Genomic emancipation

Tsvi Benson-Tilsen, 21 June 2025

Contents

Introduction

We, the free world, as a society, should decide to invest in the development of technology for human germline genomic engineering.

To me, this claim speaks for itself. Who wouldn't want to massively decrease the risks of many diseases in their future children? Who wouldn't want to give their children strong and diverse capabilities, like creativity, problem solving ability, wisdom, and empathy?

If so many people want this technology, doesn't it stand to reason that our scientists and entrepreneurs would be highly motivated and enabled to develop it? But, well, they aren't yet.

So, even though the claim speaks for itself, we have to ask: What would it look like to have a world where humanity greatly benefits from germline genomic engineering? What broader vision does reprogenetic technology fit into?

Some reasons we should work out a vision:

- To notice major problems with the vision.
- To honestly persuade more people that the vision is desirable, if it is.
- To hold our intentions strongly–so that we are not overly discouraged by attacks, and so that we are motivated to work together towards the broader vision.

(These reasons are explained more in the appendix "Why envision genomic emancipation?".)

In this way we can go ahead with developing the technology at full speed, while steering away from harm and towards good worlds via planning and alertness.

The rest of this article describes a vision, which I call "Genomic Emancipation". The main part of this article is divided into several sections, each addressing a question asked about Genomic Emancipation: what, from whom, of whom, by whom, how, to where, and when–and how to uphold humanity throughout the process of emancipation. Lengthier, more peripheral elaborations are deferred to appendices.

Disclaimers

The aim of this essay is to lay down the central points of my current thinking about the broad positive motivations that should be behind reprogenetics. There is a literature on this which I haven't reviewed rigorously, and I'm not a bioethicist. So this essay will be far from entirely novel or comprehensive.

This essay speaks only for me. Since the topic is complex and political, the views here are especially likely to be revised. I'd hope for more people to participate in envisioning futures that are made good by including reprogenetic technologies.

What is emancipation?

The roots of the word emancipation are "ex-man-ceps", meaning something like "(taken) away from the possessor":

- "ex-" means "out"
- "man" means "hand", as in "manual"
- "ceps" means "taker", as in "concept" ("together-taken"), cognate with "capture" and "have"

So emancipation is being taken out from the grasp of the grasper's hand. By implication, the grasper had to grasp, in order to suppress whoever was grasped. They were grasped and their potential was cut off, but their potential was

there, pushing outward, and so it had to be clasped with iron in order to be cut off. When they are emancipated, they are empowered to successfully push outward, and can pursue their potential.

Emancipation has two aspects: liberation and empowerment. Liberation is negative: it breaks bonds, removes constraints, opens up the door to possibilities. Empowerment is positive: it gives energy, capability, an engine, which can drive forward into those possibilities.

What is genomic emancipation?

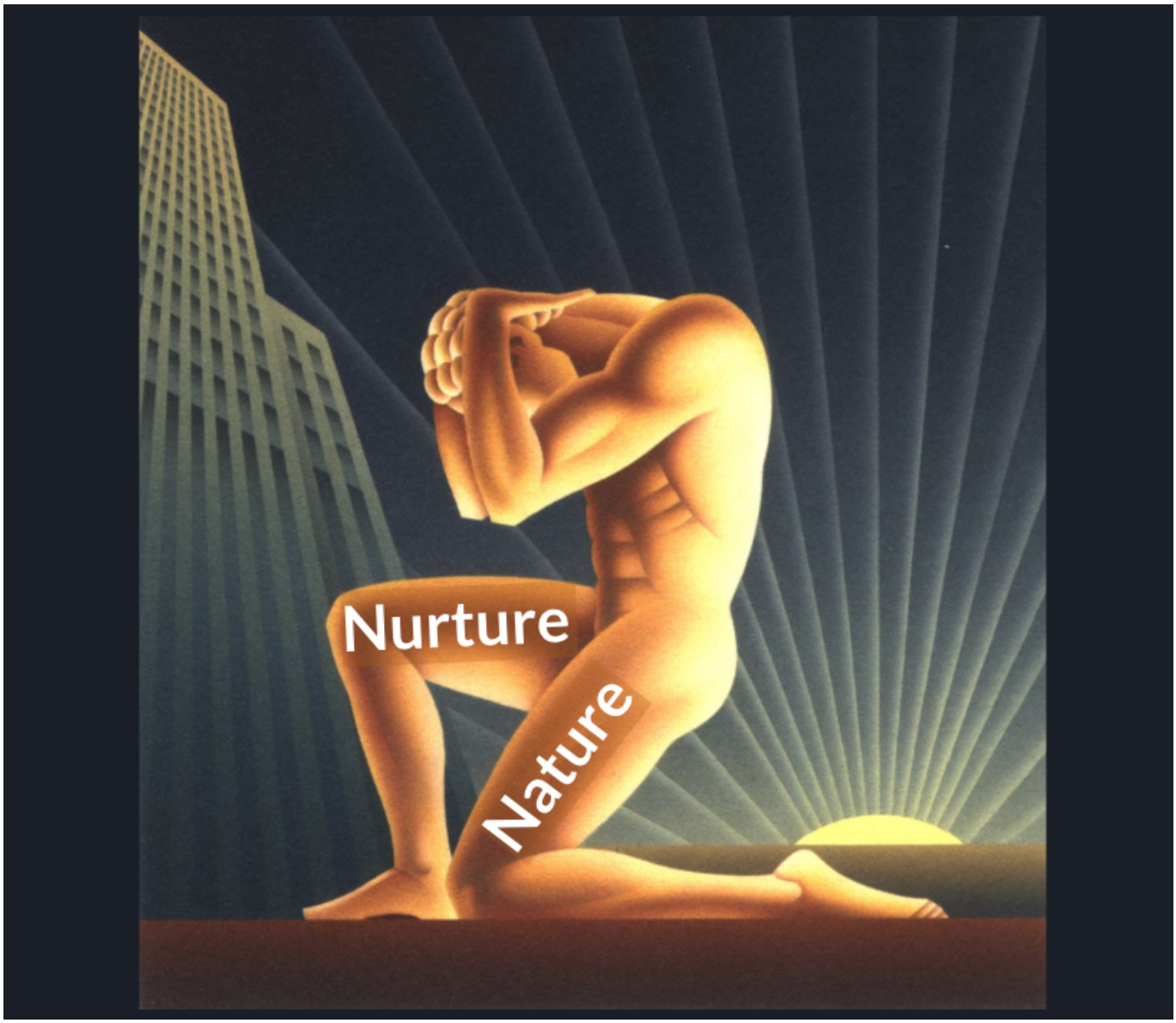
The simple meaning of genomic emancipation is:

> Making biotechnology to empower parents on behalf of their future children.

The practical meaning of genomic emancipation is making it so that any parents who want to are able to freely, effectively, judiciously alter the genomic foundations they give to their future children. In other words, many parents would want to give their future children genomes that would make the children's lives better, as the parents judge it–lives that are perhaps healthy, long, sane, and/or full of the sort of thriving that is unlocked by high physical and cognitive abilities. Genomic emancipation means making it technologically, legally, and socially feasible for those parents to do so.

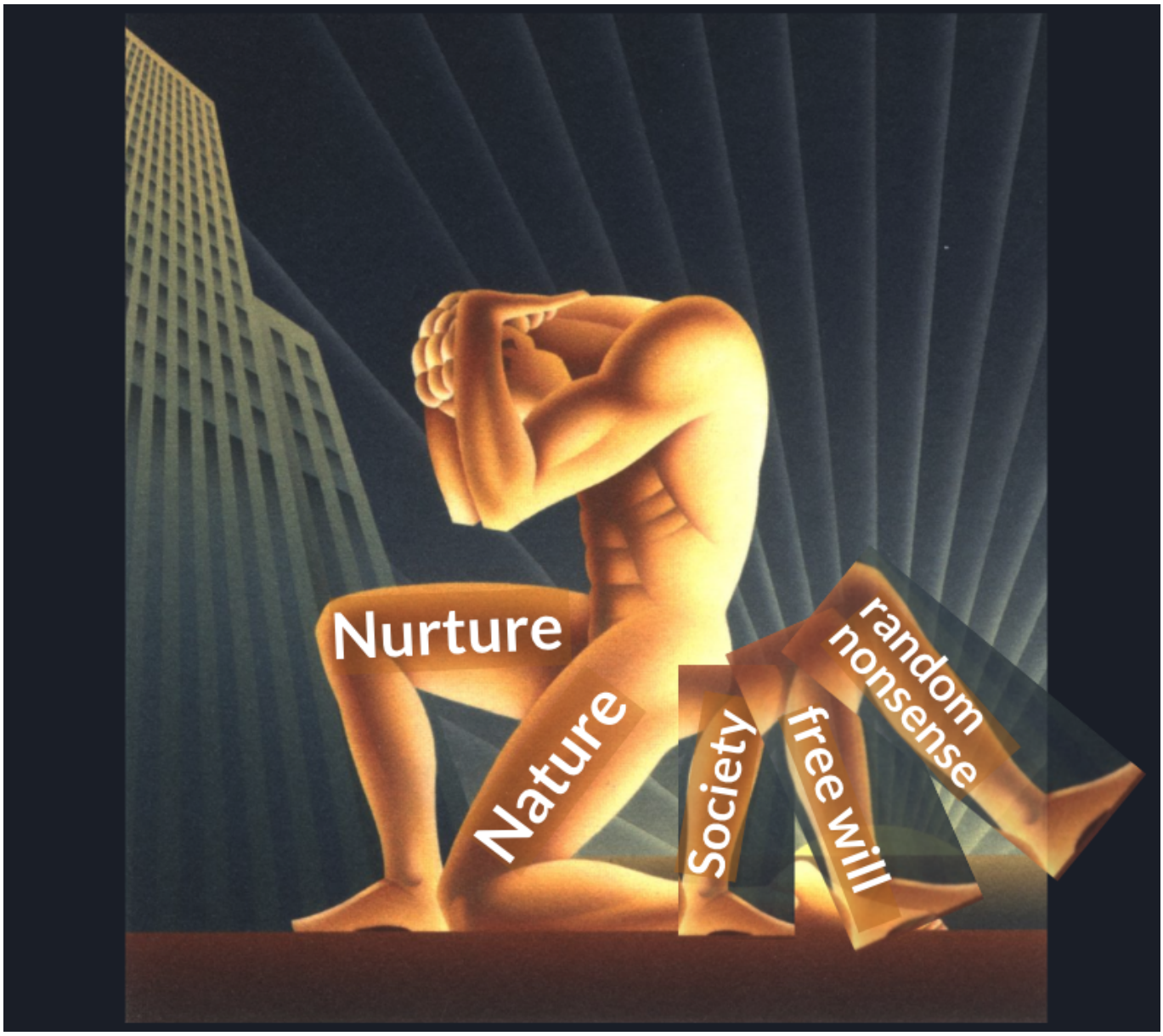
Genomic liberation means upholding genomic liberty: lifting undue constraints, by law or social stigma, on how parents are allowed to affect the genomes of their future children.

Genomic empowerment means developing the science and technology of human germline genomic engineering, a.k.a. reprogenetics[1], and then making that technology usable by parents. Genes alone do not determine a human's destiny, nor do memes alone–instead genes and memes are like two legs, both jointly required for support and balance, combining to provide a strong foundation for free spirits:



Alright it's more complicated, what do you want from me.

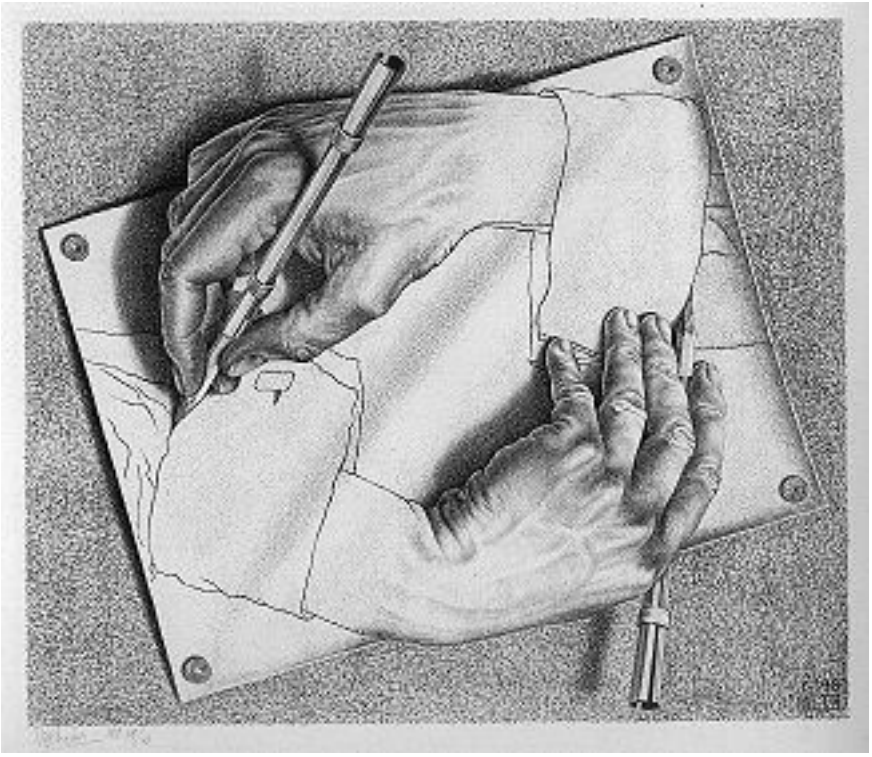
[1] Silver, Lee M. Remaking Eden: Cloning and Beyond in a Brave New World. New York: William Morrow, 1997.



But the point is that nature and nurture both support a human becoming themself. Therefore both nature and nurture can be levers with which to increase the support given to a human to become themself.

The ideal that underlies genomic emancipation is:

> The birthright of human spirits includes fuller self-unfolding via self-sovereignty over their own genomes.



That ideal should be pursued precautiously and gradually–but eagerly enough for our urgent needs. See “Emancipation when?”, below.

Emancipation from whom?

Whose hands are we in the grasp of?

Mother Nature

The hand that grasps our left wrist is the hand of Mother Nature, who–if we're indulging in animism–not only is the generous giver of the material of life, but also is the casually cruel matrix of illness, incapacity, decay, madness, and annihiliation, which we are all more or less familiar with via our loved ones, and sooner or later are subject to ourselves, in old age if never else.

No matter how much one might sigh and say "Well, that's life…", it will never actually be ok that

- a child's life is cut short,
- a young man goes blind,
- a daughter loses her father to cancer before she grows up,
- a cancer researcher was not gifted with as much cleverness as he would have wanted to put towards inventing a cure for the father's metastatic killer,
- or an old woman can no longer recognize or even remember her own son.

We are not taking control of evolution, we are bidding her goodbye. Thank you for your service–you did the best you could–but we were never destined to be your possessions. From now on we will let our ideas, rather than our children, bear the risk of withering and dying.

The lesion

The hand that grasps our right wrist is the hand of unreflectively overconservative society at large. There is a lesion in our collective psyche around anything to do with genetics and reproduction.

This lesion prevents people from appropriately deploying capital–financial, political, and human–toward the ambitious possiblities of germline engineering, except in a scattered and usually furtive manner. We cannot collectively imagine the benefits clearly, so we cannot be motivated by them. Legal prohibitions, declarations from ethics councils, academic norms for funding and hiring, and general stigma all suppress technological progress and terribly constrict what germline modifications would be allowed if technically feasible.

At the ground level, this lesion is there for good reasons. There are many perils of germline engineering technology, and a blunt force reaction against that technology is the only reaction that's easily available to society. We'll have to do some work in order to make it possible for society to choose a more precise reaction to the perils, a reaction that allows for speedy and sane development of strong reprogenetics. (See the appendix "Blunt-force responses".) On the other hand, although there are good reasons for the lesion to exist, the lesion is also metastatic: People know that other people don't feel comfortable to seriously consider reprogenetics, so they themselves feel uneasy, and this behavior is thoughtlessly self-reinforcing.

So that is the hand that grasps: a blinkered and blinkering aversion that pervades the halls of academic, political, and financial power. Many individuals (many academics, some scientists, and the common man on the street) will say out loud the obvious–that germline engineering would be a godsend. But as a collective we are horribly averse to seriously inclining towards the possibility. (See the appendix "To be defended against false refutations".)

Emancipation of whom?

Recall the ideal that underlies genomic emancipation:

> The birthright of human spirits includes fuller self-unfolding via self-sovereignty over their own genomes.

The ideal of genomic emancipation talks about giving human spirits more sovereignty over *themselves*, over their own genomes. So then why does genomic emancipation mean, in practice, empowering *parents* to influence the genomes of their future children?

There are two reasons:

1. The alternative would be radical somatic/morphological emancipation. Reproductive genomic emancipation–the sort that can make lots of healthy, long-lived, brilliant people–is probably safer and more technically achievable than large effects through somatic gene editing. For example, having large effects on cognitive ability by gene editing brains is likely very difficult once childhood development has already finished, and is likely very risky. Thus radical somatic emancipation will probably progress more slowly.
2. It's impossible for a human to choose her own genome *before she comes into being*. Therefore her genome must be chosen by someone or something else. It is just like with a two-year-old: The infant isn't equipped to make a good judgement about whether it is good for him to drink a sugary alcoholic drink, and his parents should restrict that freedom on behalf of his longer-term empowerment.

Given the necessity for someone or something other than the child to choose her genome, genomic emancipation says:

> **In order to appropriately empower the future child, on balance it would be better if much more influence were given to parents,** working together with genetic counselors to understand the available genomic choices.

That's because parents are, in most cases, the best available agents to steward the child into being. (See the appendix "Influences on a child's genome".) By and large, the parents are a better choice than blind nature, a professional committee, or a state. That's because:

- they intrinsically care more,
- they will be tasked with, will invest the most in, and will be held accountable for raising the resulting child,
- they are humans (as opposed to an inhuman process such as a committee),
- and they have a transpersonal spirit-stake in their child. (See the appendix "Non-separateness of parent and child".)

Genomic emancipation does not mean saying to parents "Ok, do whatever random thing you feel like, follow whatever whim, it's all good when it comes to genomic choices for your future kids.". That is wrong moral advice. Further, it should not be how society is set up: there should be some legal restrictions as well as some professional norms for reproductive clinics which constrain parents's genomic choices. (See the appendix "Forms of parental care".)

But as a matter of *the change we can make to society*, in order to genomically emancipate future children, emancipating parents is the right choice to make today. Parents are not the rightful lords of their children's souls, but they are the rightful stewards.

Emancipation by whom?

What do the grantmakers, the scientists, the investors and regulators and clinicians, what do they have to hear?

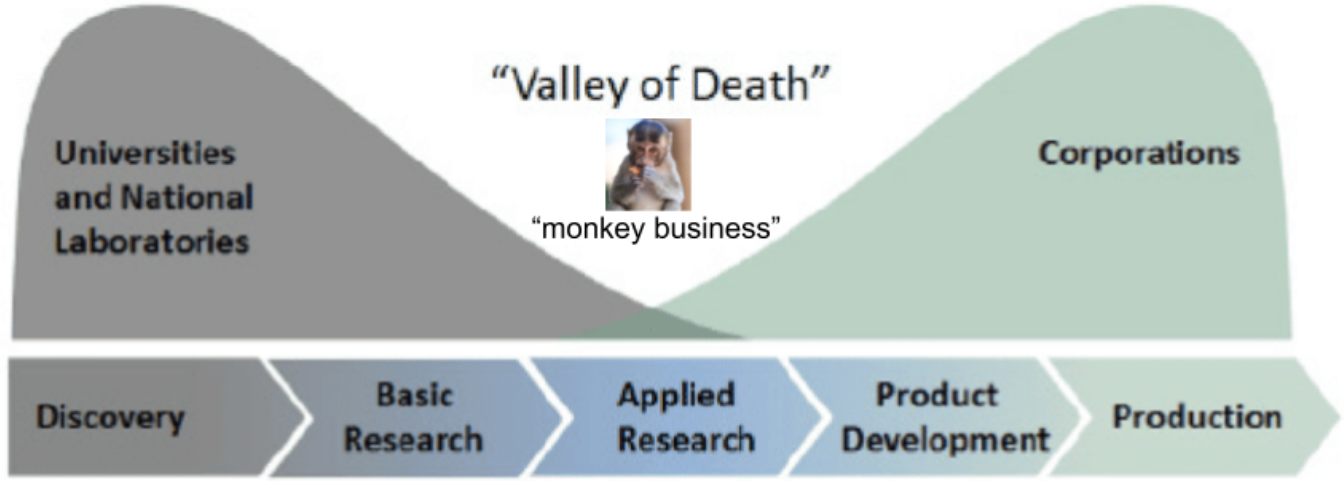
Academics do not want to lose their funding and jobs, and do not want to overpromise. Investors and entrepreneurs don't want their ventures stymied by regulation. Regulators don't want retrospective popular outrage. They all care what society at large thinks.

So, if you want parents to have the option to give their kids health and life and capability, then say so! They have to hear the rest of us saying clearly that we want genomic emancipation.

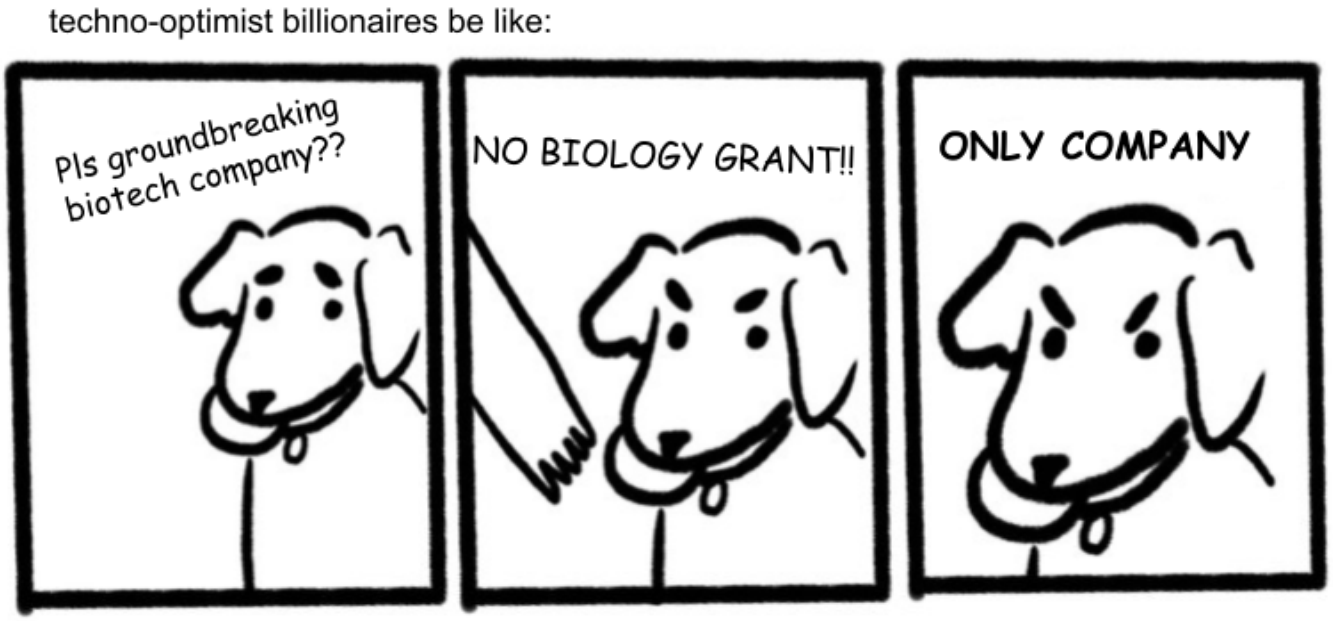
Emancipation how?

On a social level, we have to decide to pursue genomic emancipation.

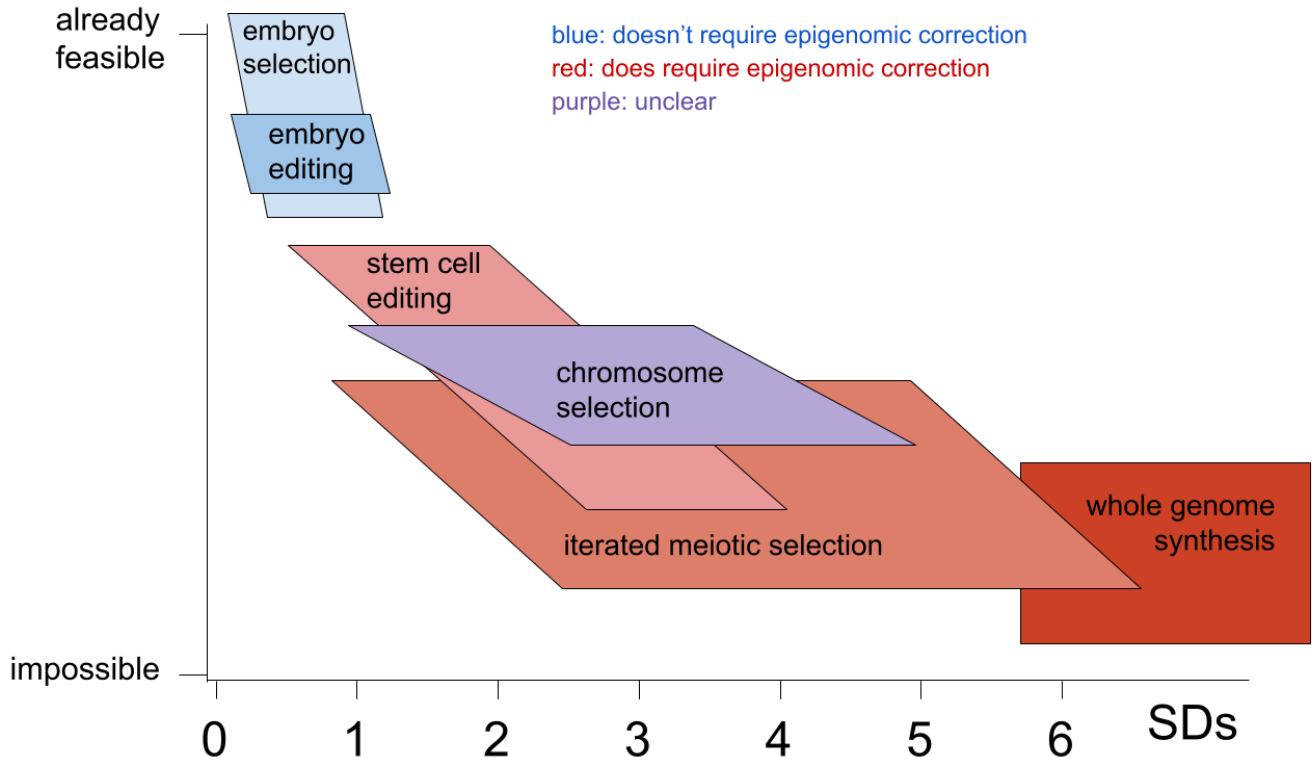
On a technical level, there's a bunch of research that needs to be done. The fundamental technical bottleneck is the epigenomic correction problem, which is most likely to be solved via IVG (in vitro gametogenesis): making eggs (or sperm) from stem cells in the lab. If any funders want to robustly, significantly accelerate the field, they should invest in IVG. In particular, they should invest in a primate research center aimed at assisting with reproductive research. It might not happen otherwise, due to the valley of death: Projects go unfunded if they aren't a good fit for government-funded academic research or for commercial ventures.



(I think the National Primate Research Centers aren't currently up to the task.) This has to happen.

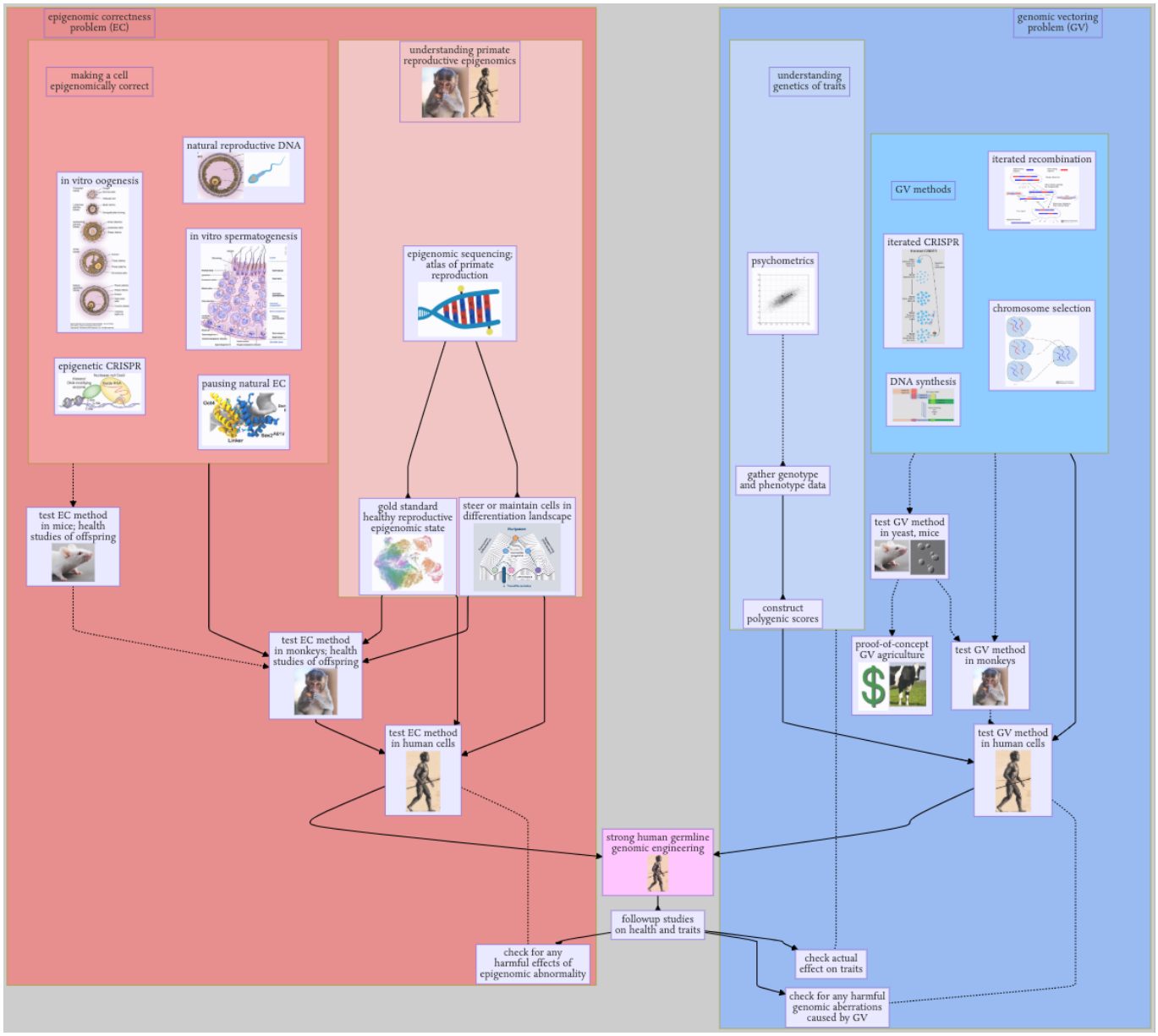


Here's a zoomed out picture of the main hypothetically possible genome engineering methods. It shows qualitatively (but not with any quantitative precision) how strong each method is and how feasible it is. Embryo selection is available now, and embryo editing might be available soon, but these are both fairly limited. Stronger methods include stem cell editing, chromosome selection, iterated meiotic selection, and whole genome synthesis, but most likely these all require in vitro gametogenesis in order to make healthy human babies with modified genomes.



The appendix "The ramp-up of reprogenetic strength" gives a brief sketch of how the development of reprogenetics might go.

For more technical information, see "Visual roadmap to strong human germline engineering", which is an interactive version of this zoomed-out research roadmap:



For much more technical information, see "Methods for strong human germline engineering".

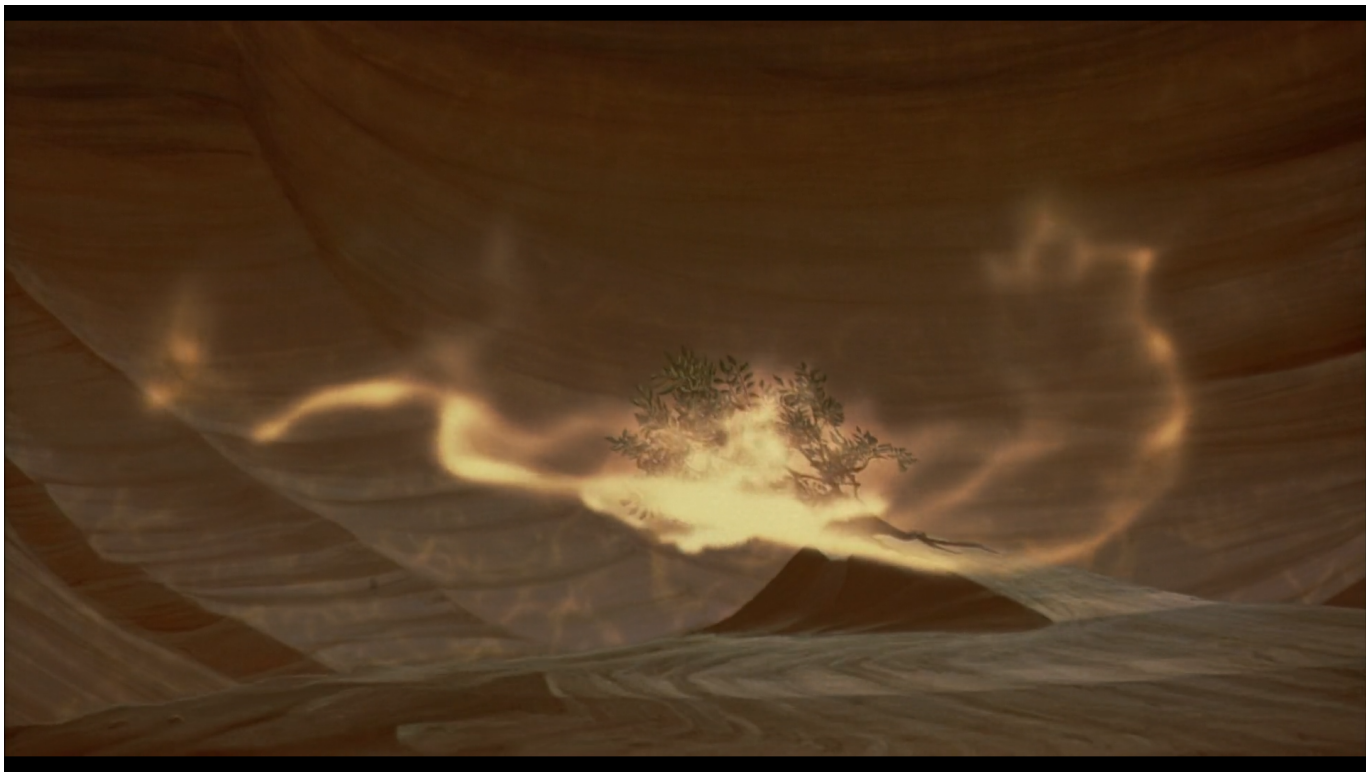
Emancipation to where?

Where are are we going? If we're genomically emancipated, what happens? And what do we want to happen?

The bush

To a great extent, where we are going should remain an open question.

The burning bush tells Moshe to go free his people (the bush's people) from Egypt, and Moshe says, "Ok, and just who exactly, might I ask, should I tell the Israelites is coming out of the blue to save them, that they should up and leave all of a sudden?". The bush says, a bit ambiguously, something like "I will be as I will be.". But make no mistake, that was a direct answer to Moshe's question: The bush doubles down, saying "No seriously though, that's what you tell them, just tell them 'I will be' is coming to save you. That's my name, 'Mr. Being', and I'm sticking to that, that's going to be my name literally, *literally*, forever.".



What is the meaning of this? The bush, a.k.a. God, is saying: "It's an open question, sort of; or a work in progress; what I will be has to be determined through our collective alive unfolding; it's not something we can delimit or comprehend finally in advance.".

Do not be deceived by the obliqueness and abstraction of this answer: God is not floofy or malleable or insubstantial. The bush burns, it lives–but it is not consumed, it is the Ner Tamid, and to be eternal it has to have an eternal integrity. Humanity should self-transform: continually, but cautiously and gradually; openly and without premature definition, but in a way that upholds and strengthens our core humanness.

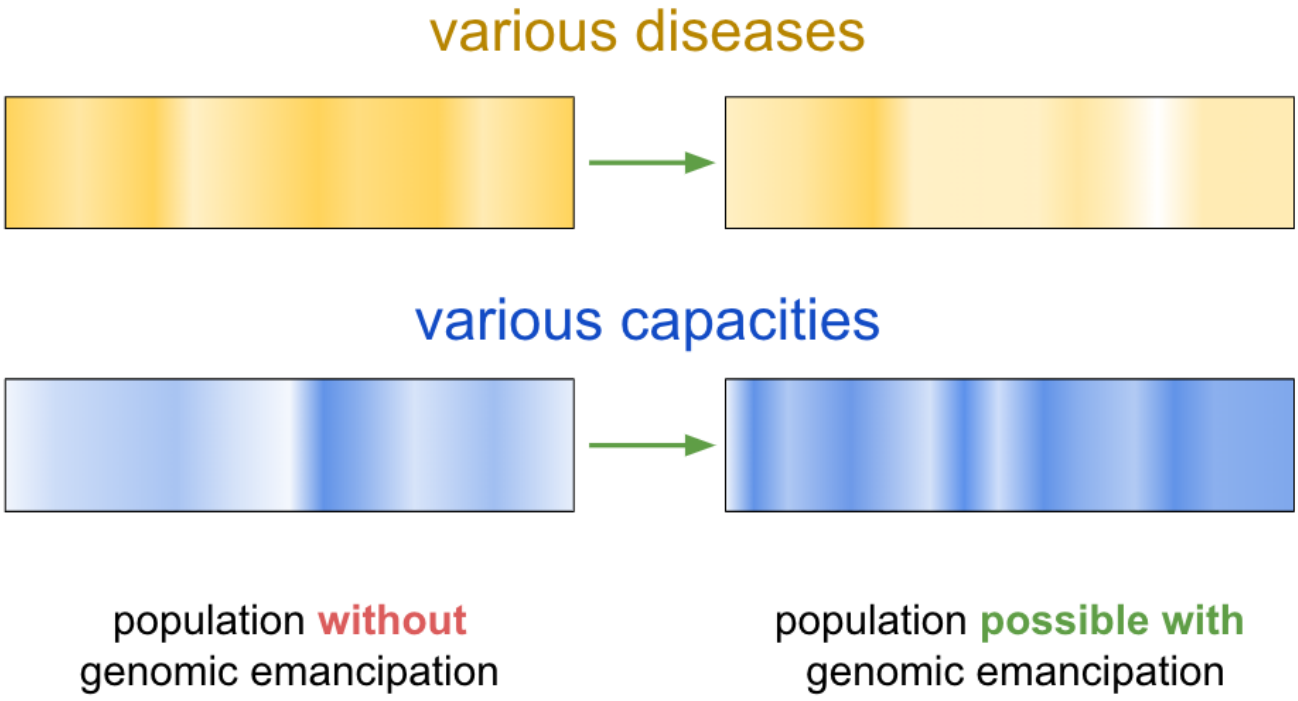
In other words, we can not and should not say in advance exactly how we should apply reprogenetic technologies. To a great extent, that question is up to our future selves to figure out, ongoingly.

Expansion

While broadly leaving the future open, I will name a few features of the future that I'd hope to see. The overall theme is (cautiously and gradually) expanding humanity into more ways of wellbeing.

We don't want to expand strictly all variation. In fact, probably the collective sum of our autonomous genomic choices would decrease a lot of variation–namely, variation in "how much do I have this disease". We currently have a wide variety of diseases that maim us–both literally, and also figuratively: cutting off big chunks of the network of possibilities for life that would have otherwise been available to us. It would not be bad if we went from the great variation of "lots of people have diabetes and lots don't; most people don't have Huntington's but some do; lots of people get Alzheimer's, some don't; …" to the much more uniform world of "very few are forced by their genes to get diabetes, very few forced to get Huntington's, very few forced to get Alzheimer's, …".

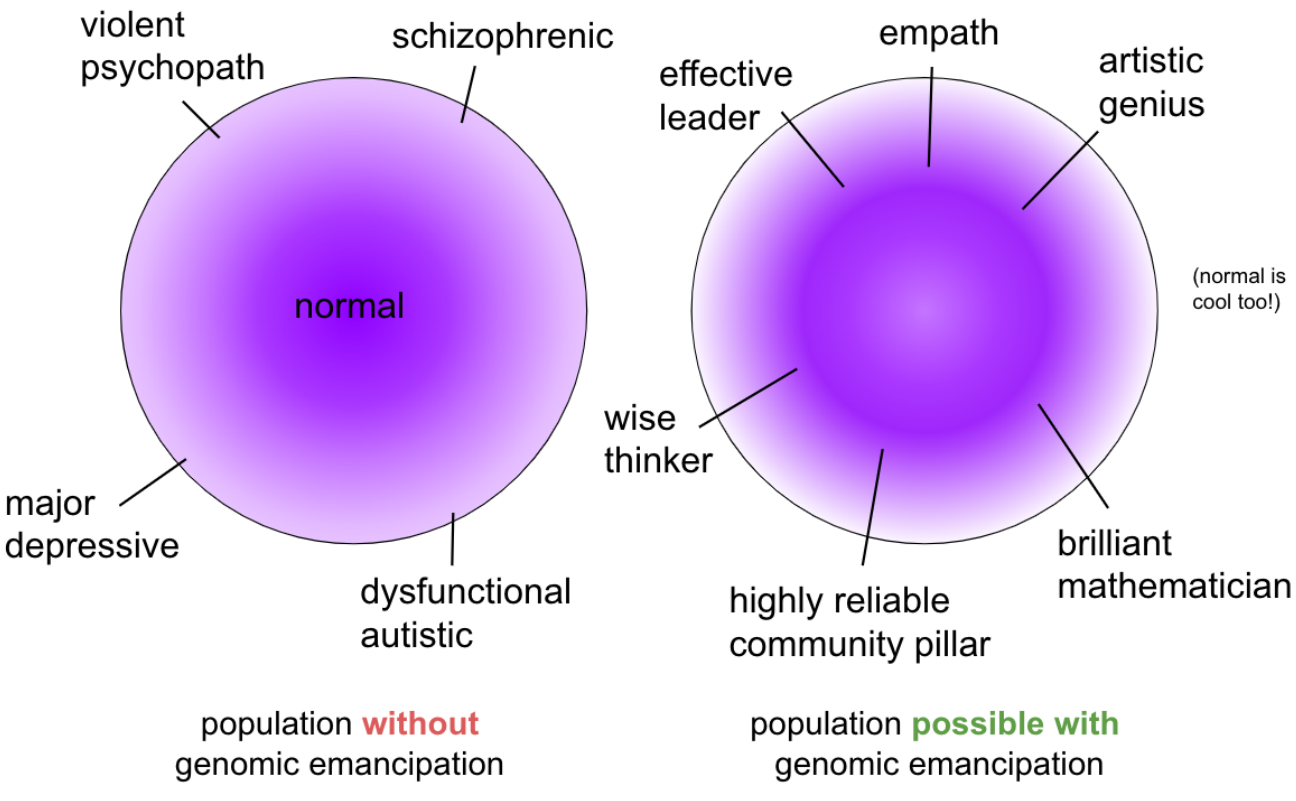
On the other hand, variation in our *capacities* is obviously good. Let there be an even richer and more widespread range of human capacity! Let there be a profusion of brilliant athletes, artists, scientists, empaths, leaders, ad astra! So we have a picture of decreasing variation in some ways, and increasing in other ways:



I would also hope for a greater variation in traits that are neither obviously desirable nor obviously undesirable, even if they're controversial. For example, consider personality traits:

- many personality traits have tradeoffs for each phenotype;
- for many traits there's no obviously better direction or phenotype;
- in many cases, groups of humans benefit from having a diverse set of phenotypes in order to fill a variety of social niches;
- and many different people have differing opinions or desires for their children regarding various traits.

I would hope that fewer children will be burdened with pathological extremes of personality, while many non-pathological but less common phenotypes become somewhat more common. Children should not be forced by random rolls of the genetic dice to be schizophrenic or dysfunctionally autistic. On the other hand, more children should have the potential opportunity to be a brilliant mathematician, a wise thinker, an inspiring leader, or an artistic genius.

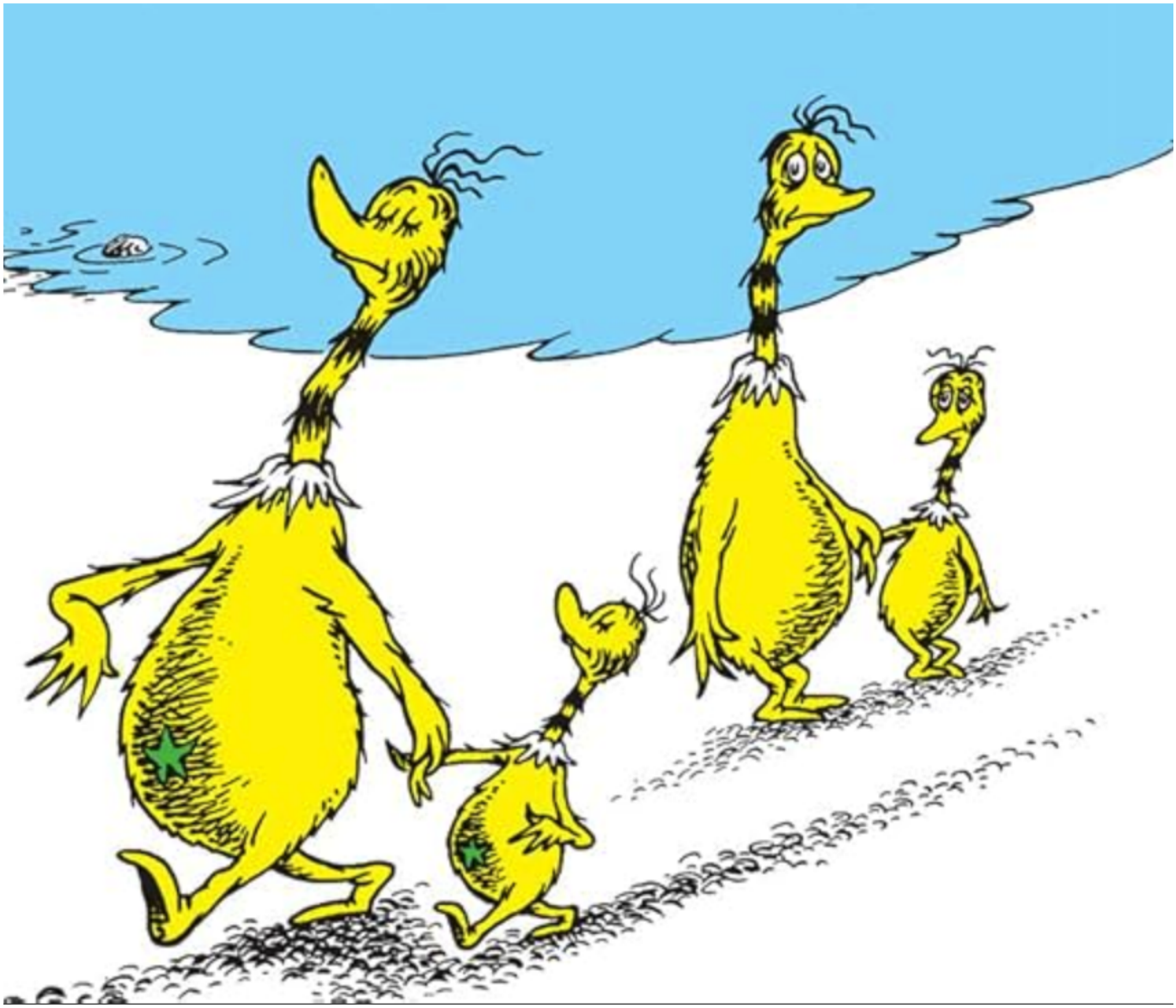


(Note that this depiction is only aspirational: personality traits in general, and specifically their genomic influences,

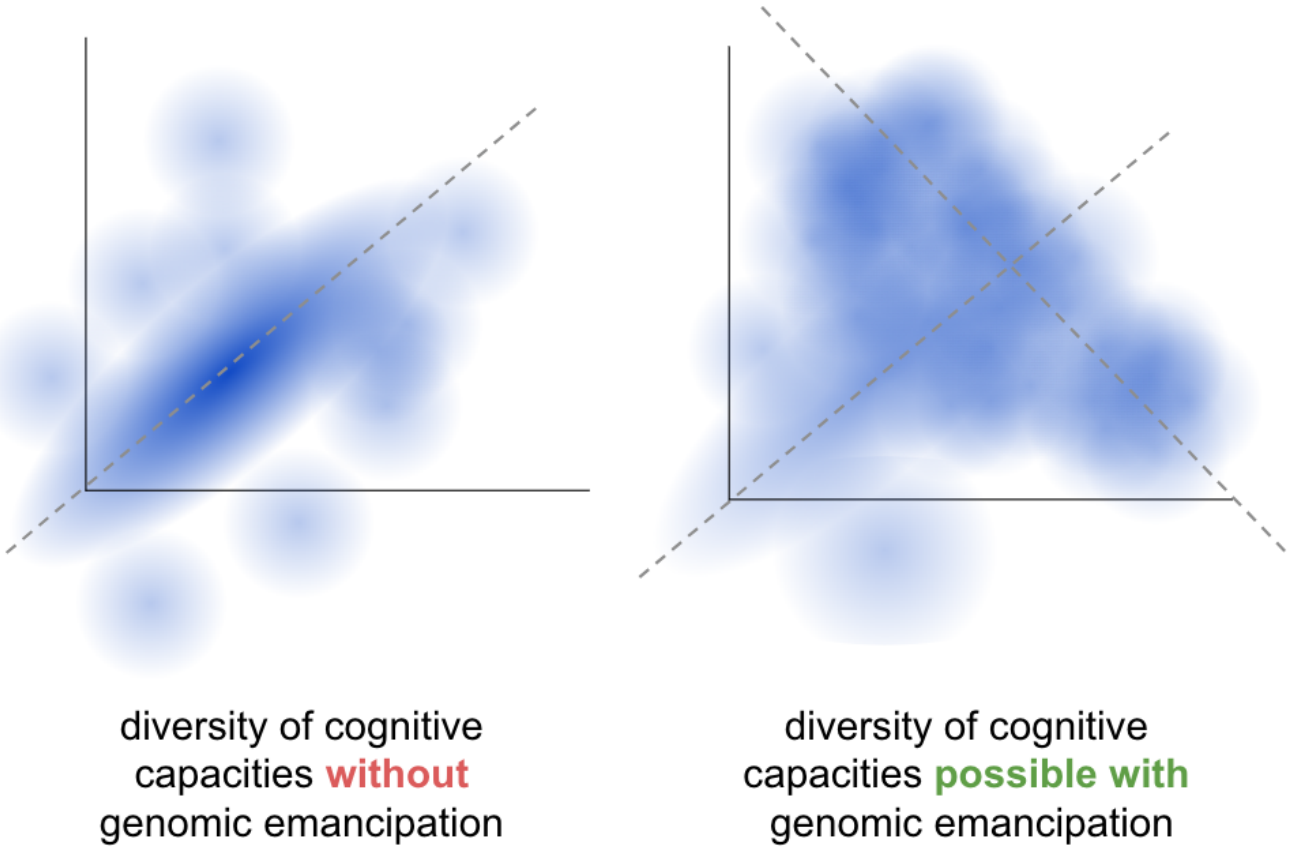
are not currently well understood.)

Intelligence

What about intelligence? Are we going to homogenize, collapsing into one kind of intelligence that's easiest to target with germline engineering? Are we going to create two types of people, the Haves who all Have some high level of intelligence, and then the Haven'ts, who Haven't that level?



On the contrary, here is what I picture happening to humanity's distribution of cognitive capabilities, as we start using reprogenetics:



On the left, the current distribution of cognitive capacities is schematically represented. Each axis abstractly represents some cognitive capacity–such as verbal IQ, or spatial IQ, or performance on some test, or potential ability to make scientific progress, or potential ability to write moving poetry. Since cognitive abilities are pretty strongly correlated with each other, the distribution is mostly clustered along the gray line, which represents IQ.

On the right is a hypothetical possible future, that could result once many parents have had the opportunity to use reprogenetic technologies. In this possible future, we don't have more homogeneity, more inequality, or a two-class system. Rather, anyone who wants is uplifted in terms of overall cognitive capacities.

We'll begin to do away with the deeply unfair somewhat-linear scale of generally weaker or generally stronger cognitive capacities. We'll become less constrained by genetic noise. Instead, over time, we'll be more constrained by the upper limits of human biology and feasible reprogenetics, represented by the second perpendicular gray line. Far from segregating into two classes, we will spread out into a wider variety of special brilliant minds.

(See "Appendix: Intelligence".)

Equal opportunity

In general, it's unfair that some people are in practice doomed to a life with incapacity, pointless suffering, or premature death. Genomic emancipation would go a long way toward correcting this unfairness.

Emancipation when?

Should we be more intently pursuing genomic emancipation now, rather than later?

The following subsections present considerations in favor of Emancipation Now. This focus isn't because there aren't many conceivable risks; see "Potential perils of germline genomic engineering". However, in my actual expectations and plans for germline engineering, most of the *largest* considerations land in favor, so I will not pretend otherwise! And anyway, here in this essay I want to sketch some parts of the case in favor.

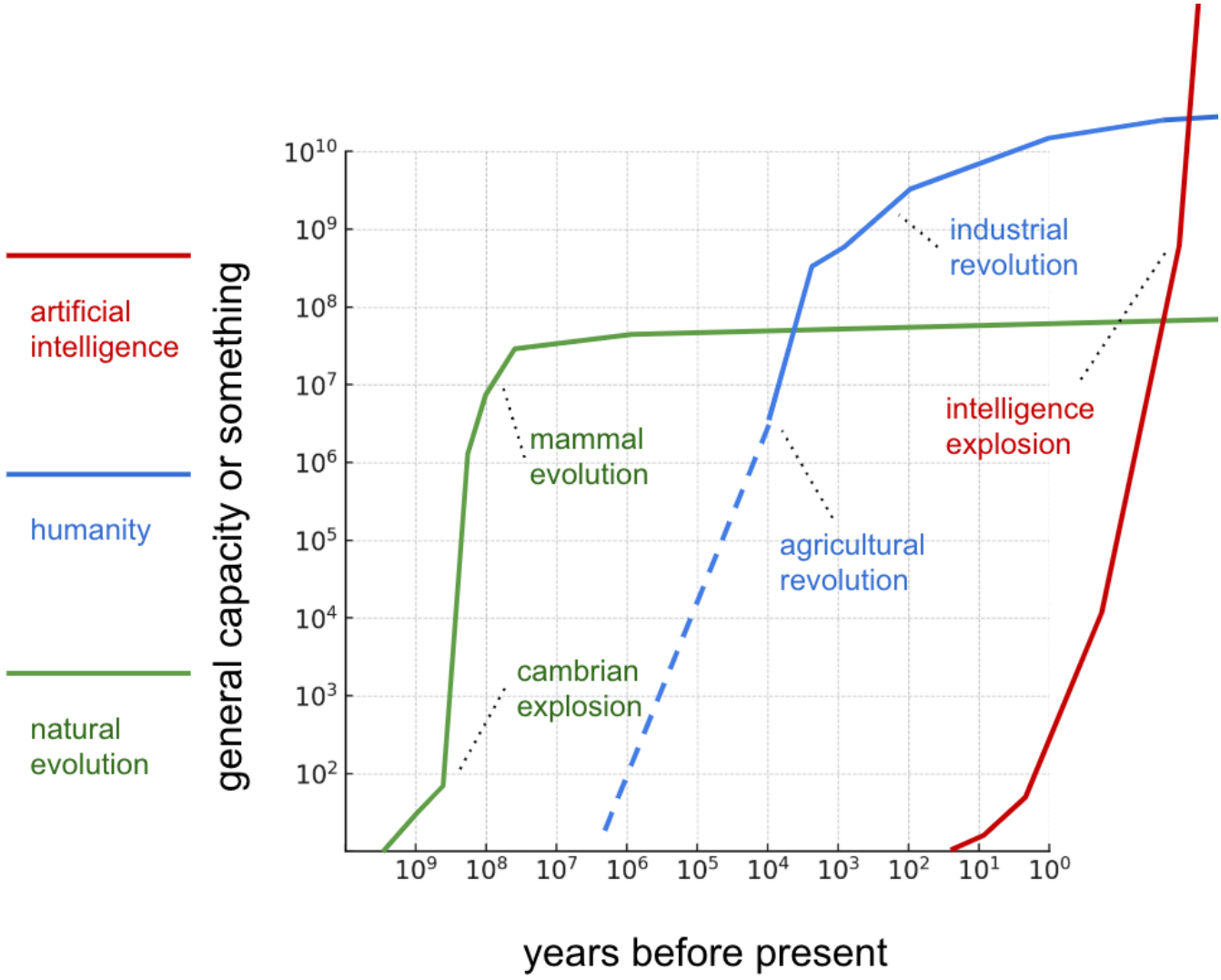
The urgent need for health

Don't forget the basic fact that genomic emancipation would enable parents to give their children a greatly reduced risk of many diseases and mental illnesses. Every day that genomic emancipation is delayed, it is as though thousands of people worldwide have, avoidably, been given diseases ranging from breast cancer and coronary artery disease to cystic fibrosis and schizophrenia.

The urgent need for human capacity

The rapid and accelerating change in global human society makes an urgent demand for more human capacity. We need more brilliant (clever, sane, wise, empathic) humans to navigate the threat of artificial general intelligence, political turmoil, cultural and epistemological disintegration, climate change, novel destructive technologies, and unforeseen threats.

Artificial general intelligence, in particular, is a ~~freight train~~ maglev bullet train hurtling towards us at an unknown (fast) speed from an unknown distance:



Safety, efficacy, and societal consent

There are open questions and problems around how to make germline engineering technologies safe and effective, and about whether we are collectively on board with using the technologies.

The statement Emancipation Now doesn't mean "we should ignore these problems". Rather, it means: "We should be investing much more in addressing these problems, as part and parcel of developing germline engineering technologies.".

"Safety hasn't been demonstrated yet" is a good reason to not try to actually make a human baby using the unvalidated technology. But often "safety hasn't been demonstrated yet" is used as a reason to *not pursue* the *safe version* of the technology. This makes little sense. There's some instrumental relevance: if safety hasn't been demonstrated, maybe it will be difficult to demonstrate, so the costs of making the safe version will be higher, so it's on balance a less promising investment. But this is a fairly weak reason, given the enormous benefits of genomic emancipation. And, more importantly, it's not at all a reason to *not run the calculation* of whether it's a good investment.

Likewise for "efficacy hasn't been demonstrated yet".

And, likewise for "society hasn't consented yet". That's potentially a very good reason to not go full steam ahead with *applying* the technology. But it's not a good reason to not *develop* the prerequisite science, and it's literally the opposite of a good reason to *not have the conversation* about applying the technology. If we're not even having the conversation about applying the technology, it's not reasonable to expect efforts toward genomic emancipation to wait on hold forever.

Genomic engineering overhang

Many of the potential perils of genomic emancipation come from shocks to society. The problems come from transitions, rather than from stable states. In general, the shock is lessened if we start getting feedback sooner rather than later. We can see what happens when we apply the relatively weaker versions of germline engineering technology.

There's some current ambient level of our knowledge about stem cell manipulation, DNA manipulation, genomic data, psychometrics, and polygenic scores. If we wait until that level is quite high before we start applying reprogenetics very much, there will be a capability overhang. Then, the overhang will all fall at once, when someone does decide to go ahead with applying reprogenetics.

Instead, we should continually take small steps forward to increase the range of the applications that we're trying out, and keep our eyes open for problems. In that way, we can take our growing pains one at a time.

As long as there is a capability overhang in genomic engineering, the wealthy and powerful people who can circumvent boundaries will be getting a head start over the rest of us, for reaping the benefits of these technologies.

As long as there is a capability overhang, it will be possible for some people to pursue it in defiance of society's stance. The only people who pursue it will be the sort of person who would defy society's stance. They will be selected to be somewhat uncommonly reckless or unethical. They might be pressured into relative secrecy, or even into lying about the results of their experiments.

For the next few decades at least, the technology will be quite impactful in some areas, but will not be a world-melting change. We'll be able to decrease disease risks, increase lifespan and healthspan, increase IQ, and maybe nudge a few personality traits. We won't be able to make children who are nonhuman, inhuman, or superhuman. So we are on fairly safe ground to take steps forward, for the time being.

(See "Appendix: on safer-sooner reprogenetics" for more discussion of how reprogenetics will be safer if developed sooner and more gradually, and what the ramp-up might look like.)

The internet and human destiny

We've had the internet for a few decades. Besides the great benefits, in that time we've also encountered several major issues–personal data or infrastructure getting hacked, dark markets for immoral things, addictive media, loss of attention span, political polarization, and so on.

Now, does this make us want to have never invented the internet in the first place, or to have delayed its invention? It doesn't make me want that.

To me, the internet is, in an important sense, part of the destiny of humanity; it's a more or less necessary step along our path as a global community. Humanity was always going to become much more connected, we were always going to process and share information at scale.

If we were always going to become more connected, then as a necessary consequence, we were always going to be required, at some point, to figure out how to cope with the anxiety-inducing, spaciousness-deflating pressure to participate in the high-frequency, high-consensus global conversation. That is a problem that lies inevitably on our path of more connection, of more collective consciousness.

Likewise, if we were always going to share information at scale, then we were always going to be exposed to the most viral memes, including false and destructive memes. We were always going to suffer from massive correlated failures of huge numbers of agents who are copying each other's beliefs.

The same applies to genomic emancipation. Our destiny is in the stars, and our destiny is radical self-unfolding via self-sovereignty. Making choices about our genomes is a step on that path. As Professor Hank Greely points out, all we've been doing since we came down from the trees is enhancing ourselves. (And, overcoming nature's cruelties through our own artifice.)

So: If genomic emancipation means that parents and doctors will have to make difficult choices, that's on the way to our destiny. Increasing self-sovereignty implies more responsibility and more difficult choices.

If genomic emancipation implies that what it means to be human will begin to be called into question, that's on the way to our destiny as well. Increasing self-sovereignty implies more and deeper changes to oneself. It implies self-sovereignty over ourselves as humans-in-general, including the possibility of stepping outside our own humanity, not just self-sovereignty over ourselves as people who fit within the mold of what humans have already been.

Now, it will indeed be a major problem for us, when we are required to decide which aspects of ourselves are or are not fundamental. It will be a major problem, but it's not a *contingent* problem. If you trip and break your leg because of some strangely-shaped concrete protrusion of the sidewalk, that is a *contingent* problem. It's perfectly coherent to imagine a world without the protrusion, and in which you didn't trip, but where you are still basically the same person in all the ways that matter. Nothing about who you are, and you want to become, requires that there be a sidewalk protrusion to trip you. On the other hand, we *are* required, by our nature as self-transforming souls, to face the problem of what aspects of ourselves are fundamental to who we are, and who we want to be. It's a problem that we *will* want to undertake, sooner or later. (Ideally later.)

Of course, none of this means that we should sit back and let bad stuff happen as a result of the internet, or as a result of genomic emancipation, just because the problems are allegedly inevitable. What's inevitable is that we'll be *faced with* these problems–and we are supposed to actively preempt them or solve them.

Thus, insofar as a peril caused by genomic emancipation is actually part of our destiny, it shouldn't be simply counted as a point against emancipation. The question is not about whether or not to create the problem for ourselves. The question is when and how to face the problem.

Heal what's in front of you

The world is complicated. So what do you do?

According to a folk tale, something happens when Pharaoh's army is bearing down on the Israelites on the shore of the Sea of Reeds, aiming to unemancipate them. One of the Israelites–a man by the name of Na shon–panics and runs into the Sea. Having been held his whole life as a slave in only sand and mud, Na shon doesn't know how to swim, and promptly proceeds to start drowning. Meanwhile, Moshe is freaking out because of the whole slave army thing. "God, their chariots approach, what can I do to save the people of Israel?" cries Moshe.

So God says: "Moshe, just, breathe for a second. First things first. One of your people is drowning. Save Na shon, and then we'll deal with Pharaoh."

To give Na shon something to hold onto, Moshe sticks his staff of heavenly power into the waters of the Sea of Reeds… which, apparently, *causes the Sea to split in two*, opening a way for the Israelites to escape.

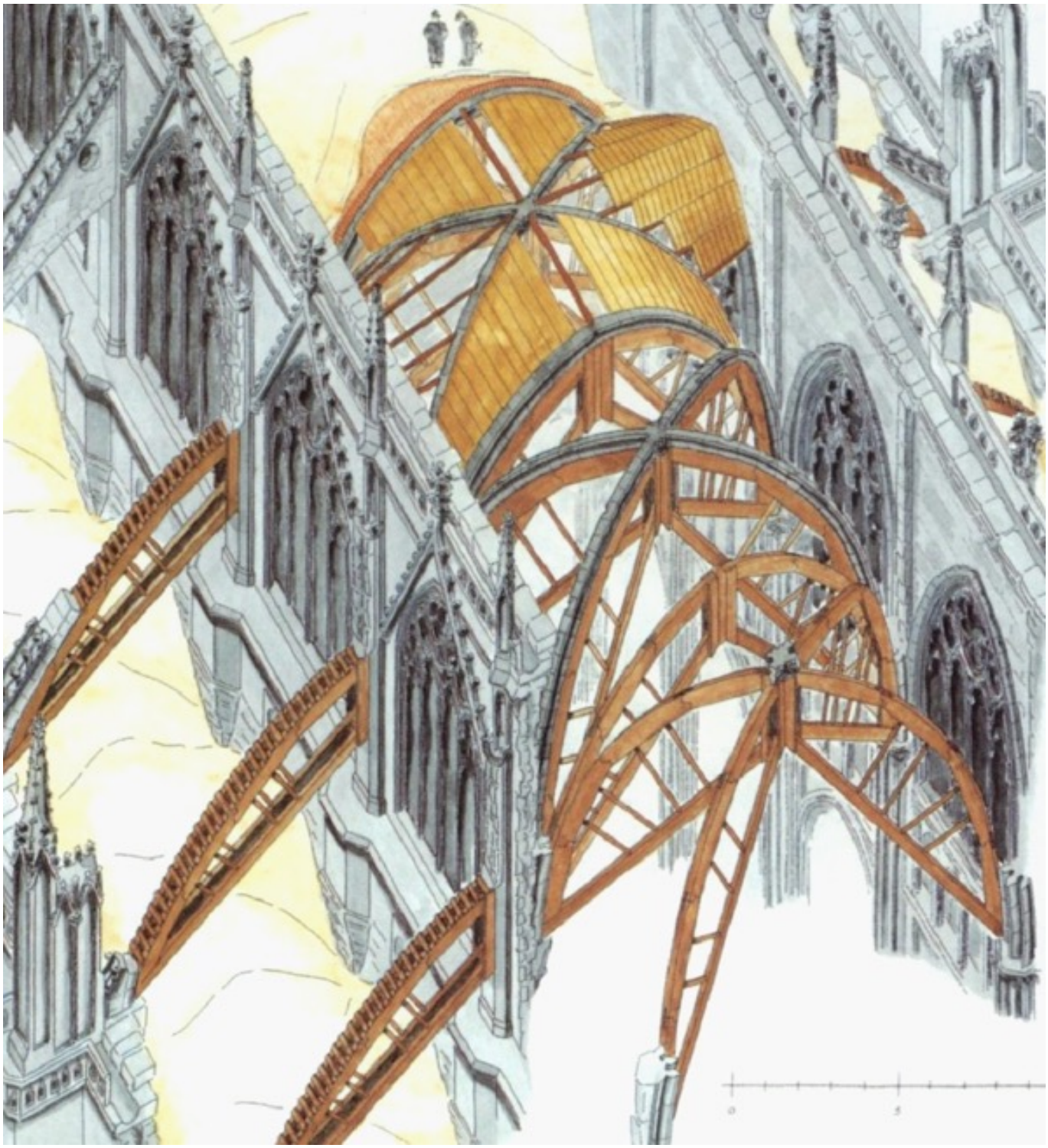
So the point is that you don't have to solve everything in advance. If there's a thing that seems concretely good to do, if it seems that it will likely be of great help in service of something that really matters, and there's no strong reason not to do it, then it's good to start doing that thing. You keep your eyes out for problems and your ears open for warnings, but you don't stop in your tracks.

It's hard to foresee even all of the most important consequences of genomic emancipation. But I don't think that's enough to say we shouldn't proceed. We have to exercise precautionary foresight, and make the technology safe, and keep our eyes open. And there will be problems that we will have to address in the future when we find out about them. But if the straightforward effects of developing reprogenetic technology look overwhelmingly desirable, we should proceed with conviction and at speed.

Buttressing emancipated humanity

In the longer run, where are we going with genomic emancipation? Does humanity collapse, or what?

We will have to work out buttresses to hold up our collectivity in the face of the new forces that will be at play after genomic emancipation.



The infinite game

God tells Moshe to relay God's message to Pharaoh. The message is famous as: "Let my people go!".

But this is a paraphrase. What God actually says is usually translated as "Let my people go, so that they may worship me.". My hyperliteral rendering would, instead, be "Send my nation, and they will work for me.".

I don't advocate for an emancipation that entails a total disintegration of humanity as a collectivity–as a unified perspective, a community, a sovereignty, a grand project. Rather, we're to be emancipated, in order to work for God.

I see most of my readers balking at that statement. Fair enough! Let's rephrase. We're to be emancipated in order to participate in this:

> Humanity, as an ideal collective of human spirits–what we will be, believe, and value, when we've grown up much farther together while relating to each other in a radical way, i.e. in a way that holds a vast space open for both diverse autonomous spirits and for strong and deep reconciliation between those spirits.

In order to participate in that, we'll need some restraint to keep the infinite game going. Enough restraint to avoid outcomes like:

- collapsing under competitive or short-sighted modification,
- tyranny of the parents or tyrannizing of the children,
- abandoning children,
- the disintegration of humanity,
- tyranny of one generation,
- or loss of intrinsic care for children.

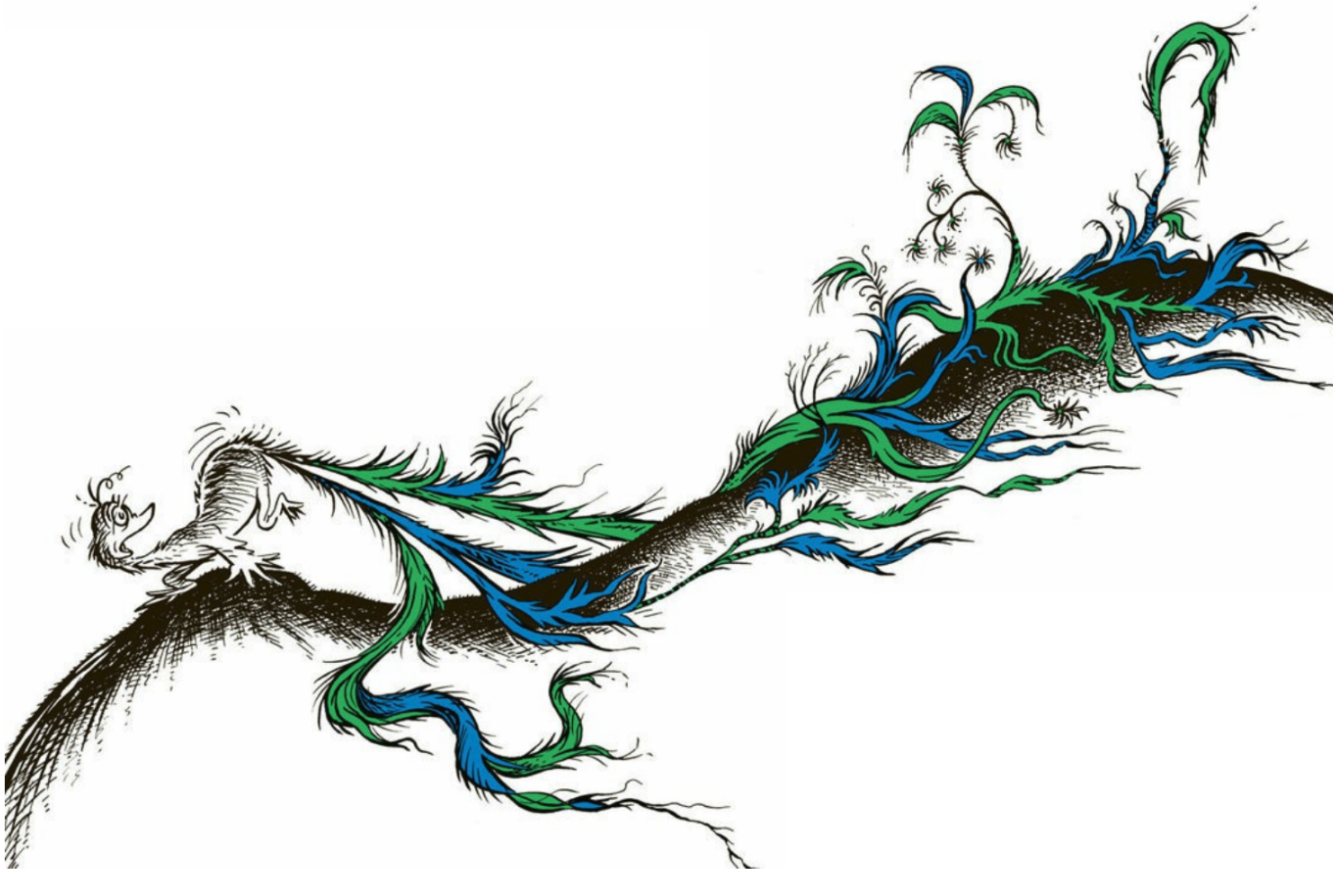
But not so much restraint that we cut off genuine possibilities for humans or humanity.

Growing pains

Recall what happened to Gertrude McFuzz:

Lolla-Lee-Lou's invidious tail stimulates McFuzz to seek biomedical enhancement:

Which works!



All too well.

We'll have to learn to not make choices that materially harm our children in order to advantage them within zero-sum competitions, or for some gain that is superficial or selfish. If we don't learn to do this, we'll have to coordinate, socially or even legislatively, to restrict choices such as making your son 7 feet tall.

Habermas and multigenerational feedback

A core element of genomic emancipation is that we are emancipating the children. Parents are given most of the decision-making authority. But insofar as we're able to actually listen to the children, they have the ultimate authority.

Suppose some genomic choice creates children who then later decry that choice. They may say, for example, that the choice caused them great suffering, or that it needlessly cut off some life path that they would have wanted to pursue, or that it greatly diminished their flourishing.

In this case, these children are the best available people to speak on behalf of the possible future children whose parents might make that same genomic choice for them. So, probably in most of these cases, we should restrict that

genomic choice.

A key restriction to enable multigenerational feedback: It is prohibited to make genomic choices for a child that would severely silence that child. See "Permanent silencing". We'd aim, in this way, to not have children be perpetually abandoned or perpetually tyrannized by genomic choices made for them.

In "The Future of Human Nature", 2003, Jürgen Habermas argues that germline engineering would create a new and deleteriously asymmetric relationship between parent and child[2]. Genomic choices supposedly subjugate the child to the parent's will and whim in a more irreversible way than childrearing choices, because the child can later retrospectively reclaim agency over their own lived history–but, supposedly, not over their genomes.

By giving voice to all children in humanity's multigenerational self-transformation, we give children their ability to also reclaim even their own genomic foundations as part of their agency, by taking sovereignty over the next iteration of those genomic choices. This is why reprogenetics must always come with a commitment to the child's right to eventually be informed of what genomic choices his parents made about him.

Fukuyama and human dignity

In "Our Posthuman Future", 2002, Francis Fukuyama argues that modifying humans using biotechnology, including germline engineering, could threaten human dignity[3]. Human dignity is a status afforded to all humans equally, which grants them human rights, and which if threatened could destabilize or destroy fundamental social coordination structures.

For Fukuyama, human dignity isn't just a political category that could be assigned to anything, such as a carrot or a penguin. Rather, it's a peer status based on specific features of humans as agents, giving rise to some quality of humans called "Factor X". Quoting Fukuyama:

> Factor X cannot be reduced to the possession of moral choice, or reason, or language, or sociability, or sentience, or emotions, or consciousness, or any other quality that has been put forth as a ground for human dignity. It is all of these qualities coming together in a human whole that make up Factor X.

I agree with this argument. For the foreseeable future, we should not try to make it technically feasible to remove fundamental universal human features. And, if that became possible, we shouldn't do it, and we should maybe ban doing it.

Beyond political matters, there is a spiritual issue. We don't want to delete our humanity. We do want to self-transform, but we want to do so in a way that is directed by the extant faculty of humane judgement that each of us has. If we delete core parts of that faculty of humane judgement, then we no longer have that faculty available–so we can't use our humane judgement to notice and rectify the mistake we made by breaking our humane judgement. We'll never get back together our Throm-dim-bu-lator.

[2]Habermas, Jürgen. The Future of Human Nature. John Wiley & Sons, 2014.
[3]Fukuyama, Francis. Our Posthuman Future: Consequences of the Biotechnology Revolution. Macmillan, 2003.

However, as noted previously, such radical modifications are unlikely to be feasible in the near future. The genomic choices that are likely to be available soon do not threaten human nature or human dignity.

C.S. Lewis and the tyranny of one generation

In the eponymous third essay of "The Abolition of Man", 1943, C.S. Lewis argues that man's conquest of Nature continually empowers us–up until, in the final conquest of Nature, one generation will radically disempower all future generations[4]. Through genetic and memetic control, that generation–the Conditioners–will, according to their whims and without concern for transgenerational spirit, shape human nature in a complete and final way. By fully subordinating the fundamentals of humanness to their own somatic whims, they give their whims free and inhumane reign to trash or delete humanity. Thus they effectively abolish man, leaving only their own artifice.

For Lewis, the liberation of one generation is also a disempowering of the previous generations; and the empowering of one generation is also an unliberation of subsequent generations. The liberation of one generation means breaking or stepping outside of the *Tao*, discarding whatever of humanity is supposed to be transgenerational. He writes:

> [… W]hat motive is to impel the Conditioners to scorn delights and live laborious days in order that we, and posterity, may have what we like? Their duty? But that is only the *Tao*, which they may decide to impose on us, but which cannot be valid for them. If they accept it, then they are no longer the makers of conscience but still its subjects, and their final conquest over Nature has not really happened. The preservation of the species? But why should the species be preserved? One of the questions before them is whether this feeling for posterity (they know well how it is produced) shall be continued or not. However far they go back, or down, they can find no ground to stand on. Every motive they try to act on becomes at once a *petitio*. It is not that they are bad men. They are not men at all. Stepping outside the *Tao*, they have stepped into the void. Nor are their subjects necessarily unhappy men. They are not men at all: they are artefacts. Man's final conquest has proved to be the abolition of Man.

Indeed, we should not fully conquer Nature, in the sense of breaking all continuity with our history, and discarding all values, or ways of thinking and being, that come from our past. Genomic emancipation doesn't imply doing so.

But empowerment, contra what Lewis seems to suggest, is not zero-sum. To fulfill our values, we want to liberate and empower our children. We can use our emancipation to further their emancipation.

Our transgenerational values point through our children. We don't really want our children to follow some specific life plan, like being a historian of blueberry cultivation or a tax attorney specializing in multinationals. We want more open-ended things for our children. We want that they should pursue what deeply matters to them, and we do not / cannot / should not control or even know in advance what those pursuits will be.

Another point: Humanity is not so easy to tame. African slaves in America were subjected to a sustained assault on their humanity and pride, in a way that one might have expected to break them, or even to genetically select out agency and resistance. But a great many freed slaves not only welcomed freedom, but *went back to fight* in the Civil War. The Jews, having been brutally persecuted for a thousand years in a thousand lands, returned to Erets Yisrael and built a world-renowned defense force. Can't stop the signal, Mal. Lewis's Conditioners are probably only science fiction for the foreseeable future: Since humans are free spirits at their original core, you'll have a pretty tough time engineering them to be permanently canalised; and for a trait that is highly polygenic and/or non-genetically determined, we won't be able to greatly decrease the *variance* in that trait any time soon.

Sandel, May, Heidegger: the giftedness of being

In "The Case Against Perfection", 2009[5], Michael Sandel argues that applying reprogenetics would erode our sense of the giftedness of life–that life is a gift to be cherished, not something to be mastered. The most compelling element of his argument about giftedness is his discussion of parental love. He says that "parents bent on enhancing their children are more likely to overreach, to express and entrench attitudes at odds with the norm of unconditional love". Sandel quotes the theologian William May[6] on the tension between love that accepts and love that transforms:

> Parents find it difficult to maintain an equilibrium between the two sides of love. Accepting love, without transforming love, slides into indulgence and finally neglect. Transforming love, without accepting love, badgers and finally rejects.

Sandel judges that reprogenetics would fall on the side of transforming-love without accepting-love, like SAT prep courses and an overprofusion of lessons and tutors:

> The hyperparenting familiar in our time represents an anxious excess of mastery and dominion that misses the sense of life as gift.

Later, Sandel clarifies the connection between viewing life as a gift and unconditional parental love:

[4] Lewis, C.S. The Abolition of Man - How Education Develops Man's Sense of Morality. 1943.

[5] Sandel, Michael J. The Case Against Perfection: Ethics in the Age of Genetic Engineering. Harvard University Press. 2009.

[6] 'The President's Council on Bioethics: First Meeting Transcript', 1 July 2003. https://web.archive.org/web/20030701142932/http://www.bioethics.gov/transcripts/jan02/jansession2intro.html.

> Whatever its effect on the autonomy of the child, the drive to banish contingency and to master the mystery of birth diminishes the designing parent and corrupts parenting as a social practice governed by norms of unconditional love.

Why does the mystery of birth matter? From a 2002 discussion between May, Sandel, Fukuyama, and others in the President's Council on Bioethics[7], Sandel paraphrases May saying that a key element of viewing life as a gift is an "openness to the unbidden" and the unelected.

That's Sandel's point: If parents are exercising their desire to shape their future child, they are diminishing their commitment to love and care for her, whoever she may turn out to be. They are making their child something to be molded and mastered, rather than someone to be appreciated as they are. (See "Deficient social context of intrinsic care".) Parents are supposed to be open to the unbidden–open to relating to whoever comes, outside of their control.

This rhymes with Heidegger's argument from 1954 in his essay "The Question Concerning Technology"[8]. He takes modern technology to be, not a set of apparatuses and methods, but rather a way of relating to the world. He argues that our way of relating to the world, in a technological mindset, involves aggressively pigeonholing everything–the natural world, the constructed world, and ourselves–as a resource, as something to be exchanged, commanded, and deployed as potential means to some end. Heidegger points to a consequence of this attitude: Modern technology, as a way of relating to the world, excludes other important ways of relating to the world. We are in danger of losing, for example, meditative or poetic ways of relating to the world, that let things reveal themselves to us–and so, furthermore, we're in danger of losing the constellation of these different modes and the creative tension between them.

We can apply Heidegger's argument to reprogenetics, rhyming with Sandel's argument: the parents are in danger of impoverishing themselves, in terms of how they relate to their child. They might lose the ways of being with their child that let the child reveal his being, and that let them have his being revealed to them.

I draw the following lesson from this idea of openness to the unbidden: While using reprogenetics, parents should keep firmly in mind that this is a child.

"But that is the most obvious thing in the world" I hear you say. Yes, but still. This is a child, and she will be messy and surprising, he's mysterious, she'll exert her free will, he won't necessarily fit in to your plans, she won't necessarily look like you thought even if you used reprogenetics, he might have quirky ways of thinking. This is your child to love. You can't control everything about the environment, you can't control random developmental events, you can't control most genes relevant to a trait, and you can't control most traits. Most of all, you can't and shouldn't control your child's free will and self-sovereign self-creation. Your child is a mystery–just with some traits nudged around a bit, *probabilistically*.

This is why we don't call them "superbabies", "CRISPR babies", "designer babies", etc. They are babies simpliciter.

You may be paying money and putting a bunch of thought, and even fight and sacrifice, into making genomic choices for your children. That is right and noble. But the child's life isn't about that. The child isn't a product that you're paying for. Once your genomic choices have been made, it's your job to care about the whole child, without particular emphasis on traits related to your genomic choices. The child's life isn't about the traits you were thinking about in the reprogenetics clinic. It's about whatever life the child creates (that is, whatever life she co-creates with you and her friends and family).

Finally, parents should (morally speaking) use reprogenetics to *increase* the mystery of birth. That is, parents should *increase* their future child's capability–to think, solve problems, pursue aims, and self-create. By empowering their child, the parents make him more of a mystery, more of a surprise.

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[7] 'President's Council on Bioethics: Transcripts (October 17, 2002)', 14 July 2003. https://web.archive.org/web/20030714225339/http://bioethicsprint.bioethics.gov/transcripts/oct02/session2.html.

[8] Heidegger, Martin. The Question Concerning Technology, and Other Essays. Translated by William Lovitt. First edition. New York: Harper & Row, 1977.

Palinsynopsis

- What is emancipation?
  - Liberation and empowerment.
- What is genomic emancipation?
  - Empowering parents to make genomic choices on behalf of their future children.
- Emancipation from whom?
  - From Mother Nature, who thoughtlessly and pointlessly disempowers our children by forcing upon them illness and diminished capacity; and from the lesion, which thoughtlessly and pointlessly forces us to go at tenth-speed in our pursuit of empowerment for our children.
- Emancipation of whom?
  - Of future children–and of parents, who are their best available stewards.
- Emancipation by whom?
  - By us–by society.
- Emancipation how?
  - By making that decision as a society, and through the science and biotechnology of reprogenetics.

  - By funding a primate research lab focused on reproduction.
- Emancipation to where?
  - To wherever we will decide to go, as we learn more.
  - To a world where more people are enabled to pursue their desires with vigor.
- Emancipation when?
  - Emancipation Now…
  - …to address our urgent needs for health and capacity…
  - …and as there is no strong reason we shouldn't go ahead now, carefully but rapidly.
- Buttressing emancipated humanity…
  - …by maintaining the collective game through which our humane spirits will unfold together.

Conclusion

We, the free world, as a society, should decide to invest in the development of technology for human germline genomic engineering.

Appendix: Is this eugenics?

This question has two parts: a substantive question and a terminological question.

The substantive question

The substantive question is about the motivations behind genomic emancipation, its recommendations for technology and policy, and how those relate to the abuses under the banner of eugenics in the 20th century. This question is important, but I won't deal with it here. In short, there's a lot of agreement between the idea of genomic emancipation and Agar's liberal eugenics[9][10]; and liberal eugenics is quite different from 20th century eugenics, and in fact is opposed to it, in both methods and motivation. Time permitting, I'll write a more detailed analysis.

The terminological question

The terminological question is about what to call the ideology or goal or category of technologies and policies that fall under the umbrella of what I'm calling "genomic emancipation". Some authors (such as Agar[11], MacKellar and Bechtel[12], and Veit et al.[13]) have argued that it's ill-advised to *avoid* using the word "eugenics" in a term describing ideas about using reprogenetic technology to alter future children, since it falls in the broader category of trying to alter, in whatever way, the biotic inheritance of future children. In order to avoid repeating any of the abuses of 20th century eugenics, the argument goes, it is best to remind ourselves of those abuses via the association with the name "eugenics". This reasoning has some substantial merit… but on the other hand, to me it sounds somewhat like the following line of reasoning:

> In the past, people have abused Tide Pods by consuming them as if they were food. This does not mean that all uses of Tide Pods are bad. However, if we are going to continue using Tide Pods for cleaning clothes, it's important that we keep in mind the ever-present danger, however remote, that some people might attempt to regress back to the repudiated mindset that holds that Tide Pods are basically food; after all, Tide Pods will continue to look, in a certain light, juicy and yummy, if you aren't thinking through what they really are. To keep in mind the possibility of a perverse edibilization, therefore, we shouldn't call

[9] Agar, Nicholas. 'Liberal Eugenics'. Public Affairs Quarterly 12, no. 2 (1998): 137–55.
[10] Agar, Nicholas. Liberal eugenics: In defence of human enhancement. John Wiley & Sons, 2008.
[11] Agar, Nicholas. Liberal eugenics: In defence of human enhancement. John Wiley & Sons, 2008.
[12] MacKellar, Calum, and Christopher Bechtel. The Ethics of the New Eugenics. Berghahn Books, 2014.
[13] Veit, Walter, Jonathan Anomaly, Nicholas Agar, Peter Singer, Diana S. Fleischman, and Francesca Minerva. 'Can "Eugenics" Be Defended?' Monash Bioethics Review 39, no. 1 (2021): 60–67. https://doi.org/10.1007/s40592-021-00129-1.

Tide Pods something Orwellian like “clothes-washing capsules” or “detergent packets”; instead, we should call them “juicy juicy yum-yums”.

The issue is that, to most people, “eugenics” means: Nazism, “keeping the gene pool clean”, forced sterilization and euthanasia, and generally controlling reproduction or immigration for the supposed benefit of society at the expense of individual freedom and wellbeing. This isn’t just an “association” with the name “eugenics”. What happened is this:

1. You have a large international movement, with a fairly coherent and specific ideology backed by many intellectuals and other elites.
2. That ideology calls itself “eugenics”.
3. That ideology does a bunch of horrible stuff, which is straightforwardly in accordance with the ideology.
4. Now everyone hates “eugenics”.

It makes sense!

Some defenders of the term “eugenics” say: look at the etymons, it means “good birth”, which is obviously good. Just because someone misinterpreted it, doesn’t mean we should give up the technical term. Now, I’m more of an etymonic extremist than you are, but even I won’t die on that hill. If nearly everyone uses the word to mean something else, and they are doing so for a straightforwardly good reason, it’s just confusing to try going against that. If someone tells me “Yeah, I’m in favor of reprogenetic technology; indeed, I am a eugenicist.”, then I in fact become confused–it sounds somewhat like they are trying to tell me that they support “remigration” and ending all social welfare and other such ideas.

To put a finer point on it, suppose someone tells you they are a “Nazi”. And you’re like, um, what, excuse me? And they say “Woah chill out, I don’t mean I want to genocide the Jews and the cripples, I just mean that I’m a socialist applied at the national level; Nazi is just an abbreviation of national-socialist, I’m just using the etymology broh.”. Not very convincing.

Really, if we take the etymon really seriously, “eugenics” is subtly but importantly incorrect. “Eu-” means “good”–and speaking of the Good in the context of *social policy* correctly raises the question “Good according to whom?”. It suggests that there’s some particular way of being “good-born”. But this is wrong: different people have different notions of what genomic foundations are desirable to give their children. Even one person’s notions of desirable genomic foundations would probably say that a diversity is better than one single sort of person–e.g. having some girls and some boys, some disagreeable and some agreeable, some inclined toward science and some towards art, etc. What we want as a society is emancipation, not some single homogeneous societally-determined “good” type of person.

This argument might fail to land with some people–but consider this: Imagine someone proposes that we pursue something called “euphemics”. This means “good speech”. (The root “phem” means “speech”, like in “blasphemy” (“deceptive speech”) or “euphemism” or “prophet” (“before-speaker”) or more distantly “-fess” as in “confess” or “profess”.) Well, it’s Good, so you’re in favor of it, right? It’s in the name, how can you be against Good Speech? Surely that’s better than Not-Good Speech? But this should not alleviate worries about a Ministry of ~~Truth~~ Euphemics. Freedom of speech is not euphemics, they are different motivations and different implementations.

There's another argument, e.g. made by Veit et al.[14], for using terms like "liberal eugenics" or "new eugenics". The argument is that other people are going to describe reprogenetic technology as eugenics anyway, as a way of casting that technology in a bad light. This is an empirical question about what term communicates more clearly; does "liberal eugenics" succeed at communicating that we're talking about… what I can only fluently think of as genomic emancipation, contra historical eugenics? My guess is that "genomic emancipation" is clearer, and I don't think it is Orwellian–but time will tell. The intent is to highlight the main goal: to make our future children free and empowered, by acting freely on their behalf. It's a different intent from making our children have "good" birth.

But anyway, Veit et al. are obviously correct that the actually important things are the technologies, applications, policies, and consequences, not what words we use as labels for them. So "genomic emancipation" is just another attempt to make some communication a bit clearer.

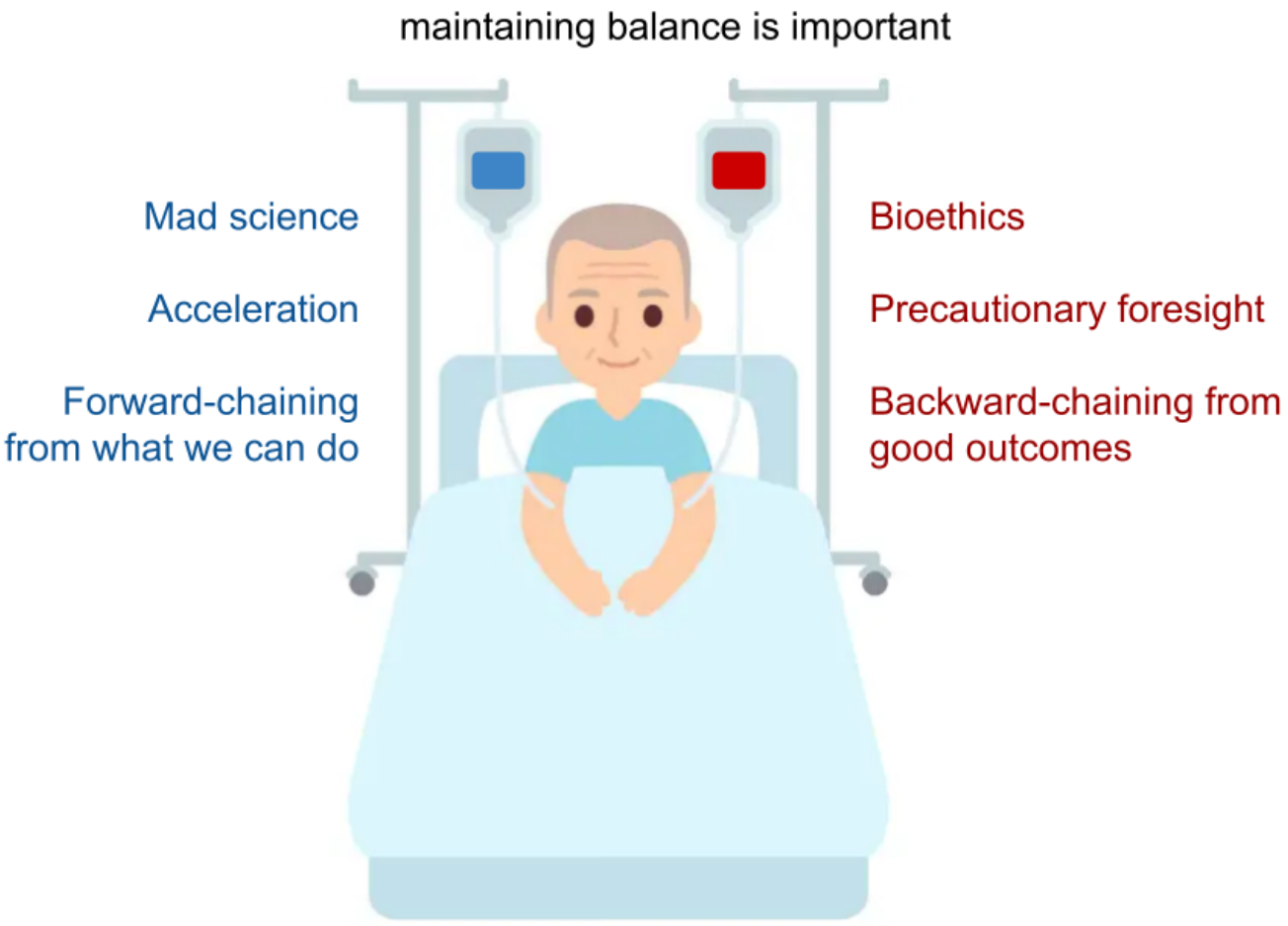
Appendix: Why envision genomic emancipation?

This section elaborates on the reasons we should work out a vision of genomic emancipation, listed in the introduction.

Another way to say these reasons: The political will toward a world with germline engineering should be:

- destroyed by true refutations;
- sharpened by true criticisms, in order to to aim at good worlds;
- if good and true, then spread and amplified;
- defended against false refutations;
- and exerted to realize the vision of the good possible worlds.

We don't want to first fully consider every issue with reprogenetics, down to the last detail and argument, in advance, and only then proceed with developing the technology. Rather, we want to consider and go ahead, at the same time.



Noticing major problems

Since germline engineering will probably eventually be a world-transforming technology, we have to apply precautionary foresight. That means looking ahead to what the world would be like, so that we can steer away from the worst outcomes, and if necessary completely change course.

[14] Veit, Walter, Jonathan Anomaly, Nicholas Agar, Peter Singer, Diana S. Fleischman, and Francesca Minerva. 'Can "Eugenics" Be Defended?' Monash Bioethics Review 39, no. 1 (2021): 60–67. https://doi.org/10.1007/s40592-021-00129-1.

To be destroyed by true refutations

I believe that genomic emancipation will be great. But I, and the many others who believe that, could be wrong. If the vision turns out to be undesirable, we stop pursuing it. So, one reason to envision a future with reprogenetic technology is so that the political will towards such futures can be destroyed if it ought to be destroyed.

Some possible ways the vision could be, on net, undesirable:

- It seems likely that cleverness is easier to enhance than wisdom. It's conceivable that there being lots of really clever but not wiser humans would make things worse–though I'm not sure what could convince me of that. E.g. maybe it ends up looking like humanity would be able to make AGI (which would then kill everyone) if only there were a lot more very clever AGI researchers.
- It's conceivable that, no matter how widely accessible the technology is, no matter how democratically empowering it is, no matter how blurred together everyone is in terms of their actual traits, nevertheless there is a coalitional conflict. Maybe the social dynamics of "in or out"–genetically enhanced vs. not genetically enhanced–nearly inevitably lead to one or the other group, or both, stigmatizing, harassing, and eventually being violent towards each other. If that conflict was likely to be extreme enough, it would be better to wait.
- Maybe some god-forsaken totalitarian regime predictably would purloin the reprogenetic tech and use it to enforce some deeper hell on its captive citizens, and this will be so terrible that it can't be ethically justified to make the tech anywhere.

To be sharpened by true criticisms

If we have a clear vision, that makes it easier to notice unforeseen problems as we proceed, and easier to change our plans to avoid running into bad outcomes. So, we envision genomic emancipation so that the political will towards genomic emancipation can be directed to pursue good futures and avoid bad ones.

Some examples of this, based on foreseeable perils:

- There are many potential ways that reprogenetic technology can be unsafe and/or ineffective. Some of those worries are not realistic. But some of them are realistic, and are nonobvious and/or would take significant technical effort to handle. E.g., genomic and epigenomic integrity have to be ensured; polygenic scores have to be validated to identify causal variants; traits should not be pushed outside the human envelope; and so on.
- There are some exceptions to absolute genomic liberty which should probably be prohibited in advance, if any of them might actually be done.
- In order to prevent inequality and to prevent coalitional conflict, we should make the technology widely accessible and follow several other policies.
- To prevent parents or other people from having unrealistic expectations about genomically engineered children, we should communicate clearly about what can and can't actually be done with the technology.
- To prevent selecting for irresponsible people working on frontier technologies, these technologies should be allowed in the US, using innovation-positive regulations.

To hold our intentions strongly

With a clearer vision, it's easier to intend the vision.

To be defended against false refutations

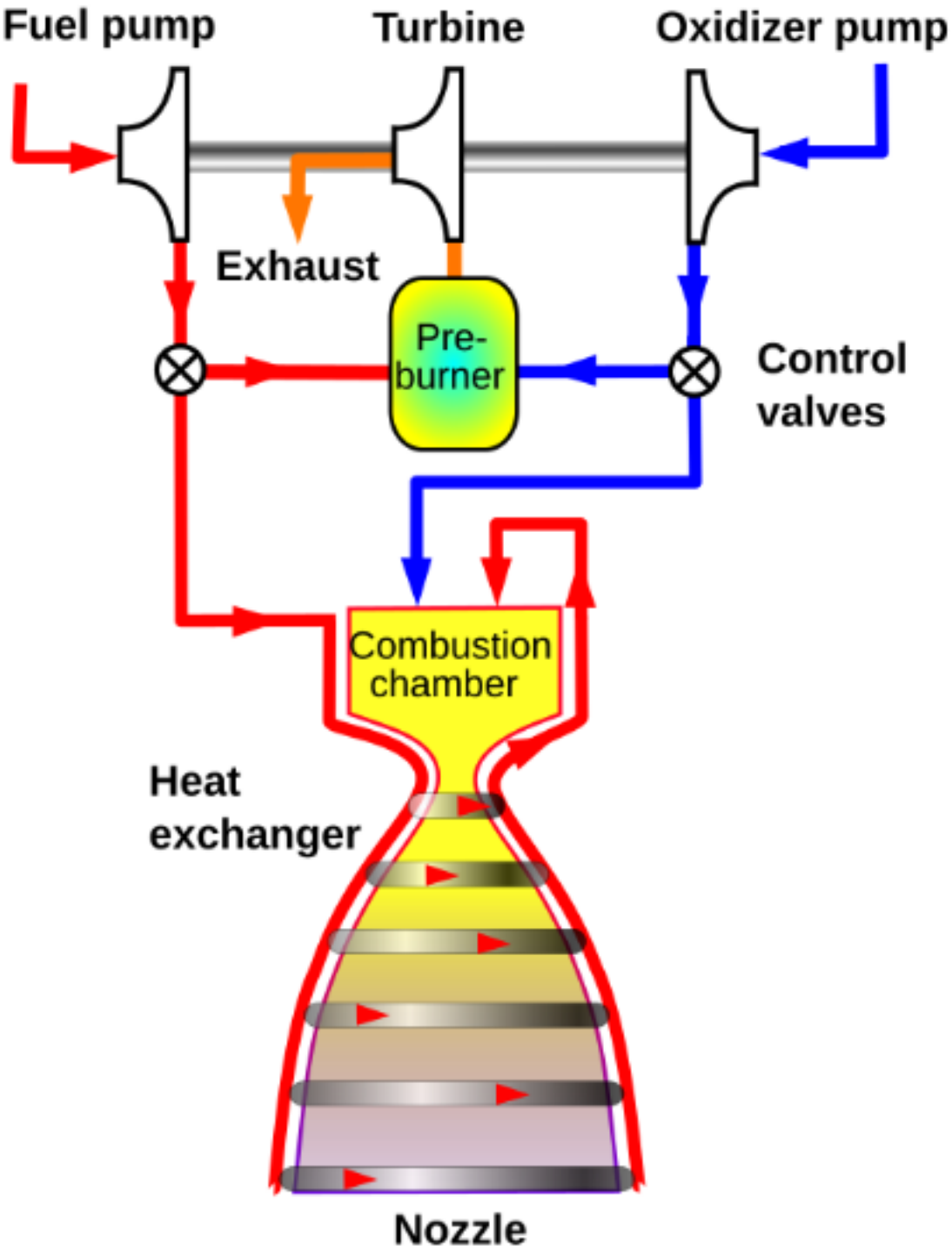
There are many reasons to think that the technology will be:

- difficult to develop,
- not very effective,
- unsafe,
- difficult to find applications,
- overregulated,
- or harmful to humanity.

Whether or not these are good reasons to not invest in developing the technology, they can be discouraging. Also, people's perceptions about reprogenetics, and people's perceptions about other people's perceptions about reprogenetics, create a miasma, where people just feel bad about working too directly on reprogenetics, even if they don't have a specific reason not to.

Both of these effects combine.

They create a sort of grid lock, or a cold-start problem. In some rocket engines, the propellant is pushed into the combustion chamber by pumps, and the pumps are driven by turbines, and the turbines are driven by burning fuel that's flowing, and fuel is flowing because of the pumps. Which is a circular dependency! Therefore ~~it's impossible to start rocket engines~~ they have to start using an extra power source.



(Image by Duk, wikimedia.)

Similarly, there's a circular dependency with motivation for germline engineering. The investors tell you that funding this company is too risky because it might get regulated. The regulators tell you that they won't explain what would convince them of safety, until some company comes to them with a safety study. The bioethicists say you can't allow the technology because it's not safe yet. The scientists say they can't do safety studies because the hiring boards wouldn't hire them and the funders wouldn't fund them.The hiring boards listen to the bioethicists. The public would be on board, but the scientists won't say that the technology could be really great, and the bioethicists keep saying spooky things. Everyone's afraid of the public and each other.

Part of the issue is that people are afraid because of the vague miasma–and the miasma throws them off-kilter enough that they wander off and do something else instead, rather than thinking things through about germline engineering.

When we know that what we say is true, then we wish to stand even in the face of ridicule, criticism, and punishment. When we do not know that what we say is true, why go to the trouble? If we believe that we dimly perceive some reality, then the dimness of that perception is enough to leave us feeling alone in our perception. If we can't see it clearly, and say it clearly, then others will not see it or say it either, and we'll be left in a Lurch.

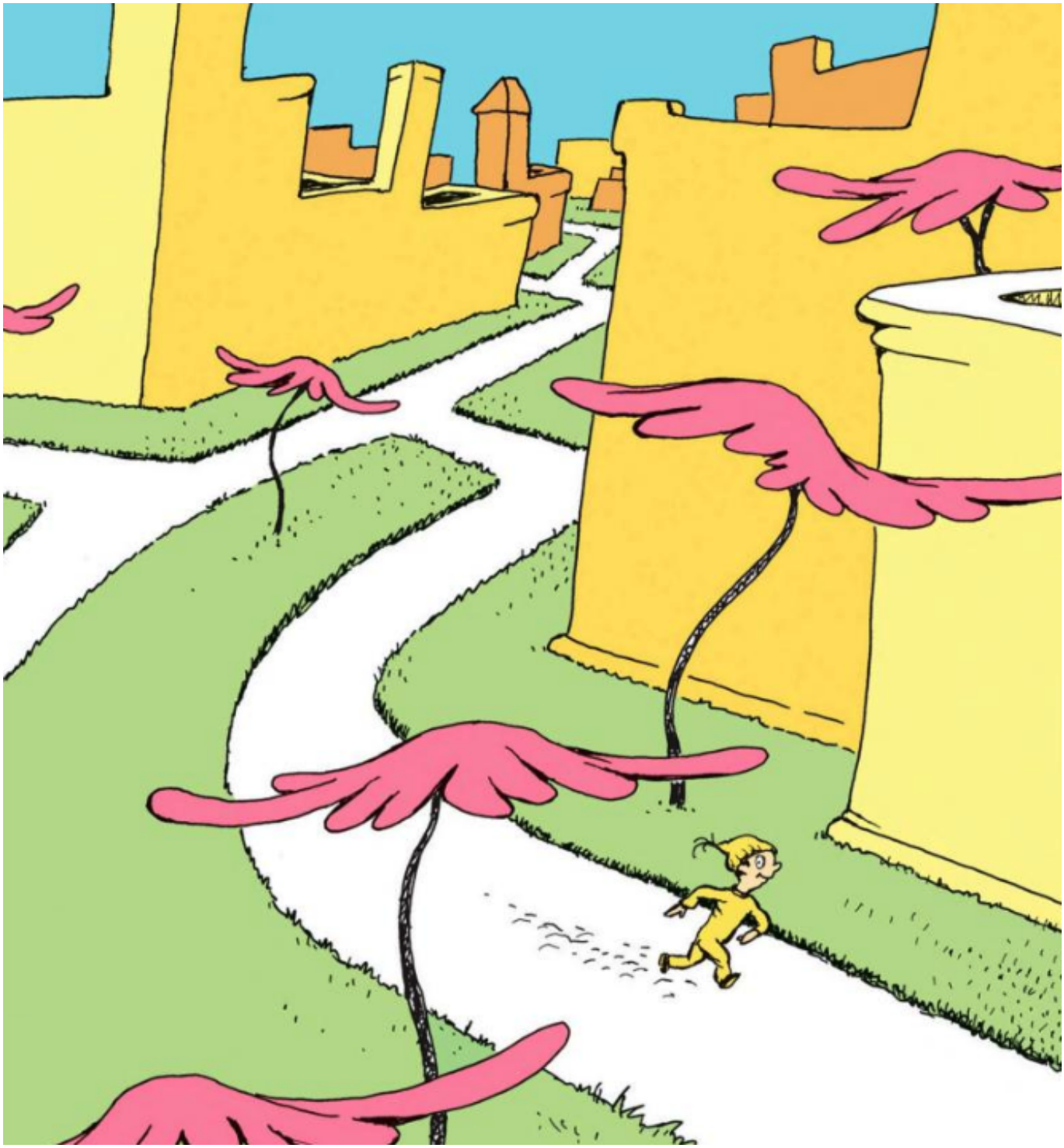
Without a vision, we are off-kilter. We're leaning slackly, with our center of mass teetering off to the side; one push would knock us over. Defending a vision is not so that we can get people to like us. It's so that we can have our feet below us, and know what we stand for.

To be exerted to realize the good possible worlds

In order to coordinate toward some goal, the goal has to be held in common knowledge. In order to be held, the goal has to be envisioned clearly.

It's somewhat stunning how infrequently people ask the questions that you would ask if you were actually trying to make strong germline engineering happen. It does not look like we're carefully doing foresight, and laying the groundwork; for the most part it looks like we aren't even trying. Collectively, we aren't seriously considering the possibility of strong germline engineering, because we aren't properly motivated by the vision.

Apparently the straightforward guesses one would naively make about the potential benefits are not enough to coordinate on! It's much easier to brush off the idea of amplifying intelligence by saying that current polygenic scores for IQ aren't very good, or asking "What does IQ even meaning anyway?", rather than saying "Surely the >60% heritability of IQ is a hugely important fact that we can use somehow!" and then trying to figure out how. If we expected to be able to work with lots of other people on all the relevant science and tech, we would be asking different question than we're currently asking. If we had a collective vision of genomic emancipation, then we'd start investing in the field commensurately with its potential benefits!



With our brains in our heads and our feet in our shoes, we can steer ourselves any direction we choose.

To be spread and amplified

If the vision is desirable and true (coherent, achievable), then it should be spread through honest respectful persuasion, so that antipathy becomes neutrality, and neutrality becomes investment. To be spread through honest respectful persuasion, the vision has to be legible, so that objections and fears and discomforts can dialogue appropriately with the vision.

Overall, this is a large task. What follows is a description of a few parts of why that's hard, and how a clear vision might help.

Blunt-force responses

Suppose that a woman is assaulted in a dark alley by a man. Thereafter, she is pained by the presence of any man, and behaves fearfully and hostilely toward them. What advice should her friend give her? Telling her "You should try trusting men a little bit more, so that you can have friendly, working, and love relationships with them." is kind of like telling her "You should be more ok with getting assaulted.", which is poor advice.

She might or might not be miscalibrated about the relative costs and benefits of a lower or higher threshold for trusting men. But that is mostly besides the point. The real issue is that she does not know how to distinguish the trustworthy from the untrustworthy men, and she does not trust herself to do so.

It would be nice if it were as simple as: "Distrust a man who is wild-eyed, smelly, mumbling to himself, presenting an angry or leering expression on his face, dressed in ill-fitting dark clothes, walking unevenly, lurking in narrow places, glaring, and alone; trust a man who is well-dressed, calm, upright, and friendly.". But the man who assaulted her was well-dressed, and was calm until he wasn't, and behaved quite as if he was her friend until he didn't.

If she cannot distinguish trustworthy from untrustworthy, or she cannot rely on herself to do so, then "trust none" may be the best option available to her. This is a blunt-force response: If you can't take a complex action involving fine distinctions, but you have something important to protect, your best option may be to take a broad and forceful action that casts a wide net of protection–and which therefore also has lots of costs because it is a blunt response that asserts itself in many inappropriate contexts.

Another example: To protect human life, many Christians oppose abortion even from conception. They may justify that stance with assertions like: "The soul and the body are one; when the body is created, the soul is there too; souls must be protected; therefore the body must be protected, even from the moment it is created.". The assertion that "the soul and the body are one" is occupying the place that could have been taken up by some more specific assertion about which parts of the body are the soul at which points in embryogenesis. The broad assertion "the soul and the body are one" is in some cases best understood as a blunt-force response to threats against human life in general, e.g. from pagan child sacrifice or Ancient Greek infanticide. If we did not know some stage beyond conception when a human fetus's soul definitely has not yet manifested, or if we could not rely on ourselves to act only on true knowledge of such a stage, then abortion would be, probabilistically, murder.

Blunt-force responses are good

At this point, some readers will, in their heart of hearts, feel a sense of dismissive superiority, thinking that such blunt-force responses reflect, at best, an understandable but illegitimate attitude of blind fear. Lest this feeling lead such a reader to actually dismiss the blunt responder, I'll reemphasize the point:

> Until the blunt responder has a better option available, *they are not making a mistake.*

To say that they are making a mistake would be like saying that Hippocrates made a mistake whenever he failed to use penicillin to prevent bacterial infection.

Another analogy, which highlights the coordination aspect: Why can't we all just use [your favorite data format] to store and process digital images? In some hypothetical sense, yes, we could switch most image storage to some standard format, and doing so would make some tasks simpler. But that's not really an available collective action.

The blunt-force response against germline genomic engineering

Likewise, "just do germline engineering and don't do eugenics" is not, at the outset, an available action that society can take, and that society can rely on itself to take. That action has to be *constructed* as a possible action–a plan that we could credibly commit to following (as voters, social norm enforcers, scientists, clinicians, policymakers, industry executives).

I don't think it's too difficult to construct the basics of the plan "do germline engineering and don't do eugenics". Genomic emancipation is not historical eugenics. The two ideologies advocate for the use of nearly disjoint means, deployed towards distinct purposes, and paired with recommendations for public policy and social norms that are in many cases diametrically opposed.

That said, when people have intuitive worries about human germline engineering, they sometimes give voice to their worries by refering to "eugenics", even if that's not a precise expression of their worry. Their worries are legitimate anyway, regardless of the fact that genomic emancipation isn't eugenics, and should be addressed with precautionary foresight.

If another member of society objects to the development of reprogenetic technology, it could be that they are not making a *mistake*, from their perspective, even if they would reliably change their mind given more information. For purposes of sociable compromise, if they are not making a *mistake*, then it is often illegitimate to bulldoze over their concerns. Further, if you wish to fall back to a BATNA then very well… but keep in mind that the great majority of capital–financial, social, human, political–does not wish to blow up the negotiations and leave with you to develop reprogenetics on an island.

Instead, it is best to first attempt the negotiation. Part of that negotiation is making the alternative vision of reprogenetic technology clear, and clearly distinct from historical eugenics. Only in that way is "genomic emancipation, and not historical eugenics" an available plan that society can trust itself to enact.

Critiques of character and motivation

To the advocate of developing germline engineering technology, the reaction of the critic is sometimes dumbfounding. I say, "Wouldn't it be great to give parents the ability to give their future children low disease risk and strong capabilities?", and then you respond with "That's eugenics! Like the Nazis!", and I'm just like, where is this coming from? How did you jump to that?

I could proceed to explain:

> No, eugenicists want to control other people's reproduction. They are often racist or classist, targeting whole groups of people with hostility. They justify the use of state force through population-level goals like the "health of the gene pool" or "improving the nation's stock". Fundmentally, they believe it is good for some entity, such as the ruling class or the state or some nebulous coalition, to decide what races, people, or genes are "good" and "bad"–and then to impose that decision on everyone. Genomic emancipation is aimed at empowering individual parents to make genomic choices.

Maybe this would work on some people… but probably not on the Christian theologian David Bentley Hart. He writes[15] (emphasis added):

> Most of the new eugenists, admittedly, see their solicitude for the greater wellbeing of the species as suffering from none of the distasteful authoritarianism of the old racialist eugenics, since all they advocate (they say) is a kind of elective genetic engineering — a bit of planned parenthood here, the odd reluctant act of infanticide there, a soupçon of judicious genetic tinkering everywhere, and a great deal of prudent reflection upon the suitability of certain kinds of embryos — **but clearly they are deluding themselves or trying to deceive us**. Far more intellectually honest are those — like the late, almost comically vile Joseph Fletcher of Harvard — who openly acknowledge that any earnest attempt to improve the human stock must necessarily involve some measures of legal coercion.

Hart goes on:

> Joseph Fletcher was a man with a manifestly brutal mind, desperately anxious to believe himself superior to the common run of men, one who apparently received some sort of crypto-erotic thrill from his cruel fantasies of creating a slave race, and of literally branding others as his genetic inferiors, and of exercising power over the minds and bodies of the low-born. And yet his principles continue to win adherents in the academy and beyond it, and his basic presuppositions about the value and meaning of life are the common grammar of a shockingly large portion of bioethicists. If ever the day comes when we are willing to consider a program, however modest, of improving the species through genetic planning and manipulation, it will be exclusively those who hold such principles and embrace such presuppositions who will determine what the future of humanity will be. **And men who are impatient of frailty and contemptuous of weakness are, at the end of the day, inevitably evil.**

If Hart's descriptions of Fletcher's book[16] are accurate, I am not aligned with Fletcher. But that's besides the point. The question is: What would Hart say to genomic emancipation? If I say "it would be good for parents to be able, if they wish, to prevent some diseases in their future children", then am I "impatient of frailty and contemptuous of weakness" and therefore "inevitably evil"?

My guess is that my stated disinterest in "having inferiors" or of "improving the species" would not impress him. My guess–though I don't know–is that he'd say something to the effect of (not quoting):

> It is the same fundamental impulse in both instances: You believe it is good for man to choose who will live and who will not be allowed to live. You believe that it would be better that a feeble person is less worthy of life than an able person, to such a degree that you would destroy the feeble at the start of their life in order to make way for the able. These stances evidence that your evil impulses have free reign over you; therefore you should not have free reign over which future humans will live.

But what sort of critique is this, from straw-Hart? It can be understood as a critique of character; the claim is that anyone who wants to affect the genomes of any future children–even one's own–is of poor character and therefore not suitable to make such decisions. Hart writes (quoting):

[15] Hart, David Bentley. 'The Anti-Theology of the Body'. The New Atlantis (blog), Summer 2005. https://www.thenewatlantis.com/publications/the-anti-theology-of-the-body.

[16] Fletcher, Joseph. The Ethics of Genetic Control. Buffalo, N.Y: Prometheus, 1988.

> Decisions regarding who should or should not live can, by definition, be made only by those who believe such decisions should be made; and therein lies the horror that nothing can ever exorcise from the ideology behind human bioengineering.

Hart is apparently incredulous that someone might support both reprogenetic technologies and also the public policy principle of genomic liberty, or might be considering the wellbeing and capacity of future children rather than considering "who should or should not live". It sounds like legal coercion is entirely peripheral to Hart's real objection. His real objection is that anyone seeking to affect the genomes of future children is evil.

I'm rather incredulous at Hart's incredulity. I don't currently see a plausible alternative to the following conclusion: In fact, Hart is applying a blunt-force reaction. He, and/or society at large, cannot *tell the difference*, or cannot *trust themselves* to tell the difference, between the different–and in fact opposed–motivations for reprogenetic technologies.

It is an unfortunate fact that people try to hide their motivations in order to deflect opposition until they have enough power to forcibly implement their adversarial intentions. Not only does this sometimes work, but also it blurs the boundaries around who intends what. If everyone claims acceptable intentions, you have to either work harder to discern who really does have acceptable intentions, or else make a blunt-force decision–either allow or disallow some activity, regardless of intention.

If in fact there are feasible moral uses of reprogenetic technology, then people like Hart should change their mind and recognize the desirability of those uses. For them to change their minds, they'll have to be able to distinguish moral from immoral uses, and distinguish moral from immoral motivations. I hope that a clear presentation of a moral motivation, genomic emancipation, will make those distinctions easier for people to make.

Deference as a blunt-force response

Many people defer on moral questions, and specifically defer about questions like "Which large-scale projects should society coordinate to achieve, and which should we coordinate to prohibit?". I suspect this happens a lot regarding reprogenetic technology.

A scientist who could work on reprogenetics might see good reasons to do so, and might not see any really good reasons to *not* do so–and yet still avoid working on reprogenetics. Why? Because of the lesion, the miasma: lots of other people have said that reprogenetics shouldn't be pursued. Maybe those people have bad reasons for saying so. But it would be a whole lot of work to understand their reasoning deeply enough to feel really confident that you're not stepping over some moral boundary. So by far the easiest response for the scientist is to just work on any of the many other areas that aren't so controversial and have more funding, but that are comparably interesting and probably at least somewhat helpful to humanity.

In effect, moral deference is a societal blunt-force response. There is a simple category, which is "anything to do with reprogenetics", and some more complicated categories, like genomic emancipation vs. historical eugenics. Someone who is morally deferring is not tracking fine-grained distinctions. They are sort of taking a poll among, say, bioethicists, or polemicists. They follow the broad sweep of opinion, which can say something about simple categories but can't as easily say something about more complicated categories.

I'm not sure how to address this. Some ways:

- Address the underlying concerns.
- Preference cascades.
- Communicate about the reality of public opinion (in fact very many people are in favor of reprogenetics).
- Build contexts (community, funding, work) for people who want to pursue reprogenetics.

Further, I hope that presenting a vision of a good world with reprogenetics will help coalesce the moral position as a socially feasible alternative to the prevailing distrust.

Appendix: The origins of souls

Influences on a child's genome

Souls are not genomes, but genomes do influence nascent souls. Currently, there is some mix of influence on a future child's genome from:

- **natural randomness**, e.g. the randomness that affects which parents happen to meet each other, or the random positioning of chromosomal crossover points in meiosis;
- **natural damage**, e.g. de novo mutations in the child's DNA due to errors made when copying DNA;
- **natural selection**, e.g. which embryos are robust enough to survive early development;
- **parental choices**, e.g. mate selection, or a man choosing what to eat while making sperm;
- **legal restrictions**, e.g. laws prohibiting incest, or regulations *prohibiting* embryo gene editing (making children more likely to inherit known monogenic diseases);
- **professional ethics**, e.g. IVF clinics refusing to perform IVF with gametes from some specific sources;
- **societal choices**, e.g. social pressure on mate selection, or social pressure to abort fetuses with specific conditions;

- **incidental societal effects**, e.g. society makes pollution which especially hurts people with vulnerable lungs (making any randomly chosen child less likely to have parents with vulnerable lungs).

It is not possible to "eliminate influence" on a future child's genome. Some process produces the child's genome. The influence can be exerted more or less by different people or processes–that's the only available kind of choice.

The question is: How can we change the combination of these forces that act on the genomes of future children, so that the children are more emancipated?

It is likewise impossible to compute consent directly, by just asking the future child. Some combination of people and processes has to compute a de facto guess at her consent (or ignore her consent). If it makes sense to have children at all, given that they can't consent to that, then it also makes sense to partially rescue them from nature randomly meting out diseases.

You laugh and/or cry, but some people actually think this.

Again, the question becomes: How can we change the combination of genomic forces so that the consent of future children is computed and heeded as much as possible?

This is why genomic emancipation means *empowering parents on behalf of their future children.*

Why not just have the state enforce beneficial choices?

In response to my proposed principle of genomic liberty, some people have argued that parents should not have power over their future children's genomes. Instead, the state should enforce rules, e.g. to make sure that children are given only beneficial genes, or to enforce justice.

But there is no way to magically implement state control of reproduction that makes the Actually Good or Actually Just genomic choices, and everyone is happy. Coercion is bad, seeing like a state is bad, and no one wants to live in

the Brave New World. Different people have different opinions about what is Good or Just, and might not think in those terms at all–see the next subsection on forms of care for a child.

Most importantly, having the state enforce Actually Good choices is a fabricated option. Even if there *were* some correct objective Good genomic choices, you *still* can't enforce those with the state. That's because the state is just not a good tool for something like that. You're not going to get the state to do the Good regulation, you're going to get some committeed lobbied grafted low-context policy. Sometimes the state really does have to preemptively regulate things. You don't want to wait for people to start building nukes in their backyard before outlawing that. But this is not one of those times!

Finally, and related to the previous point: Even if there were an objectively Good set of choices, that's not something we can *coordinate* on. People want different things for their different children. If we want to construct a political coalition that would support and accelerate reprogenetic technology, we need a vision that is broadly beneficial.

I think that Genomic Emancipation should be broadly beneficial, according to each person's own values. It won't be perfectly universally beneficial: some parents will make genomic choices that really are bad, e.g. they cause their children to suffer, so that the children later say "This should not have been done, or even allowed.". But I think it would be very broadly very beneficial, and should therefore be broadly agreeable and motivating.

Forms of parental care

Parents, by and large, care deeply about their children. The form of this care varies. Parents might, for example, emphasize:

- the child's wellbeing and happiness;
- the child's flourishing, striving, and pursuing;
- the child's long-term empowerment, autonomy, and self-sufficiency;
- the child's unconstrainedness and freedom (even to the point of allowing her to get addicted to low-fulfillment activities);
- how much alike the child is to the parents;
- how unique the child is;
- what the child will do for the world;
- the child's success (prestige, money, fame, influence);
- what the child will do for the parents;
- how the child will participate in some broader project, e.g. god, society, a specific community, or human progress;
- is the child decent, good, virtuous, or having some other properties;
- or grandchildren.

And of course, the care doesn't have to be limited to anything as concrete or explicit as the items on that last. The caring is a whole way of being that the whole person (the parent) can be, in relation to their child. The caring can be complex, nebulous, evolving, and open to the unknown and uncontrolled.

In summary: The forms of parental care are varied and hard to put in a box. This has several consequences.

First consequence: There is a question of morality: "What are the moral obligations on a parent who is making genomic choices about her future child?" The answer to this question would have to incorporate parental caring as its basis–the reason we ask the question is as parents or in loco parentis. But since parental caring is so varied, the answer to the question is very difficult to compute, as it would have to incorporate caring of many varieties. In practice, the way we'll have to enact our current best guess is by having different parents autonomously enacting their best guesses. Thus, the target is genomic emancipation, not genomic goodness.

Second consequence: We should be socially tolerant of each other, giving each other fairly wide latitude, in terms of what we criticize (or praise), to exercise genomic liberty. There is good reason to be tolerant simply on the grounds that too much social pressure would enact a "soft eugenics" through the tyranny of the majority. But furthermore, as a positive reason to be tolerant, we should view ourselves as participating in a broader, long-term project of computing moral genomic choices–which requires parents to enact their form of deep caring for their future children.

For example, my first-order belief is that it is better for a child to have relatively high openness to experience, because that will spur her to explore more widely and participate in some advanced-guard way of being human. But someone else might believe it is better for a child to have relatively low openness, so that she carries on traditions, holds to principles, and pursues goals with long-term determination. I will act on my belief, but I do not want to socially censure, let alone forcibly prevent, the other from acting on her belief.

(Tolerance, both social and legal, should only go up to a certain point; see "Exceptions to the genomic liberty principle".)

Third consequence: It would be very very difficult to get anywhere near a full agreement among everyone about what are Good genomic choices, or even what are ther right criteria for such choices.

However, this picture isn't silent on the question of moral genomic choices. It says that parents must choose on the basis of their care for their child. Parents ought not to choose based on whims. E.g., if some artist is popular this year, and that artist has noticeably uncommonly high openness, and the parents try to imitate that by choosing for their child to be high openness in expectation–that is an impoverished and immoral motivation. Parents choosing based on whims aren't doing their version of caring for their child; they are failing their child, and compromising their

child's autonomy; they're failing humanity's long-term project to compute moral genomic choices; and they're failing to participate in the transpersonal being extending through them and centered in their child (the family spirits, you could say).

Non-separateness of parent and child

Parents can legitimately partially speak on behalf of their child–even their future child. That's because they are the child's guardians. So, to emancipate a future child for herself, the best available option is to empower her parents on her behalf.

But there is a further nuance to the simple idea of emancipating future children for themselves.

The nuance is: Humans spirits are not perfectly separated from each other into separate human bodies. A child grows up to be someone who has some elements given to her by the humans who raised her and by her friends–habits, attitudes, beliefs, plans, skills, goals, relationships, virtues, etc. Thus the entity that is being emancipated, a human spirit, is to some smallish degree, distributed across brains. In particular, parents are partially (to some smallish degree) their children. So it's appropriate for parents to make choices about their children, not just as a matter of practical necessity, but as an essential matter: part of what it means for their future child to be emancipated, is for the parents to be free and empowered, to some smallish degree, to choose who the child will be. (Many will object in horror. But I'll defend this as being just as right as it is right that parents choose to teach their children good ethics, courage, and strength–or whatever other elements like that.)

In this sense, even before a child is conceived, if the parents have already begun to prepare themselves for their future child, then the child's has begun to be manifested. At first, the child's soul begins to manifest mainly in her parents; a little bit in the surrounding village; and a tiny bit in the broader society and state. A zygote is like a flag that has been planted: it is invested with meaning and potential, but until it is actually a settlement it only meaningful because of what other people are bringing in. As the fetus grows and becomes more socially real, the future child's soul is manifested more–still mainly by the parents–in the form of plans, expectations, intentions, readiness, preparations, and openness. Then the fetus starts developing a nervous system, and almost of the soul goes on to be manifested in the child's brain. But still some of the soul is in and from the parents, the village, and the broader society.

Thus, not only can parents speak on behalf of their child, but also they can legitimately partially speak and consent *as* their child. This is a slight but important wrinkle–in fact, we speak of the genomic emancipation of the children, and also the transpersonal human spirits that extend across generations, and also the whole project of humanity.

To say it a different way, what a human spirit is, is not something perfectly separated out to be in exactly one central nervous system.

Further, on balance it is good for professional ethics among reproductive clinics, and even in some cases social stigma, to softly restrict what genomic choices can be made. For example, many people would not be comfortable helping a deaf couple make their future child deaf, even if that's legal. I think it's fine and even good for it to be relatively harder to get that service, if most clinicians don't, on reflection, don't want to offer it. If we want to get metaphysical about it, society at large also has some transpersonal stake in the future child. If society at large univocally and strongly abhors some treatment of the child, including some genomic choice, that can constitute a denial of consent spoken by the aspect of the future child that is universally shared by everyone.

All of this only goes up to a certain point. Parents, let alone the state, are not the owners of a child. The child owns herself. Insofar as the child can take possession of herself, she has a right to do so.

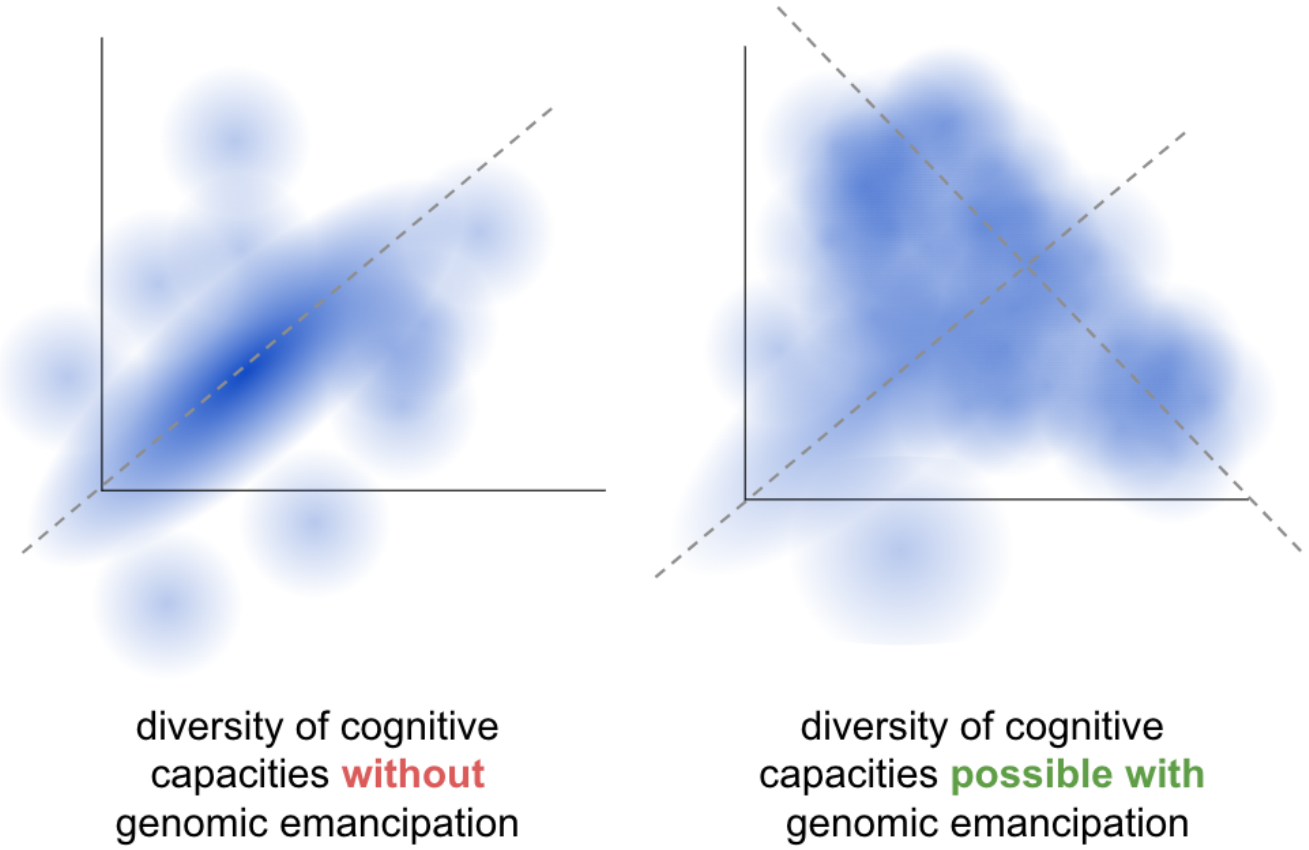
The point is just that when it is impossible for a child to take possession of herself directly, the next best option is for the child to take possession of herself through her parents. To say it a different way, genomic emancipation is about freeing the spirit that is shared between parents and child.

Appendix: Intelligence

One might worry that if many parents apply reprogenetic technology to increase the IQs of their future children, then we'll collapse our diversity. Will everyone be like some stereotyped "high IQ" person?

In fact, *currently* we have a significant degree of one-dimensionality in the distribution of our intelligences. At least in terms of easily measured cognitive abilities, there's one central factor, the "g factor". Different cognitive abilities tend to fairly strongly correlate with each other, so that to a significant extent, you can summarize someone's general intelligence with a single number (eliding of course their specific knowledge, skills, and social roles). Further, there's a significant degree of unfair, unjust inequality in how much general intelligence different humans are genomically predisposed to have.

Genomic emancipation would open up the space of feasible cognitive abilities for humanity:



On the left is a schematic representation of the current distribution of cognitive abilities. Most people fall in a multivariate gaussian distribution, with substantial correlation; then there are some non-gaussian spots, e.g. due to specific disorders.

On the right is the sort of distribution of cognitive abilities that I picture us having, when we're partway through the development and uptake of germline engineering technology. Note a few things about this hypothetical possible future:

- The cloud of humanity has expanded. In this possible future, we're not as tightly packed around the average, and not as tightly packed on the g factor line. This means we're exploring more of mindspace.
- Instead of being constrained by mutational load and antagonistic selection, humanity's cognitive capacities start to be more constrained–for the time being–by the upper limits of human biology. Instead of there being a single major axis of variation between people–the general factor of intelligence–there is now a new major plane of variation: the region approaching the (safe) limits of human biology, and then varying in emphasis or interest or specialization.
- In particular, there's less of a fuzzily one-dimensional scale of stronger or weaker general cognitive capacity.
  - When genomes are created through natural randomness, people are unfairly thrown to some spot along this scale. One person is granted a genetic predisposition for strong cognitive capacities across the board, but another person randomly and unfairly recieves a genetic predisposition for generally weaker cognitive capacities.
  - If humanity expands into the plane of variation approaching human limits, then the difference in predispositions for cognitive capacities is less about the overall strength across the board, and instead is more about emphasis or specialization, which is much less unfair and much more a matter of a beautiful diversity of brilliances.
- The general level of capability has gone up. Intelligence is a very positive-sum good, as long as it's not egregiously overconcentrated in some hostile elite. Everyone is better off–or at least, we could make that be so, if we can collectively decide to treat everyone better using our increased capacities.
- There's no sharp distinction between "enhanced" and "unenhanced" people.
  - The distribution of abilities fills our local patch of mindspace continuously, and with people born using germline engineering mixed in indistinguishably with people born without engineering, so that in every way there is still exactly one humanity.
  - People might *construct* such a categorization based on whether a child was born using germline engineering. But, at least according to this schematic possible future, there's no *actual* sharp distinction in terms of cognitive traits.
  - This is in fact what I expect: in the near-term, while we can push the *mean* of some traits around (that is, push around the expectation of the trait value, for one specific child), we can't much decrease the *variance* in that trait. There will still be lots of genetic variation, as well as all the non-genetic variation. So the distribution of even the most strongly engineered genomes will greatly overlap the distribution of the genomes that are less strongly engineered or that are not engineered.

Appendix: on safer-sooner reprogenetics

Examples of how reprogenetics is safer if developed sooner

- Safety problems can be made apparent when the dangers aren't very large.
  - E.g. trying to add +30 IQ points will be much, much safer than trying to add +150 IQ points, but may demonstrate minor issues. If we hold off on any such germline engineering until it's already possible to attempt +150 IQ points, then some deranged lab might attempt that in one shot, without any warning from prior less extreme tests.
- People might treat a kid differently depending on whether the kid's parents used reprogenetics. If in fact the genomic choices are small, with only fairly subtle effects, this discrimination will happen less. Further, children resulting from relatively weak reprogenetics will get people used to the fact that those children are nearly indistinguishable from non-reprogenetic children.
- The set of traits we today know how to influence in a future child is a pretty good set to start with, compared to other possible sets of traits.
  - In the near-term (say, the next decade or two), reprogenetics will be able to make future children healthier and more cognitively capable, but probably won't be able to majorly alter the moral character of future children. By first increasing our collective brainpower in a relatively morally neutral way, we can better equip ourselves to correctly handle the more difficult choices that will come up later.
  - Imagine instead that we don't apply reprogenetics for a long while, and then it becomes possible to e.g. make a future child be especially obedient. At that point, it would become easier for a totalitarian state to impose a future of genomically-enforced obedience on its subjects.
  - It's not currently feasible to do anything like deleting core aspects of humanity, but it might eventually become possible. If that becomes possible, it would be good to already have in place a well-functioning regulatory regime that allows the reasonable applications but successfully enforces prohibitions on egregious applications.
  - Further, egregious changes like that could interfere with universal human dignity and destabilize social structures such as human rights. A gradual expansion of humanity would push much less pressure on human dignity and give us more time to adaptively strengthen human dignity.

There are also reasons that going slower is safer. For example:

- We'll gain more information about natural reproduction, which will make it easier to make reprogenetics safe.
- We'll gain more information about the effects of genetic variants on traits, so we'll know better what direct effects our reprogenetic interventions will have.
- In the very long-run, we'll probably make moral progress, so we'll decide more wisely.

The ramp-up of reprogenetic strength

Like with most technologies, there will probably be a natural ramp-up of the capabilities of the technology. A zoomed-out sketch:

- Currently, embryo selection against disease risks is available.
- Very soon (or already), embryo selection for cognitive traits like IQ will be available. This is fairly weak–probably well under 10 IQ points of a difference in the great majority of cases.
- A little later, it might be available to make a small number of genetic edits in embryos. This will give some significant decreases in specific disease risks, but won't noticeably affect polygenic traits.
- Somewhat later, it could become possible to transplant a few chromosomes; this would be more powerful, but not by so much, maybe in the ballpark of 5-15 IQ points.
- After that, at some point (could be 10 years, could be 30), it will be possible to make eggs, sperm, or both, or zygotes directly, from stem cells. Then larger numbers of genetic edits (dozens or possibly hundreds) will have a good chance at becoming feasible, and/or maybe more chromosome transplants, and possibly arduous forms of iterated meiotic selection. These will have quite strong effects, like tens of IQ points.
- All the while, more genome sequencing data is being collected, some people are taking IQ tests, psychometricians are improving tests for cognitive abilities and personality traits, and geneticists are learning to correlate genes with the whole gamut of traits. All of this progress will gradually increase the feasible effects of germline engineering technology, on average.
- Methods improve for genotyping / DNA sequencing, for stem cell manipulation, and for integrated reprogenetics. The methods become faster, more reliable, and easier to use for clinicians, and therefore become less expensive and more accessible. More people use the technology, leading to widespread increases in commonly desired traits like health, mental health, and cognitive capabilities.
- Those technologies all keep advancing, increasing our ability to affect many traits, and to greatly affect highly polygenic traits, and even in some cases to meaningfully decrease variance in highly-heritable quantitative polygenic traits like height or possibly IQ.
- In the longer run, at some point it will become possible (not to say desirable) to make changes that go significantly outside the human envelope. E.g. pushing IQ beyond what a normal human skull could support; deleting (or even adding) aspects of body or brain architecture; or adding genes from other species. By this time we will have had much more space and information with which to figure out how to navigate further technological developments.

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