MORE HUMAN THAN HUMAN

ETHICAL CHALLENGES OF A PROBABLE FUTURE

by

Michael James Senftleber, B.S, M.B.A.

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Committee Members:

    Craig Hanks, Chair

    Elizabeth Kanon

    Holly Lewis

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DEDICATION

I dedicate this work to my wife, Katherine, and our three children Isaac, Aaron, and Effi.

Katherine and the boys remind me every day what it is to be wonderful humans.

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TABLE OF CONTENTS

ABSTRACT

In this Applied Philosophy and Ethics Master's thesis, I will explore the ethical challenges resulting from enhancing humanity that may be present in a not too distant future. While I will discuss much of the current literature and take a position on the ethics of enhancing humans, I believe it is a foregone conclusion that humans will be enhanced. And while that doesn't decrease the importance of discussing the ethics of enhancing humans, I believe that the potential ethical dilemmas that might be present in the future are more important to begin thinking about and discussing. The path our future history takes will have a massive impact on which ethical dilemmas are present and which are impactful. The summation of this paper will serve as a topology of these future dilemmas where I will document and offer potential paths that may be employed for further research and discussion.

1. INTRODUCTION

For the last roughly 12 thousand years the human species has been a relatively stable, slowly evolving species. This has allowed for a distinct line between which beings are human and which beings are not human. Ethical frameworks have used this convenient delineation of human versus non- human to describe behaviors or desired outcomes. But prior to that, 12 to 75 thousand years ago, there were multiple species of humans including Neanderthal, Homo erectius, Denisovans, and others (Harari, 2015). Here I will make the assumption that it is conceivable, probable, and inevitable that humanity will have to deal with multiple human species again. Not in twelve thousand more years, but more likely in fifty to two hundred fifty years. Advances in human-computer interfacing and in genetic engineering will produce multiple paths to this inevitable future.

I will look at two completely separate advances that will need to be dealt with independently. First, I will examine augmenting humans with computer and robotic technologies replacing or extending ever more of a human with upgraded parts. We are already assisting or replacing organs with technology. We've already proven the ability for brain-to-computer interfaces that allow a person to think and perform actions with robotic arms or think and control another's action. We have developed basic bionic eyes that have allowed the blind to see. In theory there is little limit of capabilities or of how many enhancements one person could have. Second, I will consider genetically modified people, the so-called designer babies. We have proven the ability to select embryos with or without specific genes. We have seen programmed editing of genes to enable or disable specific traits; and following in the footsteps of agri-business is the genetic

mixing of DNA from one species with that of another. By selecting genes or splicing in DNA from another organism we have corn resistant to the corn borer, we have crops that grow bigger or stay fresh longer, and we have plants that can tolerate environmental conditions they previously couldn't. I've selected these two forms of enhancement as they're a good mix of the possibilities and where one may fall short the others might fill the gap. There are many other related areas such as athletic or cognitive enhancement through drugs/hormones and cloning humans, but I'll focus on these broad enhancements to humans and label them technohumans and transhumans separately and enhanced humans collectively. I'll then refer to non-enhanced humans as natural humans.

In this paper I will examine the ethical challenges of the relationship of and between these divergent human variants and will I address where or if a line between the two could be drawn. I'll touch on related questions of whether it is ethical to enhance, to allow enhancing, or to restrict enhancing humans. I will examine the ethical concerns of should we or shouldn't we allow or encourage these technologies. I will address this question from the deontological and consequentialist perspectives. Is there a threshold between the natural human and enhanced human that is acceptable or is the slippery slope too fraught with danger to allow even the first step? I will also address concerns of personal liberty and privacy versus the greater good of society. However, for this paper I make the assumption that ethical or not we will find ourselves in the situation where some portion of the population is distinctly enhanced and potentially no longer biologically human.

My thesis is that ethical roles and responsibilities do not change or differ between natural and enhanced humans; there is no clean line of delineation and the prospect of a

population of superior beings calls into question the entire anthropocentric position of most ethical frameworks. Attempting to prevent advances are futile and our ethical responsibility to individuals is to protect personal liberty while our ethical responsibility to society is to promote equality and prepare for an even greater distribution of abilities and advantage. The future doesn't have to be a dressed-up dystopia like Huxley's *Brave New World* or Niccol's *Gattaca*, but it also will not be a panacea free from want. I do not doubt there will be inequality across nearly every dimension; I do not doubt there will be power struggles; I do not doubt there will be significant missteps. I know there will be many difficult questions and challenges for "people" and society, but something being hard is not an excuse to abandon or redefine ethics.

2. ENHANCEMENT VECTORS

The two primary vectors I will describe are Technohumans, those humans enhanced by human-computer interfacing, and Transhumans, those humans who through genetic modification have been enhanced by genetics or epigenetics.

2.1 Technohumans

While artificial intelligence and automation receive much of the attention in technology ethics today, a less discussed ethical concern which is not humans being replaced by computers and robots, but of humans becoming computers and robots. The quiet progression has already begun and is increasing at an ever-rising rate. From prosthetic limbs, to pacemakers and artificial heart valves, to artificial lungs, to a bionic pancreas, body parts replacements are being developed which will enable replacements of original equipment due to a defect, being worn out, or even as an upgrade. Even the sources of perceptions have replacement parts being developed. In 2013 Wentai Lui and a team of physicians and engineers created a bionic eye, a retinal implant, restoring sight to the blind. This device operates with a tiny video camera on a pair of glasses which sends the video to a wrist worn computer that transmits information to a microchip attached directly to retinal nerves (Lin, 2013). Similar efforts are underway on other senses, such as smell and hearing. Perhaps that leaves the brain, mind, or consciousness as the last vestige of original humanity. But even the mind can be enhanced or augmented. An example is transactive memory theory, as proposed by Daniel Wegner in 1986, which is the natural system of sharing memories by externally encoding information. As groups of humans live together, they naturally depend on others to

4

expand and complete their memories (Wegner, 2013). Technology has new and efficient means for this shared memory, such as always at hand computing, memory, and access to all the world's knowledge. As such humans can access much broader memories or information without having to retain or construct this for themselves. This growth then comes with dependence on said technologies. While the computer or smartphone are the typical access points to this vast trove, developments are already being made to interface directly into the mind. In *Ethics: Theory and Contemporary Issues*, MacKinnon and Fiala tell of Jan Scheuermann, a woman who was paralyzed from the neck down due to a degenerative brain disease. Doctors were able to implant electrodes directly into Scheuermann's brain and after some training she was able to think and control a robotic arm (MacKinnon, 2019, pp. 470-487). While this experiment helped Jan regain an ability she had lost the same technique could be leveraged to add additional capabilities to other people and there is no restriction that what the mind is controlling is connected to the person or even in the same room. Once the brain is interfaced to a computer, one that could be connected to any digital network, one "simply" needs to train their brain to take actions. This training is much like driving a car, playing a video game, texting at a stoplight. These are all complex activities that we've learned to do without conscious thought through mental training. Other experiments, completed on rats, have enabled electrodes implanted in one subject's brain to control the actions of another subject. If an outside "force" can insert thoughts and produce actions is the will outsourceable? Each of these advances in isolation make for exciting opportunities, but as these technologies are developed, refined, and become more commonplace there is no limit to the number of replacements a person could have. And as in the Ship of Theseus thought experiment,

where a ship has boards replaced one at a time, over time, and after every board is replaced is it the same ship, the same can be asked of the identity of a human who has one at a time, over time, replaced every original part. And finally, as I'll discuss in the Therapy versus Enhancement section, there is no physical barrier to restoring to "normal" function and advancing significantly past "normal" function.

2.2 Transhumans

While my examination of Technohumans focused possibilities in repairing or upgrading an existing human by interfacing computer and robotic technology, this section will deal with the repairing or upgrading by changing the biology of living or future beings. I'll focus on only a few of the many possibilities in enhancing the biology of an individual. Many of the possibilities of bioengineering transhumans emulates evolution but removes chance. Medicine and science have in recent centuries focused on correcting issues, diseases, malformations, fertility, etc. Now science is enabling the ability to insert edits or choices into the process of development or to interrupt the process of deterioration, as well as affect the expression of genes.

I'll begin with procedures on existing humans. Science is developing technologies to insert corrected or enhanced encoding into an existing human which could reverse cancer, decrease dementia, and restore nerve sensation. This can be accomplished with techniques such as stem cell replacement or gene editing, but with the goal for it to correct a deficiency or damage. The same techniques could be employed to enable a human to grow faster, stronger muscles, deeper more efficient memory, mellow or aggressive behavior, or more elastic, innovative thinking. These techniques, like the

technohuman discussion above, rest on an enhancing an individual, presumably by choice.

However, genetic engineering doesn't stop with what an individual chooses to do to themselves, it can be leveraged to choose for an offspring or an entire hereditary line. With in vitro fertilization a couple (or a collection of people) could create dozens of fertilized eggs and then screen those eggs against abnormalities or undesirable traits or for desirable traits allowing choice of which one or two eggs to let grow to fruition. This ability to select from screened embryos allows one to select only the "best", but of naturally possible offspring. However, with the introduction of gene editing where scientists can programmatically turn on and off genes, no longer are you selecting from a basket of the naturally possible. You are creating by selection. Techniques such as this could be used to switch off the "breast cancer gene" or repair the Hodgkin's Lymphoma gene; it could also be used to select for skinny genes, blond hair, strong muscles, the optimum serotonin levels, intelligence, or just to phase out those left-handers. At this point humans, at least those with the resources to participate, can tune their offspring to be advantaged (in whatever advantage means at the time). Also possible, but ethically more questionable, is a technique common to the agriculture business: taking DNA from one species and adding it into another. This attempts to take a benefit one species may have and insert it into that of another species. Perhaps it is resistance to a blight or an advanced skill. Additionally, science is experimenting with creating chimeras, animals that have complete genetic information from multiple species. By inserting multiple zygotes from different animals into an undifferentiated tissue, characteristics from each

can exist in the resulting tissue or animal. One area of active chimera research involving humans is growing human organs for transplant in non-human animals (Schneider, 2019).

There is also a significant difference in downstream consequences, which may or may not impact the moral question, if these genetic changes are for an individual (adult or in creation) versus changes that are heritable. Changing a trait that can be inherited to future offspring could advantage an entire lineage or create an entirely new branch on the evolutionary tree, where even if the natural and enhanced humans wanted to, they potentially could no longer create fertile offspring together.

However, perhaps the most promising and tenable form of genetic enhancement is epigenetics. Where genetic modification seeks to alter, remove, or add to the DNA of an organism, effectively changing the template of life, epigenetics seeks to influence the expression of genes dealing instead with influenceable probabilities. In everyone's genes there are active and inactive portions. Environmental factors, even age, trigger the enabling and disabling of genes which allow traits to be expressed. New epigenetics research seeks to control this process whereby controlling the mechanism for the human body's behavior in response to genes. An example natural epigenetic response is the body's deterioration with age. In our genes it is written that at a certain point we stop laying down new muscle, stop growing, stop depositing calcium in bones, etc. By controlling the signals our genes receive to activate genes that govern this process it is hypothesized we can delay, perhaps indefinitely, the body's natural aging. Enhancements such as these not only provide potential benefits, that can in theory be reversed, and might also sidestep some ethical concerns. While not a heritable modification, a gene

therapy such as this could be employed to advantage children by providing a decisive

boost early in life (Bess, 2016).

3. CRITIQUE OF LITERATURE AND POSITION ON ETHICS OF

ENHANCEMENT

Much of the current literature focuses on the ethics of promoting, allowing, participating in, or restricting the rights and abilities of those to enhance themselves and/or their offspring. The position I will take is that in most cases it is ethical to allow or participate in enhancing natural humans and that to restrict it is unethical, impractical, and most likely counterproductive.

What's more is that we are already enhancing ourselves and our children in innumerable ways. This brings up the question of where the line between natural human and enhanced human is. Can it even be drawn? Some have argued for a line between therapy to the normal and enhancement above the normal. Some have argued that natural humans have always worked to enhance themselves and thus the line is already crossed. I argue this is not a practical or useful line.

For this paper I make the assumption that ethical or not, we will find ourselves in the situation where some portion of the population is distinctly enhanced and even potentially no longer biologically human.

3.1 Therapy Versus Enhancement

In his article "Ageless Bodies, Happy Souls", Leon Kass looks at the terminology and potential delineation between any of the above technohuman or transhuman techniques as a therapy versus an enhancement (Kass, 2003). Using Kass's definition of these terms a therapy is treatment used to address a defect, disease, or disability. Conversely, an enhancement is a treatment used to alter or interrupt normal ability or

process with a preferred ability. These terms as Kass point out are used as simple shorthand to help draw a line between the acceptable and the ethically suspect. However, these terms are themselves based on terms not easily defined. What is normal? Is it average? If we seek to change those below normal, we simply move the line for normal. One person's therapy is another's enhancement. (Only in the fictional Lake Wobegon can all the children be above average.) And does the route something took to be abnormal matter? Do we fix dwarfism, but ignore those that are simply short? For that matter, is being short negative? Cultural standards of desirable traits change over time. These therapies and enhancements could just be striving towards a temporal superficial ideal.

3.2 The Rules Are Written By The Winners

Speciesism, a term coined by Richard Ryder and popularized by Peter Singer, has an illustrative and simple way to describe human-centered prejudice. Like racism or sexism, a group of people pick an attribute which they have and use it to segregate and subjugate those without it (Yancy, 2015). Humans have done this with other species and in doing so have lifted humans on a pedestal while excusing the abuse and misuse of non-human species. Over time this us-versus-them mentality has been used by whomever is in power to define their kind as good and above other kinds. People have done it, and in many cases still do, with race, gender, religion, national origin, etc., to define what is good and worth protecting. Modern western philosophy, especially after the enlightenment, has attempted to be inclusive and remove these divides and seek equality among people or the promotion of the human collective. But this too is an us-versus-

them by simply expanding to humans the humans become the us and non-humans the them. By doing this we justify our position on top. But what happens when we are no longer on top alone and potentially surpassed by divergent human species? Do we then try to stop the game and claim the natural humans and enhanced humans are morally equal? What if the enhanced humans would prefer to write the rules in their own favor? Clearly if we can foresee the need for asking to share moral equivalence with a superior race of beings, we can see the error in refusing that same status to those we currently feel superior to.

3.3 Where Is The Line Between Natural and Enhanced Humans

Just as it can be hard to define what is better, it is hard to define the grey area between the extremes. And not being able to draw a definable line among a population reduces the ability to segregate to an arbitrary decision. If someone has only a handful of technological enhancements are they different? An amputee with prosthetic super-legs is no less human. If that amputee also has a pacemaker, a hearing aide, and artificial eye lens is he or she less human? If that person also has a computer-to-brain interface that allows him or her to communicate with someone elsewhere in the world over the internet simply by thinking about it, is he or she then less human? No. That person remains human, perhaps with after-market parts that restore normal function in some cases and provide new function in others. Are his ethical responsibilities any different? No. If someone is in need of help and he can call for help by thinking about it, then from duty or benevolence he should. Do we chastise the person without that ability for not being able to call for help? No. In any and every population there are varying attributes and degrees

of ability. Someone who can't swim shouldn't just dive into rushing water to save someone, but a strong swimmer perhaps should.

The case of genetically enhanced transhumans is not different. If you are tall whether by chance or by choice; your duties do not change. If your memory and intelligence is three standard deviations above the mean whether by luck or through expensive genetic therapies; your duty does not change.

Any change, whether by computer technology or biological technology, will be gradual and many things that today may seem extreme will become more common place. In many cases the enhancement will be undetectable, do you have a widow's peak hairline because your parents do or because your parents chose it at the baby design center? This will, of course, have challenges in competitive arenas where some people will have a distinct advantage. But the challenge of detecting and segregating by natural or enhanced is simply an extension to how many sports now try to control for differences from enhancing drugs or hormones.

3.4 A Kantian Personhood Response

Immanuel Kant sought to better distinguish what made humans morally considered beings by distancing the divide between mere observational behavior or physical biological traits. Kant believed it was reason and our capacity for reason that distinguishes us as moral beings. This capacity grants "personhood" and it is persons who have a moral duty. Persons should be treated as an end in themselves. Reason is not an inherent biological trait of the human species, but as a being capable of reason we are persons. Those not capable of reason are not persons and thus can be used as instruments

to the benefit of humans. In 1785, Kant wrote in *Groundwork of the Metaphysics of Morals*:

> …every rational being, exists as an end in himself and not merely as a means to be arbitrarily used by this or that will…Beings whose existence depends not on our will but on nature have, nevertheless, if they are not rational beings, only a relative value as means and are therefore called things. On the other hand, rational beings are called persons inasmuch as their nature already marks them out as ends in themselves. (p. 428)

A later Kantian thinker, Christine Korsgaard, refines this separation further. Korsgaard building on Kant, said that it is our relation to the normative that separates us. We live in the world and we ponder the world whereas non-person lives in the world without contemplating it. We are reflective; not only do we feel, we think about those feelings. Korsgaard describes animals as "engaged in conscious activities, but it is not conscious of them." (Korsgaard, 1996, p. 93)

By either of these descriptions of personhood enhanced humans would be persons and thus would be bound by duty to act morally and to treat all natural and enhanced humans ethically, just as natural humans would have the same duty to the enhanced.

3.5 A Sentience Response

Sentience in contrast does not separate those with reason and those without reason. Sentience is based on a being's ability to feel. From a Utilitarian perspective if something can feel pleasure and/or feel pain then what is good is the promotion of

happiness, pleasure, and satisfaction and the reduction or avoidance of pain, suffering, and frustration. Writing in the same time period as Kant, Jeremy Bentham wrote in *An Introduction to the Principles of Morals and Legislation* that the question one should ask should not be "Can they reason? nor, Can they talk? but, Can they suffer?" (Bentham, 1970, p. 283) This places a greater duty on the ethical being to promote happiness and reduce suffering to any being that can feel. This, unlike Kant's reason, is a one-sided duty as you have a responsibility to a squirrel, but a squirrel does not have the same responsibility to you. You can avoid hurting the squirrel, the squirrel does not have the capacity to be bound by duty to your happiness. If the squirrel could affect your happiness and was aware and able to make that choice, then the squirrel would be bound.

Under the Utilitarian Sentience framework natural humans and enhanced humans have ethical responsibilities to each other insofar as they can affect happiness or suffering. In this case, like the above description of the squirrel, enhanced humans might have more responsibility to natural humans as their abilities may grant them more tools to promote happiness and reduce suffering. But just as there is no hard line between natural and enhanced, there is no hard separation of responsibility. Any population has a distribution of abilities and behaviors. Under this framework it doesn't matter if you're a human, a cyborg, an alien, or a squirrel. If you can promote happiness you are bound as there is a duty to increase happiness of all concerned.

3.6 A Deontological Response to the Question of Should We Enhance

In Deontological ethical approaches, such as that of Kant, only the motivation or intention of the action matter, not the consequence. And with all of the possible changes

outlined above some will come to fruition and other possible changes not mentioned above will. Following the deontological approach, it can be ethical to enhance humans if we act out of duty to what is right. There are three primary concerns I will examine: personal liberty, helping individuals, and promoting mankind. In Kant's framework we know what is right, and thus is our duty, by applying his formulations of the Categorical Imperative. In the first formulation, *act only in accordance with that maxim through which you can at the same time will that it become a universal law* (Kant, 1785, p. 421), we can look at our three concerns. First, personal liberty it is right and could be universalized to protect the individual's right to choose for themselves, and perhaps their offspring, what is best for them. Much of human progress is built from humans' drive for growth and improvement. We exercise, we educate, we build, and work hard. Protecting the right of an individual to better themselves with developing techniques is indeed ethical. Helping others too would pass the universalization maxim that we have a duty to edit or replace defective genes if we can. Promoting mankind, however, is not as clear cut. Modern economies have been built on the notion that growth and productivity are required to drive forward and that progress is the only avenue to bettering mankind, however a constant human enhancement simply pushes for motion and not necessarily for good in itself. We can also look at these concerns against Kant's second formulation, *so act that you use humanity, whether in your own person or in the person of any other, always at the same time as an end, never merely as a means*. (Kant, 1785, p. 429). Protecting for individual liberty and the choice of an individual to choose for themselves is ethical, however the motivations of the individual making the choice come in to question. If the enhancements are made to simply better oneself, similar to studying a

subject to better one's abilities or understanding, then the enhancement is ethical. If one's motivations are to be superior to or able to control others, then it is not moral. One must treat themselves and others both as ends in themselves. In helping others, such as selecting against a defective gene or providing a bionic eye to the blind, one treats the other as an end and is thus the moral thing to do. Finally, in promoting mankind, the second formulation would generally strike down this behavior as unethical since the goal is an arbitrary end goal of a better mankind, one which does not respect the individual, thus treating the individual as a means to an end.

Generally, from a deontological standpoint enhancing humans is indeed ethical assuming the motivations are right, regardless of how disastrous the consequences may or may not be.

3.7 A Consequential Response to the Question of Should We Enhance

From a Consequentialist perspective, such as that of Utilitarianism, we will look at the same question of whether or not it is ethical to enhance humans. Consequentialists are only concerned with the results of actions, not in the action or motivation which gets one there. Utilitarianism seeks to maximize the greatest amount of happiness for the greatest number of people, all things concerned. Much of the excitement around technologies that enhance humans is the promise of greater happiness and choice. Evolution maximizes on reproduction while human interference can maximize on other vectors such as happiness. Utilitarian theory is not concerned with personal liberty, in that whether you want to or not isn't irrelevant; if an action will result in the most happiness for the most concerned then you should perform that action. Helping others is

good and ethical as is reducing the suffering of people which leads to more net happiness. This is of course assuming that on balance there isn't more suffering for the many such as from spending disproportionate resources on the few. And in the case of promoting mankind Utilitarianism approves of and demands enhancing humanity on the assumption that the enhancements lead to greater happiness.

On the whole, Consequentialist theories would support enhancing humans, but with the caveat that it could be accomplished in an equitable way. This is where the challenge comes in. As with any technology or advancement access to it is not equal. Advances such as those above will be exorbitantly expensive, especially in the early days of available, safe technologies. Those with means will be able to purchase further advantage cementing their superior position. With the progression of time, gaps in means and ability will compound further driving a divide in inequities. Another area of inequity is in relative time; as with other technologies, time progresses and while performance and capability increase, relative costs decrease. The advances you could purchase for yourself or your child in 20 years will be vastly different than the advances you could purchase in 50 years. Even on a smaller, more personal scale imagine entering the baby design center to choose the best traits your money can buy for your first child. Then five years later, as technology has pushed forward and your career has grown where you are able to buy much better options on a second child. When viewing the consequences of enhancing humans on a broader time and population perspective the negatives might net out against the positives. For example, a constant ratcheting up of the norm means everyone is always chasing to achieve an elusive above average. This is where speculation of the future is difficult, if not impossible, to factor into Utilitarianism

calculations. Everyone could have more, but happiness may be significantly reduced overall.

4. INTERVENING YEARS

Perhaps more important than if we should enhance, is how we get from here to there. By considering some of the potential paths development might take we may be able to determine the likelihood of some future dilemmas.

This is, of course, not an exhaustive collection of paths or types of paths that will have significant impact on positions, attitudes, or options available in the future.

4.1 Speed of Transition

The speed of the transition to enhanced humans will matter. Will it be a quick transition or a slow transition over scores of years or centuries? Will it be discretely noticeable or like vaccinations and consumer technology iterative steps are made and while we are further removed from our ancestors it isn't noticed and we simply call it progress? One significant challenge with a quick transition is that socio-economic-cultural norms take time to evolve. Until recently changes have been very slow, for example the move from hunter-gatherer to agricultural societies, then from agricultural to industrial. In many places these changes evolve over generations and centuries. Recent developments have introduced changes at comparatively break-neck speed; for example, tech-booms in cities like Seattle and San Francisco have radically changed how people live and who can afford to remain in their homes. Bio-engineering changes could be far more extreme and possibly happen even faster. Where 25 years ago the norm was to not have a cell phone, now having access to communications and information is near ubiquitous in many parts of the world. Another aspect of the speed of transition will be that advances rarely, if ever, develop in smooth curves as is usually assumed of the

future. Technologies advance in fits and starts. Also, where one technology might take an early advantage another might in the end be the clear winner. Think of all of those who invested in Beta-max machines in the 80s only to have VHS, in many ways an inferior technology, become the market winner. One would hate to invest in the human enhancement equivalent of Beta-max.

4.2 Access to Enhancement Technologies

Access to enhancements across society will play into socio-economic differences, animosities, and further cementing advantages. Malcolm Gladwell's *Outliers* teaches us that early advantage and trajectory compounds over time and greatly impacts outcomes. As the divergence continues the disadvantaged has no opportunity or ability to catch up. It has been shown that a 1-point increase in IQ correlates to a 1% increase in earning potential (Radiolab, 2019). Positive feedback loops where benefit it reaped from benefit will likely continue to exacerbate itself as the beneficiaries seek to extend the benefit.

Access to enhancements around the world will raise some of the above issues on a global scale, and between nation-states. Some governments may promote and subsidize enhancements to build an existential advantage over other nations. Enhancements at the level of populations could hasten an actual divergence of species by resulting in multiple human species that can no longer successfully breed between individuals of different species. A small privileged group of enhanced would be unlikely to have enough enhancement similarities and genetic variety to dramatically effect evolution, but an entire population who enhances and inter-breeds could evolve a different line compared to another population of unenhanced or differently enhanced.

Without some kind of universal and subsidized access to enhancement technologies it would likely be unavoidable that a caste system of sorts would arise. The divisions between the castes would continue to diverge and any chance of moving between castes would continue to decrease. Populations would likely self-segregate further compounding the advantaged and disadvantaged. The further this proceeds the less possible it would be to undo. It is likely that only equal and universal upgrades could avoid this. Some societies may decide, for a time, no one gets enhancement, other societies may decide everyone gets enhancement, still others may decide to let the individual choose for themselves. These would result in greatly different societies both internally and relative to other societies.

4.3 Intention

Intention will matter but will be hard to contain. Perhaps one seeks to enhance as a therapy to correct a perceived disadvantage. Someone may look for an edge for themselves. Someone else may seek to provide the best future for their child, while someone else may look to secure the superiority of their lineage. Is peer pressure or societal norms pushing people towards enhancement? Perhaps competition is the driver where once one enhances everyone must enhance to compete. Or perhaps the intention is driven purely by capitalist companies who profit from enhancing humans. Of course, intention could also come from an outside force such as an authoritarian government or a religious creed. And anytime creating a superior class of people is discussed the possibility of eugenics is sure to follow.

Let's assume that human enhancements follow the same intention path as consumer technology. The goal of consumer technology companies from Apple to Google is to get you to use or purchase their product. They know people have choice so they must create technology that appeals to people or is perceived to be better. However, they also know that as they're successful they can become their own biggest competitor. How do you get someone to replace their perfectly good iPhone when a new version comes out? As technology matures upgrade cycles lengthen and new features tend to become less compelling. Microsoft Word has been adding new features since the 1980s, but after the late 90s when spelling and grammar checking were included, people found far fewer features worth upgrading for. Microsoft, and every other technology company, needed to find compelling reasons to upgrade. Instead of advantage for the buyer they became coercive for the locked-in. Planned obsolescence, where your old version was no longer practical or capable of keeping and you had to upgrade, for a cost, to continue using the service, became a strategy technology companies employ. This might be acceptable in the marketplace of products, but when capitalism is the motivation behind developing and providing human enhancements, technology companies could become the governing body through which enhancements are available and the arbiters of how much of your resources must be contributed to continue to function as a new human.

If the intention of enhancement is driven by military supremacy or athletic competition we'll reinforce and deepen us-versus-them biases where we're no longer attempting to improve ourselves for our sake, but to beat them. Not only will this result in an arms race for the parties involved we'll further distance ourselves from other groups not involved.

What if the intention of enhancement is to seek happiness? As philosophers know happiness is an elusive concept that can be hard to define, is not the same for everyone, and can change over time. It is often the case where one seeks happiness and occasionally the case where one gets exactly what one sought only to not be happy and as a result more disillusioned than before. Human enhancement will for the most part be a one-way street, more like a getting a tattoo and unlike changing your haircut, you can't revert to an unenhanced state or let it pass if you're not happy.

Intention can also play into the mental and emotional health of a population. Are you enhancing for vanity? What if the person or group you enhanced to impress doesn't notice? With your limited resources and limited canvas which enhancements do you choose and why? As Barry Schwartz described in *The Paradox of Choice* people already suffer anxiety on the grocery store's cereal aisle due to too many choices and the competing reasons to choose one over the other. Altering your body, your humanity, or your offspring will be a choice unlike any other choice for most people and the potential subsequent regret of that choice could be equally unlike any other regret. (Schwartz, 2004, p.75)

Those in power may fight enhancement wholesale as they may want their offspring to live as they have lived with the same advantage over others. They may stubbornly try to stop others from enhancing for this reason. Ironically, this as an example of the path we could take between now and an enhanced future; if those in power refuse enhancement and instead cling to advantages of the past, they could hinder their own offspring's position in future societies.

4.4 Treatment of the Enhanced

How people who are enhanced are treated will also play into ethical dilemmas to follow. If the enhanced humans are a minority who are demonized or subjugated, out of fear, moral objection, jealousy, etc., what happens when the tables are turned and this minority either overpowers through its enhanced capabilities or becomes the majority? Will enhanced human look sympathetically upon the lesser humans? Or will a new ethical framework arise where only enhanced humans are worth duty and rights and lesser humans become part of the ranks of animals?

History is replete with examples of multiple groups of people living in the same area with some superficial difference between them where one group takes control over the other. Power shifts and times change. How the group A treats group B will have a significant impact on how group B treats group A if the dominant control changes.

4.5 Types of Enhancement Technologies

In this paper I've discussed several directions enhancements could take for example after-market bionic parts, disease immunity, increased intelligence, etc. While not all enhancement directions will advance to superhuman levels they also will not progress at the same rate. The enhancement vectors that drive the furthest the fastest will have an impact on the resulting species. One enhancement not discussed above is extreme extended life span. If an enhancement were developed where one could pick offspring or undergo treatments that doubled or more a typical human lifespan to say two hundred years old, the resulting society and species would be vastly different than if the primary enhancement was to double a person's physical strength. And if long life

advancements were coupled with extreme lengthening of fertility people could continue to reproduce long into their late 100s.

Another feature of the type of enhancement that would have lasting impact is that some enhancements enable a much steeper inflection curve. For example, the primary limiter in technohuman advancement is the interface between the physical technology and the human systems. Once a rudimentary interface is established the technology could take off at exponential speeds. It would only be limited by the speed and fidelity of the interface. Transhuman advancements have natural limiting factors. While there are some techniques to short-circuit parts of the typical fertilization, gustation, maturing curve, genetic engineering is still limited by the growth cycles of living things. So, while you could have a family line increase intelligence by some factor every generation you still have to wait for those generations to mature and reproduce. And as mentioned in the previous paragraph of this section, what if long life was a desired enhancement? Would people choose to delay offspring or have a set every twenty or thirty years.

Another impact from the type of enhancements pursued is the visibility of enhancements. Your interactions with a person with bionic legs or who is nine feet tall might be different than your interactions with no discernible difference. You clearly wouldn't challenge them to a running race or basketball. However, someone could have an enhancement far more impactful that cannot be detected by others, even through extensive testing. Imagine playing the childhood game of memory, where you flip over cards to create matches and need to remember what's been turned over before, with someone born with or enhanced with perfect photographic memory.

4.6 Nature's Response

Even if all the intentions, access, and attitudes are peaceable one cannot predict how nature herself will react to enhancements. Nature has proven time and again to be resourceful and not to underestimated. For example, some frogs have been shown to change their own sex in relation to the environment or to better balance a population. (Main, 2019) We may enhance in ways we believe to be beneficial and nature could render those advantages null or evolve other advantages.

5. ETHICAL DILEMMAS - A TOPOLOGY

When we reach this potential and probable future what ethical dilemmas might exist? This section will attempt to establish a topology of potential ethical dilemmas. It will, of course, not be exhaustive and many, perhaps all, dilemmas outlined below might not come to pass. What is important is that we recognize that fundamentally changing a specimen of a species, a multitude of individuals, or even an entire species will be fraught with challenges for both sides of the enhancement divide.

5.1 Unintended Uses of Developed Technologies

Nathaniel Comfort of Johns Hopkins University, observes, "The IQ test was invented in order to identify students who needed extra help in school. But within about a decade, it was being used as a tool to weed out the so-called 'feebleminded', not just from school but from the gene pool." (The Economist, 2019) From studies in the 1970s and 1980s on leaded gasoline it was shown that a one-point increase in IQ was equivalent to a one percent increase in earning potential. (Radiolab, 2019). This tie between IQ and earning potential shows that if a person could be enhanced or selected for higher intelligence there is a direct correlation to an economic advantage. Dr Hsu, co-founder of Genomic Prediction, in 2014 predicted that reproductive technologies would soon be used to select for more intelligent offspring. He estimated that an IQ gain of between 10 and 15 points would be possible if couples were allowed to choose between ten embryos. (Wilson, 2018). Technologies initially developed to therapeutically help the disadvantaged once developed cannot control how people or societies will employ them.

Therapies to rehabilitate and strengthen the injured or disabled could be used by militaries to create super-soldiers. Of course, the opposite is also true. Many of our modern technologies, consumer and industrial, have resulted from initial theoretical and applied research funded by DARPA, the Defense Advanced Research Projects Agency, whose purpose is to advance technologies specifically for military use.

5.2 Moral Duty

In relating ethical responsibilities between humans and enhanced humans, does one "species" owe the other more or less duty? As enhanced humans gain greater advantage over natural humans do they begin to subjugate this lesser species? As the division between natural humans and enhanced humans increases will the division between natural humans and non-human animals seem less important?

Do religions reconcile with, evolve, or get created to deal with the current moral accusation of "playing God" when we may be fundamentally changing what it is to be human? Some religions believe man is made in the image of God. If humans become enhanced are they superior to God? If they enhance does God also enhance? Were humans imperfect before and our enhancement was God's plan which we are fulfilling? Religions will surely need to grapple with the meaning of a species that enhances itself to an ideal it chose for itself.

5.3 People or Products

Will we suffer the same predicament of consumer technology with upgrade cycles and planned obsolescence? Are there top tier enhancements and cheap knock offs? Do

you buy the new Apple Bionic Eye (the iEye) or wait until after the big marketing event where they're sure to announce the newest version? What happens with intra-family disparities? When your first child was "designed" she got version 3 (the best enhancement available), but a few years later when "planning" your next child version 5 is available. Do you always buy the best you can afford? Is there a moral obligation to do so? Is this another source for perpetual debt? Much like student debt incurred with the promise of a greater future, will a parent, out of obligation or guilt, take out a 30 year "mortgage" to buy their babies the best tech has to offer?

5.4 A Divide Without a Line

Where is the line between therapy vs. enhancement? Is "fixing" dwarfism therapy whereas modifying short genes to be tall genes an enhancement? (Is there anything "wrong" with being short to start with?) Is it an enhancement if you're only increasing some capability to what some portion of people have naturally? Which portion need to have it before it's not ok, two standard deviations above the mean? Can you detect who has been enhanced as opposed to just getting lucky and being born naturally intelligent? If we can, should we?

Does the variety and availability of enhancement lead humanity to converge on a homogeneity where we max out this body's potential or do we all become divergent snowflakes choosing our own expression and mix of enhancements.

5.5 Feedback Loop

Standards of the ideal change over time and vary by society. What if we all run out and enhance to today's ideal? When everyone is ideal is the oddball the envied? What happens when one society values one thing and another something else? Think of Sparta and Athens, two separate, but contemporary societies in ancient Greece that would enhance significantly different traits; one loyalty and strength, the other reasoning and collaboration. This could lead to a potential never ending feedback loop of what is good and what is better but driving disparate societies further apart.

Will we physically reinforce stereotypes and societal roles? Will the laborer choose for his son strength and stamina? Would a slave owner demand strength, stamina, and submissiveness for a future strong and docile workforce? Might an aristocrat of old choose for his daughter traits like beauty and conscientiousness while for his son a sharp wit and jovial nature?

As what is normal shifts upward, to be competitive or even normal, people will be forced into enhancement. Normal as defined by the average set of traits, characteristics, or capabilities for a species will continue to shift as the masses engage in enhancement techniques. Once started could this ever be stopped? Or would there be a never ending ratcheting up of what is expected.

What happens to those who choose to not enhance? Will they self-segregate into enclaves and become the new Amish?

5.6 Human to Human Relationships and Communication

      In technology, like in humanity, advances in processing power, memory, and communication drive divisions and create run-away growth curves in which those left behind cannot hope to participate. Elon Musk gives an example for communication in Artificial Intelligence which I believe also applies to technohumans. A normal human communicates at byte, or perhaps hundreds of bytes, per second. Whereas computer communication is currently at gigabits or terabits per second. (BBC News, 2019) Communication presumably will continue to increase to perhaps petabits or exobits per second. If two technohumans could communicate at a terabit per second, which is about 1/15th of the Library of Congress every second, would communicating with a natural human be like talking to a tree? With communication speeds such as this we would no longer be limited to communicate in simple words and concepts, we could transmit entire experiences, complete conceptual models, or even belief systems. Natural humans would by contrast seem to take eons to communicate the most simple messages.

      If we could share or purchase a complete memory or experience is it our memory or experience? Other than the potential physical scars what would separate the person who originally captured the experience from the one who simply received it. Could an entire tourism industry evolve where you define the experience you'd like to have, someone else risks their life and limb to have it, then you simply upload and reminisce? Does this alter the entire concept of an individual's identity? Do we lose individual identity?

      In a world with continuously connected biotechnology will we further erode individual privacy? If every heartbeat, every movement, every thought and memory can

be stored and available for inspection, aggregation, and interrogation do we finally become the simple cogs in a great machine without a self? Where is the line between personal liberty and the greater good of society? Do we protect privacy until there's a great pandemic then we pull everyone's perfect location data to let the algorithms plot the best course of action to protect the population?

5.6 Nature

Ultimately, there may be a loss of natural diversity. Diversity, through trial and error, is how natural evolution works. As a species we evolve because some anomalies lead to success and others to failure. Who will choose to incorporate anomalies that are unlikely to, but have the potential to help the species overall? But then again, as access to choice increases, diversity of choice sometime follows, not necessarily for the better. Will everyone seek to be the same thing or will more people want something different as choice and variety become available?

If systems of eugenics are not forced on societies does a liberal eugenics develop through individual choice? The free hand of the market would encourage each to choose the best options for themselves or their offspring. Variety stems from differences in ability, experience, and opportunity. If ability and experience can be purchased does variety approach zero?

6. CONCLUSION

While some people might object to enhancing humans as playing God, or at least playing evolutionary architects, there are ethical benefits to improving the lives, health, and the abilities of people. There are fallacies that make a discussion of enhancing humans difficult. Some might argue it is a slippery slope and that while we start with minor investigations or treatments we could wreck the whole project of humanity. Others might argue that if nature hasn't provided us with the abilities then we shouldn't try to develop them ourselves. This is an Is-Ought fallacy. Just because it is, doesn't mean it is how it ought to be. Nature has also provided disease and disability. And finally, there is the challenge of not being able to account for future externalities. If one foresees gross inequality and societal infighting then the consequences prevent us from action, but if one foresees a genetic modification eliminating a significant aliment such as dementia then the consequences would require our action.

Futurists and prognosticators often fail to predict the future because they cannot see beyond the time they inhabit. Projections tend to be simple extensions of today. Everything is faster, stronger, better, but nothing is different. In *Star Wars* pilots battle in fighter jets, because that was the natural extension of technology when it was conceived. The military is already transitioning to pilot-less drones. Why would individuals need to pilot a space jet of the future? Michael Bess, in *Our Grandchildren Redesigned: Life in the Bioengineered Society of the near Future* describes this limited ability of futurists to see beyond their current time by pointing out that in Star Trek and in the Jetsons we have fancy gadgets but the humans are still the humans of today, mostly unenhanced and fumbling through contemporary human dramas. (Bess, 2016, pp. 2-12) Enhancements

are limited to extensions of modern-day enhancements and therapies such as a blind character in *Star Trek: Next Generation*, Geordi, who uses a visor to compensate for his lack of sight. Past agrarian societies might have thought the future would bring ample food and easy harvest, but they would not have predicted the industrial revolution. Early industrialists may have predicted advanced manufacturing to produce goods more efficiently, but they would not have predicted the technological revolution where everyone would have a supercomputer in their pocket capable of instant communication and access to the most up to date information. It is the unknown, unforeseeable advances that can have the greatest impact on the trajectory of society and humanity.

Some will dismiss this as science fiction thinking they would never undergo enhancement and can't see other people doing it. Some may argue that a bionic interface to external networks or memory banks simply would never feel natural. They are forgetting humans are remarkably adaptable and as Heidegger describes, external equipment quickly becomes transparent equipment. One does not think about the pen as they use it to write a letter. They simply think of the expression the want to share with the recipient and the hand and pen know what to do. (Wheeler, 2011)

Prohibition of technology will not prevent the apocalypse, however not seeing the potential benefits and risks of technologies that could in fact change the course of our species is ignoring history and not preparing for the future. Technohumans and Transhumans will not arrive overnight. Over generations the edge of progress will push forward and the advances and potential risks will be revealed. It is part naïveté and part hubris to not consider the ethical implications and plan for the future.

We must however be careful as we may just reap what we sow. Enhancing humanity may just be the next "evolution" of the hedonic treadmill. We are perpetually chasing an ideal and working for advantages above others which might align with current growth and innovation dogma where everything must always seek to be better, faster, and smarter. It might also be the case that evolving the species is orthogonal to happiness.

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