legal arrangements to protect patients and parents as well as the providers of interventions. "Big government" will loom over the genetic enhancement marketplace. The involvement of government and public agencies is likely to create suspicion in certain

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[7] For overviews, see Kafadar et al. (2023); Carrieri et al. (2023).

[8] See, e.g., Nozick (1974): 315. Discussions of genetic enhancement tend to ignore the fact that genome editing is a dual-use technology, with civilian and military applications (Badea and Feeney 2024). This fact in itself ensures that it is going to be strictly regulated by governments.

people about the ultimate purposes of these technologies, especially if they are already distrustful of government regulation.

Third, genetic interventions, at least initially, are going to be expensive. Due to economies of scale, the market is likely to be highly concentrated—dominated by "big genomics," just like today's pharmaceutical industry is dominated by big corporations. Such enterprises are already viewed with suspicion by many people. They are suspected to be driven by the profit motive (or worse) at the expense of human well-being and health. Once these corporations are perceived to meddle with the human genome, distrust will turn away many people.

At first, the resistance to new genetic knowledge and its applications need not be politically motivated. Motivated reasoning can arise instead from common, strongly held "folk beliefs." One such belief is *genetic essentialism*: the (erroneous) idea that there is a distinct "human nature" and it is defined by our genes. What makes us distinct as a species and as individuals is the specific genes we have. Once we start to manipulate them, we lose our human distinctiveness and dignity. We become morally alien creatures. (A good example of this kind of reasoning is Fukuyama's argument, alluded to in the quote above about "boots and spurs," that human rights and human dignity depend on human nature, human nature depends on our genes, and therefore if we change our genes, we lose our dignity and human rights.)

Another "folk belief" is the belief in the benevolence of nature. Most people unreflectively believe that nature is benevolent and safe, and technology is malignant and unsafe. Since there is nothing more unnatural than changing the human genetic make-up by editing our genome, human enhancement (at least for not strictly therapeutic purposes) is to be feared and rejected. It is not difficult to conclude from the juxtaposition of benevolent nature and malignant technology that in the hands of unscrupulous and untrustworthy governments and corporations, genetic technology is going to be used for malevolent and dangerous purposes.

A final example is the bias towards precaution. It is well-documented that humans are psychologically more sensitive to losses than to gains. Medical interventions that prevent or cure disease are easily perceived as the avoidance of a potential loss (in quality of life or normal functioning), whereas interventions that do not fix an existing condition but promise improvement in function are likely to be perceived as risky gains. Given that people care more about avoiding a loss than gambling for an equivalent gain, it is plausible that many people will be naturally predisposed to oppose the use of genetic enhancement technologies (at least until their widespread acceptance makes them familiar and unremarkable).[9]

It does not seem far-fetched that some people will be able to navigate the new technological landscape better than others. People with higher levels of education can better understand complex scientific information. They are less prone to fall into cognitive traps like genetic essentialism, the belief in the benevolence of nature, or the bias towards precaution. They tend to be more affluent and thus better able to afford genetic services. They tend to have higher levels of trust towards experts, scientific and medical institutions, and government regulation.

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[9]  For a discussion of such psychological factors and government regulation, see Sunstein (2005).

This is not to say that the better educated you are, the more willing you are to reap the benefits of human genetic enhancement. (Plenty of highly educated people believe in pseudoscientific nonsense, engage in conspiracy thinking, or fail to avoid cognitive traps.) But knowledge resistance may have a tendency to be concentrated among people with fewer intellectual and material resources and it may gravitate towards groups with preexisting political views—beliefs that fit particularly well the rejection of scientific evidence.

At some point, unscrupulous political entrepreneurs may arise to exploit the existing distrust and hesitancy for their own purposes, further fueling distrust and resistance. Groups in the population may coalesce around them and reject genetic technology across the board. The result may be extreme levels of polarization and tribalism, especially when it comes to the exploitation of new genetic knowledge.

Given these factors, it is not entirely implausible to predict that the rejection of genetic enhancement technologies becomes rampant. The idea of genome editing already taps into deep-seated biases and beliefs. In social environments with fragmented and competing information sources, low levels of trust, and the presence of unscrupulous political entrepreneurs eager to exploit tribalism, the consequences can be dramatic.

A large part of the population, typically with higher levels of education and trust in political and scientific institutions, will increasingly utilize genetic enhancement technologies. Over time, they and their descendants might indeed come to resemble "wonderwomen" and "supermen," at least compared to those who resist new genetic knowledge and technology. They will be on average more intelligent, healthier, and their life expectancy will be higher. Because of their intelligence and higher levels of trust, they will cooperate more often and more productively with others like them, and therefore they are likely to become even more affluent and have better life prospects than their fellow unenhanced citizens.

Meanwhile, those who reject genetic enhancements for themselves and their children will see their life prospects gradually contract. We don't have to imagine that they will fall into poverty. But they will find it more difficult to compete with their enhanced peers for rewarding jobs, educational opportunities, or socially prestigious positions. More and more of them will descend on the socioeconomic ladder. Over time, they might form a large underclass of people.

We can continue to assume that the unenhanced have the same civil liberties and enjoy the same political rights as others, even if their lives are comparatively poorer, less pleasant, tougher, and shorter than those enjoyed by the enhanced members of the population. The process that leads to this state of affairs does not involve oppression or coercion; the unenhanced have, in a sense, chosen it for themselves due to their irrational resistance to new genetic knowledge. We have arrived at the land of some people with boots and spurs, and many others with saddles on their backs.

Let's freeze the frame at this moment. Assume that our test society is still a decent, liberal state. Its political leaders care about their society's well-being and they are concerned with the social trends that have led to its fragmentation. How should they respond to the inequalities that arose?

## 4. Distributive Equality

Classical liberalism focused on liberty, with little to say about equality. Modern liberals have attempted to reconcile the values of liberty and equality. They are concerned with inequalities in both opportunity and material resources, like income and wealth. They typically reject strict equality of welfare, the view that justice demands that people are made equal with respect to their well-being or quality of life. They emphasize that strict equality is incompatible with liberty and that people have different life plans and conceptions of the good (that is, fundamental metaphysical and moral beliefs about how one should live their life in order to give it meaning and value). They argue that the state should let citizens pursue their life plan according to their own conception of the good. The state does have a responsibility to provide people with equal opportunities to flourish and realize what they value, perhaps along with a basic level of resources, but there is no requirement that people end up equally successful or well off.[10]

For instance, John Rawls famously argued that the basic structure of society—its fundamental political, economic, and social institutions—should satisfy two principles.[11] On the one hand, it should allow for the most extensive, mutually co-possible scheme of rights and political liberties. People should be strictly equal in this respect. This is the Liberty Principle. On the other hand, social and economic inequalities are permissible when it comes to the allocation of material resources and valuable social positions and offices as long as, first, fair equality of opportunity is satisfied (that is, roughly, people with equal talent and effort can compete for them on equal terms, regardless of their social and economic starting positions) and, second, any inequality benefits the least advantaged (that is, departures from equality are allowed only if the worst off is made better off thereby). In particular, economic inequalities are permissible only if fair equality of opportunity is maintained and they improve the lot of the least advantaged members of society. The first part of the second principle is the Fair Equality of Opportunity and its second part is called the Difference Principle.

These principles are clearly meant to apply to inequalities that arise due to genetic differences. Rawls argues that when they select the principles of justice, people

> want to insure for their descendants the best genetic endowment (assuming their own to be fixed). The pursuit of reasonable policies in this regard is something that earlier generations owe to later ones, this being a question that arises between generations. Thus over time a society is to take steps at least to preserve the general level of natural abilities and to prevent the diffusion of serious defects. These measures are to be guided by principles that the parties would be willing to consent to for the sake of their successors.[12]

In the dystopian future scenario, we can easily imagine that the Liberty Principle is satisfied. Despite the huge differences between the two groups, there is no reason

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[10]  See, for example, Rawls (1971); Dworkin (1981); Arneson (1989); Barry (1989); Anderson (1999).
[11]  Rawls (1971).
[12]  Ibidem: 108.

those who reject genetic enhancement and those who accept it could not enjoy the same set of political rights and civil liberties in a liberal democratic society. Despite the great disparities in their life prospects, their differences in health and intelligence do not have to translate into differences in freedom and rights. (In many countries, there are already large disparities in health today without similar disparities in civil and political rights.) As long as people are able to participate in social and political life, their individual differences should not make a difference to their legal and political equality.[13]

Similarly, economic inequalities can be accommodated by the Rawlsian principles. By creating healthier and more intelligent people, genetic enhancement is likely to have spillover or network effects—more intelligent and physically and psychologically healthier people are likely to be more productive, more creative in expanding knowledge and advancing technology, more successful in cooperating with others, and better at solving problems.[14] In short, they are likely to contribute more to economic growth and social progress in ways that benefit everyone, including the least advantaged members of society.

Equality of opportunity is more puzzling. We are imagining a society in which there are large differences in people's "natural endowment" (health, intelligence, talents, and so on), for the most part due to their own choices (or the choices of their parents). Even if the society is otherwise just, enhanced people with better natural endowments (and access to further enhancements) and people who reject beneficial enhancement technologies are not going to be able to compete on equal terms. Inequality of opportunity between members of the two groups seems inevitable. And remember that the state cannot remedy these inequalities by simply providing the unenhanced the means to catch up with others—that is, by giving access to the enhancement technologies that others have taken advantage of—because by assumption, these technologies are already available to all, but some people in the population reject them. A decent, liberal state is not going to force people to undergo unwanted medical interventions.

Now, one might object that it's unlikely that there would be a sharp line between the two groups. Given a range of enhancement technologies, different people will choose different bundles for themselves and their children. On the lower end of the spectrum, there will be the people who reject genetic enhancements entirely; on the higher end, there will be those who avail themselves of all available technologies, with most people falling somewhere between these two extremes. When plotted, the result would be a normal distribution.

Even in this case, however, the range is going to increase as more and more enhancement technologies are introduced—that is, there is going to be a greater distance between the two ends of the curve that depicts the distribution of enhancements in the population. The higher end of the spectrum will expand as some people choose to use novel technologies. Given the assumption that these technologies are beneficial, this is going to increase inequalities, including inequality of opportunity. Thus, the argument does not depend on a sharp boundary between the two groups.

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[13]  See also Buchanan (2009).
[14]  See Buchanan et al. (2000); Buchanan (2011): chapter 2.

Perhaps the state can compensate unenhanced people for their relative lack of ability to compete for positions and offices of prestige, power, or responsibility. But compensation is morally problematic when the cause of a disadvantage is irrationality—when certain groups of people refuse beneficial technology because they have false beliefs about it, due to their own resistance to knowledge. The evidence is available to all (and it includes the conspicuous fact that many others benefit from these technologies without any harmful effects). It's just that some people are either unwilling to draw the correct conclusions from the available evidence or they actively avoid considering that evidence.

This puts the state in a difficult position. How should it respond to the irrationality of many of its citizens? Should it consider the refusal of those who reject the use of beneficial genetic technologies as a sign of some sort of incompetence? This is a drastic option, since it implies that these people are not fully autonomous and their refusal might be invalid from a moral perspective. In other contexts, a choice is normally accepted as autonomous if the decision maker is competent, the choice is voluntary and based on an adequate understanding of the relevant information.[15] By assumption, the competence and voluntariness conditions are fulfilled: the state does not impose these technologies on any citizen. And it is at least doubtful that the irrationality of knowledge resistance is based on inadequate understanding, given that it requires that the agent actively resists or avoids evidence.

Intuitively, knowledge resistance does not make choices less autonomous. Even if resisting knowledge is irrational, this sort of irrationality is due to the agent's own actions (or lack of them)—it is a sort of irrationality that you, so to speak, bring on yourself. This is true even if it is acknowledged that in a highly polarized society with low levels of trust many people find themselves in less than ideal epistemic circumstances. Nevertheless, it would be strange if state officials argued that those who refuse to accept beneficial genetic technologies lack autonomy and therefore it is permitted to treat them as incompetent. This would be impermissibly paternalistic and swiftly lead to coercion.

In a similar manner, it would be strange if people who resist genetic knowledge and refuse to take advantage of new enhancement technologies argued that they are owed compensation for their disadvantages. After all, the disadvantages are self-imposed, even if (let's suppose) some of these people argue that their refusal to use genetic technologies is rooted in their own conception of the good. People who resist knowledge don't usually acknowledge their own irrationality. For instance, they might argue that "playing god" or "changing human nature" conflicts with their moral and metaphysical convictions and refuse to recognize that these ideas are confused and nonsensical. It is, they insist, those who disagree with them that are fundamentally misguided.

Nevertheless, one might argue that it's not clear that people who refuse to enhance themselves or their children are responsible for their disadvantages. Recent liberal egalitarian thought has emphasized the distinction between choice and circumstance. The basic idea is that a liberal theory of equality should be sensitive to choices, but not to circumstances: that is, it is not unjust if inequalities arise as a result of people's choices, but it is always unjust if inequalities are the result of circumstances. People are responsible for their choices, but not for their circumstances.

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[15] See, e.g., Dworkin (1988).

This kind of view is known as *luck egalitarianism*.[16] In general, luck egalitarians hold that it is unjust if some are worse off than others through no fault or choice of their own. Equivalently, luck egalitarians accept that it is *not* unjust if it is *not* the case that some are worse off than others through no fault or choice of their own. This might happen in one of two ways: either no one is worse off than anyone else or those who are worse off are worse off through their own fault or choice. In the latter case, their is no duty of justice to remove or compensate their disadvantage.

For luck egalitarians, the key question of the dystopian future scenario is whether the cause of the inequality—knowledge resistance—should be attributed to circumstance or choice. On the one hand, knowledge resistance does not arise in a vacuum. People take their cues from their social environment. If you grow up in a community of vaccine skeptics who have extremely low levels of trust towards scientific and political institutions, chances are that you will come to share their beliefs and distrust of authorities. Knowledge resistance might then be considered a consequence of factors that arise from your circumstances. On the other hand, we expect mature, competent citizens to respond properly to evidence, even in difficult epistemic circumstances. If you fail to form true beliefs despite the available (and perhaps overwhelming) evidence, it is hard to argue that knowledge resistance is not a matter of choice.

To sum up, it is not clear how luck egalitarians would evaluate the inequalities in the dystopian future scenario.

Luck egalitarians sometimes argue that the "cut" between choice and circumstance is up to society to determine: a political community must decide which consequences it holds its citizens responsible for and which consequences it attributes to circumstances. An outcome which it would have been unreasonable for society to expect the agent to avoid is a matter of circumstance; an outcome which it is reasonable for society to expect the agent to avoid is a matter of choice. The former gives rise to a duty of justice to remove or compensate the disadvantage that results; the latter does not. As one defender of luck egalitarianism puts it, the "unreasonableness criterion shifts the focus of attention from the individual to the society. It asks *not* whether the individual has acted in a reasonable way, but rather whether it is *un*reasonable for *society* to expect the individual to avoid a certain course of action."[17]

At first glance, the unreasonableness criterion might seem a neat solution. Surely, knowledge resistance is irrational. Surely, what is irrational is unreasonable. It is reasonable for society to expect people to take into account relevant evidence and draw conclusions that are warranted by the available evidence. Therefore, any action that results from a failure to do so is such that it was reasonable for society to expect individuals to avoid it. Thus, it is a matter of choice for which people can be held responsible.

But "society" is not a unified entity. People sharply disagree on what is reasonable for society to expect people to avoid. (People who refused to get vaccinated against COVID-19 were plainly convinced that it is unreasonable for society to expect them to get vaccinated.) In our dystopian future scenario, those who reject enhancement tech-

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[16]  See, e.g., Dworkin (1981); Arneson (1989); Cohen (1989); Temkin (1993); Segall (2016) and the contributions to Knight and Stemplowska (2011).

[17]  Segall (2010): 20, his emphases. For criticism, see Bognar (2019).

nologies might believe that it would be reasonable for society to expect people to *avoid* these technologies and unreasonable not to avoid them. Their opponents might hold that it would be reasonable for society to expect people *not to avoid* these technologies and unreasonable to avoid them. Plainly, the two sides cannot come to an agreement on the unreasonableness criterion. They are at a stalemate.

Perhaps we could reason this way. From a liberal perspective, proponents and opponents of the use of genetic enhancement technologies should be able to agree on one thing: it would be unreasonable for society to *expect* people to use enhancement technologies, because whether they do should be a matter of personal autonomy. It should be up to citizens to decide whether they engage in genome editing for themselves or their children, given their own conception of the good. A liberal state has no business of interfering with such a personal choice.

On this interpretation, it turns out that the inequalities in the dystopian future scenario are matters of choice, rather than circumstance. They give rise to no duties of justice to remove or compensate the disadvantages that result. From a liberal perspective, the inequalities might be unfortunate, but not morally wrong.

This conclusion is surprising and somewhat disturbing. Decent, liberal states have no duty of justice to reduce the inequalities in the dystopian future scenario, even when they clearly arise as a result of irrationality. It appears that liberal political theory does not have the resources to explain what is wrong with a future of some people with saddles on their backs and others with boots and spurs.

## 5. Relational Equality

In recent years, liberal political theory has been criticized for its focus on responsibility and choice. Critics have pointed out that it has ignored the many ways relations between citizens can be unequal: they can be based on arbitrary hierarchies or involve oppression, domination, exploitation, marginalization, or other relations that are incompatible with relating to one another as equals. The point or aim of equality, they argue, is to create conditions in which the fundamental moral equality of persons as citizens is realized. This kind of theory has come to be known as *relational egalitarianism*.[18]

Even if Rawls's theory of justice or luck egalitarianism does not have the resources to condemn the inequality in the dystopian future scenario, it is likely to strike many people as objectionable and unjust. It seems difficult to accept that in such a society the fundamental moral equality of persons would be expressed or respected—that it would be a community in which people can truly stand in relations of equality. Thus, relational egalitarians can argue that what is wrong with the inequality in our imagined society is the inevitable hierarchy and the fact that it is likely to lead to the oppression, domination, exploitation or marginalization of the unenhanced as a result.

In one sense, this argument merely denies one of my starting assumptions. I assumed that there need not be any objectionable power differences or hierarchies between the two groups. The social relations between the enhanced and the unenhanced might

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[18]  See, for instance, Walzer (1983); Anderson (1999); Scheffler (2003). In the context of genome editing, see also Fox (2007).

be relatively agreeable or at least characterized by benign neglect and mutual uncon-cern. All people might enjoy equal political rights and civil liberties, and the material inequalities may be tolerable—or be arranged in a way that benefits everyone. There might of course be political conflicts between the two groups. If the conflicts become unmanageable, the result might even be political or geographical separation.[19] But the presence of groups with radically different genetic endowments or capacities need not in itself be objectionable from a liberal egalitarian point of view.

Relational egalitarians, however, can respond that my assumption should be rejected. Even if the two groups *start* from a relation of equality, over time their genetic differences would translate into differences in opportunity, material well-being and entrenched political power—and once there, the oppression, exploitation and marginali-zation of the disadvantaged would surely follow. The unenhanced would soon become an underclass. With saddles on their backs, they would be dominated by the enhanced with their boots and spurs.

In other words, relational egalitarians can make an empirical slippery slope ar-gument: once some practice is introduced, it will have repercussions that ultimately lead to some undesirable end state.[20] The moral equality of persons with radically different capacities cannot long be maintained. Sooner or later, one of the groups will come to dominate the other. Therefore, the state should intervene to avoid this outcome.[21]

Our question here isn't whether genetic enhancement would put us on a slip-pery slope or what its real consequences might be. It is whether relational egalitarians can *justify* state interference by appealing to the relational inequality between the two groups. Let's assume that the slippery slope argument is sound: the dystopian future scenario would conflict with the ideal of equality defended by relational egalitarians.

Nevertheless, there is a problem. Recall the idea that knowledge resistance can become entangled with people's conceptions of the good: their fundamental moral and metaphysical beliefs about how one should live in order to give life meaning and value. For instance, it is easy to imagine that many people come to believe that our genetic make-up expresses our human nature and it is incompatible with human dignity to alter or manipulate it—a kind of genetic essentialism. Just as some people believe in the sanc-tity of life doctrine, many may come to believe in a "sanctity of genes" doctrine. (After all, Fukuyama comes close to embracing this sort of view.) Perhaps the views of these people would resemble the views of extreme anti-abortion groups today and they would create "pro-human" political movements to push for a complete ban on genome editing.

Now, respect for people's liberty to pursue their own values and plan of life is a hallmark of liberal thought. Contemporary liberal political theory insists that the state should be neutral between different conceptions of the good. In modern, diverse societies, people have different metaphysical, religious and moral views. The state should not favor any particular conception. Its institutions and policies must be publicly justified in a way

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[19] As suggested by Anomaly (2024): 119.

[20] On slippery slope arguments, see Burg (1991).

[21] Although philosophers and science fiction writers unanimously assume that the enhanced will be the dominant group, this isn't necessarily so. There is no reason to think that the unenhanced cannot have the upper hand. Political entrepreneurs might be able to manipulate their distrust and anti-elitism to gain power. It might even be the case that the enhanced become the oppressed and exploited group.

that is acceptable from all points of view. No group of citizens should feel disrespected because the state gives preference to some other group's conception.[22]

The requirement of neutrality and the ideal of relational equality can come into conflict. On the one hand, in order to avoid the formation of an enhancement-based hierarchy, the state would have to drastically interfere with private choices, limiting access to genetic enhancement technologies. This favors conceptions of the good that consider genome editing (at least for enhancement purposes) impermissible, even though at least some of these conceptions are informed by irrational beliefs and knowledge resistance. By interfering, the state would also disrespect reasonable conceptions of the good that are based on scientifically informed, rational beliefs.[23]

On the other hand, if the state leaves genetic choices to individual autonomy (which is the default liberal position when it comes to regulation of private matters), it cannot avoid (we are assuming) putting society on the slope towards the dystopian future scenario, even though it respects the conceptions of the good of those who do not object to genome editing technology, and, arguably, does not disrespect the conceptions of the good of those who do. After all, it does not force anyone who does not want to use genetic enhancement technologies to do so. Therefore, a decent, liberal state is put into a dilemma: either it violates neutrality by regulation that favors some conceptions of the good over others or it respects autonomy but also fails to prevent the emergence of hierarchical relations that undermine the equality of all citizens.

Once again, we seem to have arrived at a stalemate.

As a last attempt, we might try a different maneuver and ask whether the state should consider the inequalities in the dystopian future scenario as an instance of *structural injustice* and justify interference by appealing to the need of eliminating that injustice. While there are disagreements on how structural injustice should be defined, we can say, broadly, that structural injustice is caused by social practices and processes that put some group of people under systematic threat of deprivation, disadvantage or domination. It arises as a consequence of people and institutions acting within the limits of accepted rules and norms in pursuit of their own goals and interests—hence no one needs to intend to bring about the injustice or disadvantage or inequality. Structural injustice does not involve the wrongful action of any individual agent, institution or any repressive policy by the state.[24]

The last feature is crucial: although citizens are collectively causally responsible for bringing about the outcome (by their individual decisions of whether or not they

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[22] It should be noted that liberals sharply disagree on how the requirement of neutrality should be interpreted. For instance, they disagree on whether neutrality should apply only to the basic structure of society or to particular policies; whether it applies only to the justification of the policies that governments implement or to their actual results; and whether the requirement is absolute or can be balanced with other constraints. Here I have to set these complications aside. For more detail, see Wall and Klosko (2003).

[23] Can liberals argue that conceptions of the good that are based on knowledge resistance are *unreasonable* and hence neutrality is not required with respect to them? This leads back to the discussion on whether those whose conception of the good is irrational can be considered autonomous—and it raises similar questions. However, I can't pursue these issues further here.

[24] For an overview, see McKeown (2021); for a seminal discussion, see Young (2011).

use genetic enhancement technologies), no one seems morally responsible for bringing it about. Everyone acts within the bounds of accepted rules and institutions, the outcome is unintended, and it is overdetermined in the sense that no one's action is causally necessary. Thus, it might be argued that what is objectionable about the dystopian future scenario is that it involves structural injustice. Those who reject genetic enhancement—many of them as a result of knowledge resistance—are systematically disadvantaged. Hence a decent state should intervene to remove the injustice.

But this proposal runs into the same problems as the other ones. The unenhanced have freely chosen to forgo the opportunities that others have taken advantage of. Moreover, their refusal is based on irrational resistance or avoidance of evidence. The state could either try to "level up" these people, but the necessary policies are likely to be coercive, paternalistic, or at least disrespectful—or act in a way that would amount to *rewarding* irrational behavior (for instance, by offering material compensation). The policies may also violate the freedom of other people to pursue their own, often reasonable and scientifically informed, conceptions of the good. It is not clear what kind of trade-offs a decent state can make that could be justified to all citizens.

## 6. Conclusion

Most philosophers and bioethicists who write about human enhancement feel at home within the kind of liberal political philosophy that I have taken for granted in this paper. Many of them are cautiously optimistic about human genome editing, certainly about its medical applications, but often also when it comes to enhancing human traits. They argue that there is no inherent ethical problem with altering our genes in order to make human lives better. But that does not mean that there cannot be disconcerting consequences. A lot of work in this area tends to ignore the social implications of large-scale human genetic enhancement and fails to be curious about these implications from the perspective of political theory. My aim has been to shatter this complacency.

I have been asking how a scenario in which some people enjoy the advantages of genetic enhancement technologies while others irrationally reject their benefits can be evaluated from a broadly liberal perspective. Although a lot of details need to be filled in, it appears that standard liberal egalitarian theories have difficulties accounting for the inequalities that result. They either turn out to be unproblematic or create difficult conflicts between basic liberal values. It would be surprising if the inequality between "wonderwomen" and "supermen" and the rest was considered morally innocuous. If it is not, then it deserves more attention from political theory.

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