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Jewish and Western Ethical Perspectives on Emerging Technologies

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Thesis Statement

The rapid development of modern technology has brought with it a host of tough ethical dilemmas. I hope to explore how both our age-old Jewish values and our storied Western knowledge impact our approach to these new ideas and questions. What new moral quandaries does the world of tomorrow introduce, and what does the ancient wisdom we have to draw from have to say about them?

Abstract

My thesis seeks to investigate this topic by focusing on a two particular issues, each explored in an independent essay:

1. *Self-Driving Cars and Programmable Ethics:*

By now, almost everyone has heard about the famous Trolley Problem and its applications to the development of autonomous vehicles. This essay takes this discussion a step further, analyzing the Jewish and Western notions of ethical systems, and if they can, in fact, be “programmed.”

2. *Na’aseh Adam B’Tzalmeinu K’Dmuteinu: Humanity in the Era of Transhumanism:*

Over the last few centuries alone, the leaps and bounds made by medicine and technology would make today’s quality of life beyond conception for someone born just a few hundred years ago. But as the technology grows even smarter, and people grow more dependent on it, where do we draw the line between humanity’s usage of technology to improve their lives and becoming so entangled with artificial improvements that their humanity is lost altogether? This essay teases out what a possible Jewish response might be to this very new dilemma.

Self-Driving Cars and Programmable Ethics

Introduction

For Orthodox Jews interested in ethical implementation of technology, Mois Navon is something of a cult hero. A founding engineer of Mobileye, a small Israeli tech startup on the global forefront of autonomous vehicle technology, the “secular surfer” turned “Rabbi of Mobileye” left his position after Intel acquired the company for more than fifteen billion dollars (“Intel”). Navon took the financial opportunity afforded by the lucrative takeover to pursue his passion for Jewish learning and educate the broader Jewish community about the interface between age-old wisdom and modern progress (Simmons).

Among his many endeavors, Navon traveled around the world delivering a lecture exploring the ethical dilemmas posed by the very same technology he spent years advancing. This talk was titled, “The Trolley Problem Just Got Digital: Ethical Dilemmas in Programming Autonomous Vehicles.” The “Trolley Problem,” a famous thought experiment introduced by English philosopher Phillipa Foot in the 1967, aims to highlight the differences between deontological and consequentialist ethics (to be discussed in greater depth later in this essay) by having the participant imagine the following scenario:

There is a runaway trolley barreling down the railway tracks. Ahead, on the tracks, there are five people tied up and unable to move. The trolley is headed straight for them. You are standing some distance off in the train yard, next to a lever. If you pull this lever, the trolley will switch to a different set of tracks. However, you notice that there is one person on the side track. You have two (and only two) options:

Do nothing, in which case the trolley will kill the five people on the main track.

Pull the lever, diverting the trolley onto the side track where it will kill one person.

Which is the more ethical option? Or, more simply: What is the right thing to do?

In Navon's lecture, he highlights a frightening revelation. He observes, "the advent of the autonomous vehicle has just made the Trolley Problem very real". From this obvious, yet ground-breaking, realization stems a critically important question, one which serves as the basis for Navon's lecture: "Autonomous vehicles will be programmed to make life-and-death decisions ... how should they be programmed?" (2).

Navon proceeds to analyze in depth different versions of the Trolley Problem, supplementing the audience's intuitive ethical sensibilities (possibly inculcated by Western culture and its values) with several Talmudic and rabbinic sources to flesh out a Jewish perspective on the Trolley Problem. While the particulars of Navon's analysis are fascinating, my interest in this essay lies not in his findings or conclusions, but in the exercise itself. While self-driving cars are particularly germane to Navon's expertise, they are only one of countless automated decision-making systems made possible by recent advancements in computer science, particularly in the areas of machine learning and artificial intelligence. More and more, computers are being tasked with making decisions ranging from approving home-loan applications to determining the priority of transplant recipients among terminally ill patients. Many cases may not present the same immediacy as the split-second decision required by a digital driver, but so many choices with lasting effects on people's lives are

being left in the hands of virtual agents. Facing an onslaught of new decision-making systems, we must evaluate what our ethical duties are vis-à-vis these systems. Navon sought to introduce Jewish ethics into the autonomous decision-making programmed into driverless cars. But before we seek to inculcate ethical considerations into specific systems, we must ask ourselves to what extent can ethics – Jewish or otherwise – truly be “programmed?”

Normative Ethics

In thinking about ethics and decision-making, we must turn to the branch of moral philosophy known as normative ethics. Formally defined, “[n]ormative ethics is the study of ethical behaviour, and is the branch of philosophical ethics that investigates the questions that arise regarding how one ought to act, in a moral sense” (“Normative”). Theories of normative ethics seek to define principles for determining the rightness or wrongness of a particular action, thus creating a system for weighing the necessary moral considerations when faced with an ethical decision. In the Western tradition, there are three “mainstream” theories of normative ethics: consequentialism, deontology, and virtue ethics. A brief discussion of each should allow us to evaluate whether any lend themselves to being programmed into an automated decision-making system.

Consequentialism

Consequentialism, as its name suggests, evaluates an action purely on the basis of its consequences. Broadly speaking, this means that a “good decision” is one whose resulting consequences maximize some measure of “good” (Sinnott-Armstrong). Obviously, this demands greater qualification.

First and foremost, the notion of “good” that we are seeking to maximize serves as the most salient difference between different versions of consequentialist ethical systems.

Hedonistic consequentialism assumes that personal pleasure and satisfaction are the ultimate good, and every action should be in pursuit of that aim. Utilitarianism, developed by 18th century British philosopher Jeremy Bentham, advocates for “the greatest good for the greatest number” – in other words, individual actions should seek to maximize the sum total of human happiness (Driver). While many quibble over whether Bentham’s definition of happiness is qualitatively distinct from hedonistic pleasure, there’s no question that the emphasis on maximizing the collective experience over the personal dramatically impacts the ensuing moral calculus.

The second area of consequentialism which begs for greater clarity is the scope of consequences under consideration. One tension lies in actual versus expected consequences. Human beings can’t tell the future; thus, when approaching a moral choice, it would be unreasonable to demand anything but the expected consequences to be factored into a decision. However, the question remains of whether the goodness of an action can be evaluated *ex post facto* on the merits of its actual consequences. Even this question can be further bifurcated, as such a retrospective assessment can either be an objective assessment of the *action* by examining its consequences, or perhaps an evaluative judgment of the *actor* and her ability to effectively consider possible consequences. The next ambiguity lies in determining the spatial and temporal limits of the consequences being considered – if such limits exist. The question can be posed as such: for every choice I make, am I seeking to maximize the sum total of good on a global scale, factoring in all possible consequences between now and the end of time? This seems absurd, but in rejecting it, defining exactly where to draw the line becomes a very thorny exercise.

Assuming an individual or group can define the particular aim and scope of their consequentialist system, consequentialism seems like an ethical framework which can be reasonably integrated into the code for an autonomous decision-maker. The very idea of consequentialism dovetails almost perfectly with a well-known convention in computer science: costs and payoffs. Most advanced decision-making programs rely on some form of machine learning or artificial intelligence (subtly different, but closely related fields). Many such programs rely on a cost function to determine a decision or policy for the system to adopt. A cost function is merely a mathematical formula which takes a particular circumstance (encoded in some numeric form) as input, and outputs a numeric cost. A higher cost is understood as a negative assessment of the input, whereas a lower cost indicates a positive outcome. When making a policy, the system will seek to *minimize the cost function* – in other words, find the scenario which, when plugged into the cost function, yields the lowest cost. Other systems use an analogous strategy: rather than evaluate an input in terms of its negative cost, a situation can be simulated to determine the likely possible future outcomes. If the simulated outcomes produce overall desirable results, the initial scenario is given a payoff score. If the results are undesirable, there is no payoff. The system then makes a policy by *maximizing the payoff*, or determining the scenario which seems to maximize the potential for positive outcomes. Provided the programmer had a clear sense of the particular “good” she’d like to see maximized, and could define a clear boundaries for encoding and evaluating the consequences of potential decisions, consequentialist ethical sensibilities could very easily be integrated into decision-making architectures by simply adding a cost function or payoff into the system’s protocols.

Deontology

Deontology is often described as a foil to consequentialism; if in consequentialism, the ends totally justify the means – meaning an action is judged solely by the resulting consequences – in deontology, the ends make no difference in evaluating the means. Deontology, derived from the Greek for “science of duty,” is an ethical system which establishes a set of moral norms whereby all choices can be categorized as “permitted” or “prohibited” by their associated action alone (Alexander and Moore). To illustrate this, we return to our abovementioned Trolley Dilemma. A consequentialist would consider the consequences of remaining idle (thereby letting the trolley kill the five people trapped on the main track) versus pulling the lever to divert the trolley (thus killing the one person trapped on the side track). Since the chief concern is maximizing lives saved, the consequentialist would pull the lever. However, we can reasonably assume that “don’t kill people” is a fairly universal moral norm. As such, for a deontologist, pulling the lever (thus actively participating in killing the lone individual trapped on the side track) would be a “prohibited action.” Even though standing idly by results in greater loss of life, by definition, inaction isn’t subject to a designation reserved for concrete actions. For the deontologist, one’s obligation to obey the prescribed moral norms supersedes all other considerations.

What these moral norms are and how they achieve such overwhelming weight was formulated by 18th century German philosopher Immanuel Kant. In his treatise, *Fundamental Principles of the Metaphysics of Morals*, he defines the basis of moral obligation in terms of the categorical imperative: “Act only according to that maxim whereby you can, at the same time, will that it should become a universal law” (Sec. 2). In other words, an action must be consistent with some higher principle which could be construed as a universal moral norm. Kant posits that a hypothetical imperative (declaring an action necessary strictly because it

enables a necessary end) relies far too heavily on subjective considerations, and thus can't possibly be relied on as the building blocks for moral judgment. Only a system based on the categorical imperative, which demands absolute, unconditional adherence in any-and-all circumstances, truly reflect universal morality.

The particular do's and don'ts of a given deontological system may differ depending on the particular flavor of deontology, but if one could clearly delineate the set of permitted and prohibited actions, it would seem fairly simple to integrate into an autonomous decision-making system. In a way, computer programming might be the quintessential deontological system. Computer programs are definitionally proscriptive – meaning whatever the code says to execute is what the program will deterministically execute, no more and no less. Even if the end result of certain programs (particularly those programmed for machine learning) may not be deterministic, that is the result of the program reacting to the particular input it has been given; nevertheless, the program's behavior insofar as how it processes the input provided is completely predetermined. The program has no concern for the outcome of an action; all it will do is execute the command as it has been defined. As such, if we can include the set of clearly defined deontological norms for the decision-making architecture to consult before making a choice, such a system may be able to obey deontological ethics even more loyally than a human agent.

Virtue Ethics

The third mainstream theory in normative ethics, virtue ethics, is fundamentally different from the previous two. Consequentialism and deontology provide frameworks for determining ethical *behavior*; within the former, an ethical action is one that maximizes some notion of 'good' being achieved, whereas in the latter, an ethical choice is one that strictly

obeys a set of moral norms. Virtue ethics, however, is a framework for defining ethical *character*. In other words, virtue ethics is less concerned with making ‘good’ decisions and is focused instead on being a ‘good’ person. The following example illustrates the subtle differences between approaches:

Suppose it is obvious that someone in need should be helped. A utilitarian will point to the fact that the consequences of doing so will maximize well-being, a deontologist to the fact that, in doing so the agent will be acting in accordance with a moral rule such as “Do unto others as you would be done by” and a virtue ethicist to the fact that helping the person would be charitable or benevolent. (Hursthouse and Pettigrove)

A ‘virtue’ in this context describes an excellent trait of moral character deeply entrenched in an individual. Because the virtue makes up such a fundamental aspect of their persona, we expect such a trait to have a profound impact their decision-making considerations and overall ethical calculus.

However, with this comes the understanding that virtues do not exist in a vacuum. It is critical to recognize that a seemingly virtuous action does not necessarily prove that the motivations of the actor were similarly virtuous. Analogously, in taking several different virtues into account, an action resulting from a complex consideration of true virtues may seem superficially corrupt. For example:

An honest person cannot be identified simply as one who, for example, practices honest dealing and does not cheat. If such actions are done merely because the agent thinks that honesty is the best policy, or because they fear

being caught out, rather than through recognising “To do otherwise would be dishonest” as the relevant reason, they are not the actions of an honest person. An honest person cannot be identified simply as one who, for example, tells the truth because it *is* the truth, for one can have the virtue of honesty without being tactless or indiscreet. The honest person recognises “That would be a lie” as a strong (though perhaps not overriding) reason for not making certain statements in certain circumstances, and gives due, but not overriding, weight to “That would be the truth” as a reason for making them. (Hursthouse and Pettigrove)

It is precisely this nuanced relationship between virtue and action which demands the presence of an additional quality besides virtue itself: practical wisdom. Called *phronesis* by Aristotle, perhaps the original virtue-ethicist, practical wisdom is defined as the common sense needed to navigate the complex (and often contradictory) motivations spurred by different virtues in order to make moral decisions which are in fact virtuous, not only in intention, but in effect. While the one-two punch of virtue and practical wisdom may vaguely resemble a hybrid between deontology and consequentialism (the inner virtue reflecting some universal moral norm, and the practical wisdom attempting to maximize the greater good achieved), ultimately the emphasis is on the personal qualities developed by the agents themselves, rather than characterizations of their actions. This difference is subtle, but crucially important.

This unique nature of virtue ethics makes it impossible to conceive of a way to design an autonomous decision-maker that incorporates virtue ethics into its decision making. At this point in time, even the most advanced artificial intelligence is limited to

domain-specific excellence. In other words, even if the AI has achieved mastery over an incredibly complex task (such as driving a car), the *only* thing it's good at is driving a car. If you were to ask the same AI to predict the weather later that day, or proofread an essay for grammatical errors, it would likely perform terribly – even though far less advanced programs have proven successful in those very areas. A program capable of broad, general purpose intelligence (i.e. Artificial General Intelligence) has not yet been developed, which means there is not yet any technology which truly resembles the human mind in its totality. Abstract, nuanced concepts like ‘values’ or ‘virtues’ are intuitively understood by the human mind in all of their depth and richness, but such subtlety and complexity is completely lost on a domain-specific decision-making program. While a program can easily factor in new rules reflecting programmatically-defined moral norms, or optimize for actions which maximize a certain goal state, trying to teach a program to “be virtuous” and act accordingly is beyond our reach at the given moment.

Normative Ethics in Jewish Thought

Now that we've spent some time analyzing the different forms of normative ethics as understood by the Western tradition, let's investigate the degree to which these ideas find expression in Jewish thought. Judaism offers a rich philosophical tradition, and many great thinkers across the centuries have put forward their interpretation of Jewish ethics. In his essay “Consequentialism, Deontologism, and the Case of Sheva ben Bikhri,” Michael J. Harris asserts that both consequentialist and deontological models can be found in traditional Jewish sources (69). One example he provides in favor of consequentialism is the Talmudic statement that “the entire Torah is for the purpose of the ways of peace, as it is written: ‘Its ways are ways of pleasantness and all its path are peace’” (qtd. in Harris 70). Harris writes:

This dictum posits a general societal good, “the ways of peace,” as the sole ultimate objective of the Torah, which presumably means the normative system of the *mitzvot*. General social benefits – such as the utilitarian's “greatest happiness for the greatest number” – are typical consequentialist goals. (70)

However, Harris brings a different passage, this time from the Mishna, consistent with deontology. He cites the ruling that someone guilty of accidental manslaughter who is exiled to a city of refuge is never allowed to leave, “even if the Jewish nation needs him; even the head of Israel’s army, such as Yo'av son of Zeruyah, never leaves” (qtd. in Harris 71). Harris comments, “[t]his law seems, at least *prima facie*, to be motivated by deontological considerations – even if a better outcome will result by suspending the usual laws of exile, the unintentional killer is nevertheless not released” (71).

This tension is present in many other areas of Jewish law and thought. Take, for example, the principle of *hatzalat nefashot*, the idea that one may violate a Torah command in order to prevent loss of life. This idea seems to swing toward some form of utilitarian ethics: I should do *mitzvot* so long as they contribute to some overall good, but not when they present fatally deleterious consequences. However, there is an important caveat to this principle: if you are in a situation where you must choose between committing one of the three cardinal sins (idolatry, adultery, or murder), the law is *yehareig v'al ya'avor* – you must accept death rather than transgress such a prohibition. This would appear as a paradigm for deontology, as one’s obligation to abstain from those three sins trumps all other considerations – even when your own life is at stake.

The debate may even manifest itself in sectarian debates throughout Jewish history. Among the more mystically-oriented Jewish communities, many subscribe to the kabbalistic idea that the physical act of performing God's commandments brings God's holy presence into our mundane world. In this tradition, a Jew's ultimate goal is to sanctify her existence by doing as many commandments as possible, thus maximizing God's presence in the world. This seems to echo consequentialist theory, with maximizing God's presence serving as the overarching motivation for action. By contrast, the strains of 'rational' Jewish thought typically view the commandments in a much more deontological sense; we are obligated to act in accordance with what the commandments have outlined as prohibited and permitted, without any broader meta-principle serving to motivate decision-making.

There is even a place for virtue ethics in the Jewish philosophical canon. Maimonides, true to his strong Aristotelian influences, seems to argue in the introduction his commentary on tractate *Pirkei Avot* (known as *Shemonah Perakim*) and elsewhere that Jewish law serves as the necessary framework to inculcate key character traits and virtues (Seeskin). While he stops short of framing all ethical decisions in terms of the virtues of the decision makers, his emphasis on the complex personality of each individual and the intrinsic need to develop virtue would suggest that elements of Aristotle's virtue ethics impacted Maimonides's conception of ethics.

Jewish Normativity

While it is interesting to see how the ideas of Western normative ethics find parallels in different areas of Jewish thought, the comparisons have a fundamental limitation which renders the exercise somewhat pointless. As we mentioned earlier, the goal of normative ethical theories is to define systematic approaches to decision making which ensure moral

behavior. However, Jews are already bound to a set of normative expectations which inform almost all areas of decision-making: *Halakha*, or Jewish law. While much ink has been spilled to demonstrate that Jewish law is either consistent with some form of universal morality, or that Jewish law in fact defines a unique moral standard, ultimately a Jew is bound to act *halakhically*, and not *ethically*. To be clear, this does not mean Jews can behave *unethically*; rather that they are bound first and foremost by Jewish law, which we believe to be ethical, but ultimately the extent of our duty is fidelity to the law.

This dramatically shifts our perspective toward the programming of autonomous decision-making systems. Previously, we explored whether we could impart the mechanics of an ethical system to a computer program in the hopes of the program behaving ethically, thus satisfying the ethical responsibility of its creator. However, now the responsibility is cast in terms of Jewish law rather than normative ethics. Remarkably, despite the unprecedented nature of autonomous agents and AI, there exists a paradigm in Jewish law for the liability of property possessing limited intelligence and capable of independent decision making. There is an area of Jewish tort law which deals with damages done by one's livestock. This domain is divided into three subcategories. The first is damage done by the animal's violent and/or unexpected behavior, such as an ox goring a neighbor's animal. The second is damage done in a way such that the animal or owner derive material benefit, such as an ox grazing on a neighbor's produce. The third is damage done by the animal when it's behaving completely normally, such as an ox trampling the wares of a merchant. All three come with their own strictures and exemptions, as well as different preventative measures demanded of the owner. One can easily make the claim that since livestock are sentient beings, while we hope we can harness their energies and abilities for our own productive use, any damaged caused by them

is beyond our control and thus beyond our sphere of moral responsibility. However, these laws are teaching us that there is a standard of liability we must assume for our property. While we can't completely control every action or outcome, we must strive to meet the threshold for necessary precaution where we can and be prepared to face the repercussions when we can't. Rather than attempt to instill some form of ethical sensibility into the consciousness of our cows and sheep, Judaism recognizes the fundamental difference between humans and non-humans. Instead, it enacts policies which safeguard society to the extent that it can and defines the degrees of personal responsibility for the situations when these safeguards inevitably fall short.

This is the perspective I think Jewish thought contributes to our question of programmable ethics. In attempting to program computers to evaluate actions through an ethical lens, we are making an implicit and grossly inaccurate analogy between human and robotic decision-making. Furthermore, doing so would deflect ethical responsibility of a given outcome from the programmer to the program. Instead, the laws of livestock damage – often considered arcane in our post-agricultural society – offer a totally different outlook on this issue. A legalistic policy-driven approach seems better suited to accomplish our goals; instead of trying to instruct the program on how to make ethical choices, we should ensure that the necessary steps are taken to influence the best possible outcome (“best” defined by whatever operative values are being considered). But if we were to stop there, this would hardly be different than soft consequentialism. What's most important about this paradigm is the clearly defined liability of the programmer. The most ethical design of such systems should actually involve elements of both consequentialism and deontology, including provisions to avoid potentially harmful outcomes, and strict rules to prevent it from taking

wrongful actions. But it is crucial to recognize that these are merely preventative measures; the true morality lies in the programmer's acceptance of responsibility should their creations run afoul of their intended use. These autonomous decision-making systems have the power to affect great positive change in the world, and we should not shy away from progress in their development. However, when these systems make decisions with unexpectedly negative repercussions – which they inevitably will – the most critical ethical system to have in place is one in which the programmer rises to assume the burden of responsibility for those consequences.

Na'aseh Adam B'Tzalmeinu K'Dmuteinu: Humanity in the Era of Transhumanism

In the history of mankind, progress typically has not been something which demanded justification. To endure the natural elements, humanity was forced to engineer different means to clothe, shelter, and feed themselves. To transmit information running the gamut from basic communication to abstract religious ideas, man needed to develop language, writing, and eventually printing. Human creativity and progress go hand in hand because such ingenuity was critical for our species survival. Humans are not the biggest, nor the strongest, nor the fastest creatures in the animal kingdom; yet we occupy the top of the food chain because we are the smartest, and use our intelligence to continuously move our species forward. Progress needed no defense simply because our very existence depended on it.

Even when humanity reached a point where further progress was no longer necessary from a strictly survivalist perspective, progress marched on. While there have always been religious ascetics and traditionalists who eschew the benefits of modern comforts in favor of the bare necessities (take the Amish as a modern-day example), mankind as a whole has always wholeheartedly embraced any and all developments which could be broadly characterized by how they improve the experience of human life.

However, recently progress has recently reached what might be a fundamental turning point. Humanity's pursuit of progress has made such dramatic headway that the next steps may surpass merely improving human life and be aimed toward improving humans themselves. At the forefront of these developments is the doctrine of transhumanism. The ever-forward march of human progress makes the consequences of these developments a very real and imminent concern for us, forcing us to seriously consider the goals and

implications of such a direction before we allow ourselves to step into a future we may live to regret.

Transhumanism is an ideological movement focused on technology and human advancement. Max More, a contemporary thinker and early contributor to the philosophy of transhumanism, defines the movement as follows:

“Transhumanism” is a blanket term given to the school of thought that refuses to accept traditional human limitations such as death, disease and other biological frailties. Transhumans are typically interested in a variety of futurist topics, including space migration, mind uploading and cryonic suspension. Transhumans are also extremely interested in more immediate subjects such as bio- and nano-technology, computers and neurology.

Transhumans deplore the standard paradigms that attempt to render our world comfortable at the sake of human fulfilment. (qtd. in McNamee and Edwards)

In other words, transhumanists believe the time has come to take the fate of human evolution into our own hands. They assert that scientific progress has finally reached a tipping point where we have the power to improve ourselves as a species, and thus have a moral obligation to do so. In their efforts to transcend humanity, they advocate for developing techniques like genetic engineering (NCI Staff), stem cell manipulation, nanotech (Ito) and cloning to fight disease and aging, or technology such as brain-computer interfaces and pharmaceutical interventions to improve cognitive and physiological ability.

While the aggressively futurist mantra of transhumanism and the seemingly unnatural technologies associated with it strike many as unsettling, formulating a principled objection

to it is not so simple. For millennia, the overwhelming majority of society wholeheartedly embraced any and all scientific discoveries which could improve the quality or length of human life. Even if certain radically novel technologies took time to be embraced and accepted, ultimately science which was proven to cure disease or relieve suffering was considered yet another leap forward in man's constant search for improvement.

Many people express horror and disgust when discussing transhumanist technologies, characterizing them as abhorrent and inhumane because there's something about that "just doesn't seem right." We'll call this response, "the yuck factor," a common phenomenon when talking about futurist technologies. The weakness of the yuck factor is that such a gut feeling can usually be chalked up to modern cultural sensibilities, and thus doesn't present a strong, fundamental objection to new technologies – especially ones that can save lives. Five hundred years ago, vaccination had not yet achieved widespread acceptance as an effective immunological technique. For many it was likely unpalatable to knowingly and willingly introducing even a tiny amount of a pathogen into your body, in the hopes of fighting off a disease you haven't yet caught. A hundred years ago, before the invention of the pacemaker, many would balk at the idea of a mechanical device implanted in a human being to reverse the effects of possibly fatal cardiac irregularities; most would claim it to be invasive and unnatural. Twenty years ago, before the development of intelligent voice-assistants, people would likely claim that such technology would be creepy or unsettling. Yet these and countless other inventions, despite probably displaying a yuck factor at one time or another, have all been embraced by modern society. Once their value to society can no longer be denied, over time the cultural sensitivities shift to make room for things previously unthought of.

The challenge for transhumanist technology is that the rate of scientific progress has sped up exponentially, reaching a pace previously unseen in human history. Many transhumanists would argue that this breakneck speed entails that the time between a new technology's introduction to the public consciousness and delivery date has become too short to allow for the yuck factor to recede, but that the humanitarian spirit of these inventions are just as noble as previous scientific breakthroughs. In his essay "Humanism and Transhumanism" Fred Baumann describes how easy it would be for proponents of transhumanism to disregard these subjective sensibilities. He writes:

It is easy for its progressive opponents to show, with some moral indignation, that in previous generations people found interracial marriage or the eating of raw fish yucky. Why should we, they ask, be in the least bothered by the fact that certain things offend our tastes now? We'll get used to them. (Baumann)

Take for example, the brain-computer interface. Neuralink, a company founded by tech giant Elon Musk in 2016, has already spent years working on an implantable chip which allows your brain to be directly connected to a smartphone or other computing device. Not only could you control the machine with your mind, but the goal is to create a bidirectional data flow allowing your thoughts to be received, interpreted, and recorded by the computer. Furthermore, the ultimate goal is for information found on the computer (including the entirety of the internet) to be immediately accessible to the user – as if it were a memory. Possible uses for such a device include treatment for individuals suffering neurological disorders such as Parkinson's or Alzheimer's, or to control a robotic prosthetic limb. However, one can also envision a law enforcement officer with instantaneous access to countless databases and software for facial recognition or threat assessment. Think about

how much more effective they might be, seamlessly coupling their training, experience, and human intuition with access to more information than a typical human could store naturally. Yes, this scenario sounds exactly like Robocop, and most people would be horrified by the prospect of such a “cyborg.” But Musk himself points out that almost all people are already frighteningly close to the very entity they fear. He explains on a podcast,

“What most people don't realize, they are already a cyborg... The communication rate between you and the cybernetic extension of yourself, that is your phone and computer, is slow. It's very slow. And that is like a tiny straw of information flow between your biological self and your digital self. And we need to make that tiny straw like a giant river... It's an interface problem, [a] data rate problem. (Musk)

If the fundamental gap that brain-computer interfacing technology is truly not as wide as we thought, then perhaps the visceral opposition many currently take may fade sooner than we expect. This kind of thinking demonstrates just how flimsy and superficial the yuck factor is.

Beyond the yuck factor, many still find the prospects of transhumanism harmful to humanity. That said, most contemporary critics of the transhumanist project focus their attacks on the harmful consequences of such a movement, rather than the particular technologies employed along the way.

One such criticism revolves around the socio-economic fallout of such a technological revolution. Since these developments are happening largely (though not exclusively) in the private sector, the concern is that implementation of such technological enhancements will be first only accessible to the rich elite who can afford them. Since these

technologies would give these groups a significant competitive advantage in the areas of health, longevity, cognition, physical stamina, and ultimately financial prosperity, the class gap between the rich and poor would grow increasingly wide, reaching levels of stratification radical even by today's standards (McNamee and Edwards).

Another related issue has to do with the confluence of Social Darwinism and evolutionary biology. Since transhumanist technologies are designed to overcome human frailty, correct human flaws, and enhance human capabilities, that means the task of determining what qualities are "desirable" and what are "undesirable" is left completely to the discretion of the inventors. This direct influence on the evolutionary process is fraught with the potential for discriminatory abuse – it's easy to conceive of an ideology not unlike Nazism developing, except the *Urbemensch* would be engineered rather than evolved.

The last criticism I'll mention here is the practical concern raised with transhumanism's battle against the natural aging process. Strong transhumanism strives for total immortality; weak transhumanism advocates for taking measures to increase human lifespan beyond the current expectation. In either case, the goal isn't simply to be old for longer – it is to slow down the natural decay of the aging process to provide human beings with more years of health and vitality. While this sounds like an admirable goal, many point to the possible pernicious effects of an ageless future. The most glaring is the realization that if people take much longer to die (or don't die at all), all while birth rates remain steady, the already taxing strain humanity places on world resources will explode into a catastrophic overpopulation crisis. Another concern is the effect on the workforce if the retirement age increases along with lifespans. Individuals in premier positions hold onto those positions for longer rather than make way for younger talent; this decreased turnover could drastically

stagnate creativity and originality which is essential for innovation and progress.

Nevertheless, while all of these future outcomes represent very real threats and should be seriously considered, the consequentialist perspective isn't particularly helpful in evaluating whether particular technological advances are helpful or harmful.

If neither the yuck factor nor the projected universal consequences are helpful in drawing the line between celebrated and taboo technologies, how *do* we make that distinction? Leon Kass describes the popular dichotomy which is often offered:

Among the few people who have tried to address our topic, most have approached it through a distinction between “therapy” and “enhancement”:
 “therapy,” the treatment of individuals with known diseases or disabilities;
 “enhancement,” the directed uses of biotechnical power to alter, by direct intervention, not diseased processes but the “normal” workings of the human body and psyche (whether by drugs, genetic engineering, or mechanical/computer implants into the body and brain). Those who introduced this distinction hoped by this means to distinguish between the acceptable and the dubious or unacceptable uses of biomedical technology: therapy is always ethically fine, enhancement is, at least *prima facie*, ethically suspect. Gene therapy for cystic fibrosis or Prozac for psychotic depression is fine; insertion of genes to enhance intelligence or steroids for Olympic athletes is not. (Kass)

On the surface, this appears to be a fine definition and useful line in the sand. But Kass himself, just a few lines later, points out that the semantics of these terms fail to support rigid moral boundaries:

But this distinction, though a useful shorthand for calling attention to the problem, is inadequate to the moral analysis. Enhancement is, even as a term, highly problematic. Does it mean “more” or “better,” and, if “better,” by what standards? ... If “enhancement” is defined in opposition to “therapy,” one faces further difficulties with the definitions of “healthy” and “impaired,” “normal” and “abnormal” (and hence, “super-normal”), especially in the area of “behavioral” or “psychic” functions and activities... Needless arguments about whether or not something is or is not an “enhancement” get in the way of the proper question: What are the good and bad uses of biotechnical power? What makes a use “good,” or even just “acceptable”? ... The human meaning and moral assessment are unlikely to be settled by the term “enhancement,” any more than they are settled by the nature of the technological intervention itself. (Kass)

This morally ambiguous sliding scale between therapy and enhancement is given clear expression in the debate over the groundbreaking gene-editing tool, CRISPR.

Since CRISPR came onto the scene, it has been met with a tremendous amount of resistance due to its potential for creating “designer babies” (Haberman). The prospect of parents having made-to-order children – getting to choose features such as hair and eye color, height, or even athletic ability or intelligence – was terrifying to many. We would expect this kind of reaction, as almost everyone would agree that this is well beyond the pale of ethical human intervention in the reproductive process. On the opposite side of the spectrum, gene-editing as a form of treatment seems to be considered universally positive. CRISPR has been shown to have possible uses in treating conditions ranging from cancer (NCI Staff) to obesity

(Schmerker), and research indicates rising support for treatment-directed genome-editing (Cohen). However, might that same support extend to using CRISPR on an embryo in utero to root out the possibility of cancer or obesity later in life? On the one hand, there exists plenty of precedent for preventative medicine; chief among them is vaccination, which, rather than treating an existing malady, proactively protects the patient from a disease they do not have and may never contract. On the other hand, could the proactive nature of such procedures push them into the ethically dubious? Is there room to distinguish between taking such measures to prevent cancer versus obesity?

In such a morally complicated area, the nuanced sensitivity of Jewish thought has a great deal to offer. First and foremost, it is critical to appreciate Judaism's emphatic support of technological development. In *Lonely Man of Faith*, Rabbi Joseph B. Soloveitchik describes man's imperative to conquer and harness the forces of nature:

Only the man who builds hospitals, discovers therapeutic techniques, and saves lives is blessed with dignity... The brute is helpless, and, therefore, not dignified. Civilized man has gained limited control of nature and has become, in certain respects, her master, and with his mastery he has attained dignity as well. His mastery has made it possible for him to act in accordance with his responsibility. Hence, Adam the first is aggressive, bold, and victory-minded. His motto is success, triumph over the cosmic forces. He engages in creative work, trying to imitate his Maker (*imitatio Dei*). (ch. 1)

Rabbi Aharon Lichtenstein picks up this same thread, invoking the famous Midrashic fable relating a conversation between Roman governor Turnus Rufus and Mishnaic luminary Rabbi Akiva. Lichtenstein framed the fable as follows:

“Le-ovdah” is not meant simply to maintain the original standard; rather, we have been given the right and the duty to try to transcend it. While the former approach asserts that man was asked to maintain the world as God had created it, this answer claims that man was empowered and enjoined to create something better, as it were.

Although this approach is audacious, we find it advanced by Chazal in several places. Perhaps the most celebrated is the midrash (Tanchuma, Parashat Tazria) which speaks of the encounter between the Roman governor Turnus Rufus and Rabbi Akiva. Turnus Rufus asked Rabbi Akiva, “If God wanted man to be circumcised, then why did He not create him that way?” Rabbi Akiva responded, “Bring me some wheat.” Then he said, “Bring me a loaf of bread.” He asked, “Which do you prefer to eat, the bread or the wheat?” “Naturally, the bread,” Turnus Rufus replied. Rabbi Akiva retorted, “Do you not see now that the works of flesh and blood are more pleasant than those of God?” There is a certain audacity here, but these are the words of Rabbi Akiva! What you have here is an assertion of human ability and grandeur, and of human responsibility to engage in this kind of improvement.

The extent to which this particular view is accepted depends on whether one adopts, to a greater or lesser degree, a humanistic perspective. Humanists talk a great deal about man placing his imprint upon the world, improving it, building it, and so on. When I say humanists, I am not talking only about secular humanists; I mean religious humanists within our world as well. Rav

Yosef Dov Soloveitchik and Rav Meir Simcha of Dvinsk,- for example, talk a great deal about the need for man to create. (*By His Light* 8-9)

From this perspective, it may seem like some form of transhumanism may follow from the religious humanism that Lichtenstein articulates. Man's empowerment to improve himself and his environment seems to make no distinction between the technological advances we have so far embraced and the futuristic technologies presently in development. In fact, Lichtenstein even describes man's obligation vis-à-vis nature as one of transcendence, a nearly ubiquitous formulation in transhumanist literature.

However, there are also a great many sources which seem to indicate the opposite approach. In his essay *Divine Wisdom or Altering Creation? A Torah Perspective on GMOs*, Rabbi Gabe Greenberg gathers the opinions of several Jewish scholars on the dangers of "altering Creation." First, he cites the position of Nahmanides on the prohibition cross-breeding different species of plants or animals:

The central understanding of the *mitzvah* is offered by Nachmanides, who argues that the reasoning behind the prohibitions of kilayim is rooted in the structure *ma'aseh bereishit*, God's original creation. He notes that Genesis 1 frequently repeats that God made animals and plants *l'minam*: "according to their [particular] kind/species." Nachmanides inferred that if God created these kinds/species initially, then God must want these same species to continue and perpetuate themselves, while concomitantly maintaining this same system of speciation that had been created initially... changing Creation in this way intimates that God's works are not perfect *chas v'shalom*, and that God "needs our help" in populating Creation. (Greenberg 257)

Greenberg also mentions the interpretations of Rabbi Avraham Ibn Ezra and Rabbi Naftali Tzvi Yehuda Berlin, both of whom echo the concern of Nachmanides. He also cites a similar formulation found in the *Sefer HaChinukh*, wherein the prohibition against practicing black magic, “is similar to the aforementioned problems with *kilayim*; namely, tinkering with the Divine order of Creation.” (258) Greenberg concludes this section:

All of these *m'forshim* agree on a central thesis: God created the world with a particular and regimented organizational structure, and intended for that structure to persist indefinitely. Specifically, the types and kinds of species—of plants and animals, of bacteria and algae—that God created are meant to exist, in their current form, forever. (258)

This attitude is expressed by leading Jewish thinkers across many eras in Jewish history, suggesting its overarching impact on Jewish values. From this perspective, transhumanism has no place in the Jewish consciousness.

However, Greenberg himself acknowledges that these sources do not represent the totality of Jewish thought. He follows a similar path as Rabbi Lichtenstein, exploring the implications of the abovementioned *midrash* about Turnus Rufus and Rabbi Akiva. He also brings another *midrash* to flesh out this tension between the inherent divinity in human creativity and the danger in meddling with God’s creation. The *midrash* begins with the position of Rabbi Yosi, who asserts that the Divine wisdom granted to Adam by God imbued him with the creative spark necessary to create fire and to breed a mule. Greenberg writes on Rabbi Yosi’s opinion:

According to Rabbi Yosi, the primeval Adam's human creativity is not simply pleasing to God, but is itself a channeling of Divine wisdom and Divine creativity. The crux of the tension between these two worldviews is clearly expressed here, particularly in the second clause of the midrash. Adam's creation of the mule could be understood as a paradigmatic violation of the tenets of *kilayim* (a mule being the sterile offspring of a horse and a donkey). And yet for Rabbi Yossi, not only does this seem permissible, it is praised as being Divinely inspired. For Rabbi Yosi, the directive to human creativity and domination outweighs the concerns of toying with Creation and playing with species. (260)

Rabbi Yosi's position, however, stands in stark contrast to the response offered by Rabban Shimon Ben Gamliel:

He does not believe that Adam created the mule. Rather, he believes that "the mule was created later, in the days of Ana [grandson of Esau] ... and just as Ana was impure, so was the impurity he created." Rabban Shimon ben Gamliel's midrash is based on a confusing genealogy described in Genesis 36, wherein Ana is described as first the brother, and then the son, of Zivon. The midrash resolves this by understanding him as the offspring of a prohibited union, and in turn the progenitor of another prohibited creature, the mule.

This *midrash* offers us a helpful lens to see the tension between the static state model of creation vs. the human creativity model. Two *tannaim*—first and second century Palestinian sages—argue as to whether the combining of species is Divinely inspired, or inherently impure and destructive. We are

meant to understand that these worldviews, though potentially competing, are both quite legitimate within Jewish thought—they are both true, *eilu v'eilu divrei Elokim hayim*. (261)

In formulating the complex attitude toward human creativity and the dangers therein, Greenberg provides us with a framework to better understand the sources which could be construed as supporting some elements of transhumanism.

This more nuanced perspective is consistent with our intuitive sense is that the transhumanist project is fundamentally at odds with Jewish values. Both Soloveitchik and Rabbi Lichtenstein, in their writing elsewhere, help clarify their advocacy of human progress by providing a religious context. Greenberg sharply paraphrases how Soloveitchik articulated this tension:

The answer lies in the tension suggested in the *makhloket* between Rabbi Shimon ben Gamliel and Rabbi Yossi [*sic*]; namely, that altering Creation is either an example of Divine creativity filtered through human hands, or an unsanctioned exploitation of nature's strictures. Rabbi Joseph Soloveitchik, in his *The Emergence of Ethical Man*, argued that these worldviews are not, in fact, competing. He sees them as complementary forces which we are supposed to harness, and, ultimately, to preserve and keep in fine balance...

Rabbi Soloveitchik offered a synthesis between the two positions. Yes, God created the world in a specific, regimented way. However, there is hidden potentiality in that schema, and within those species, which are meant to change, to evolve, and to be utilized. If humans do so “cooperatively,” “peace-

fully,” and in “partnership” with nature, then we are free to exercise our creativity; not only free, but in fact mandated to do so. But overstepping our bounds would constitute a violation both of our broad human mission, and perhaps of specific *mitzvot* as well. Notably, Soloveitchik does not tell us what constitutes “overstepping of bounds,” but rather describes the emotional-spiritual aspect of such a violation. His articulation is descriptive, rather than prescriptive. (262)

Lichtenstein also raises a critical element for consideration when analyzing the role of human creativity and the Jewish perspective on transhumanism. His essay further qualifying his definition of Jewish *humanism* helps crystallize the stark and salient difference between the two ideologies. He writes regarding Judaism’s degree of concern human welfare:

The crucial question turns on the conception of human welfare. Inasmuch as man consists of body and soul, his well-being must presumably be defined with reference to both. Or rather, if we are to speak from a religious perspective, *it may be defined purely in terms of the latter, physical well-being only insofar as it contributes to spiritual development...* (emphasis added)

Hence, the Torah-halakhic conception of the nature of man suggests no definitive answer to our second question: How much weight has Judaism assigned man’s temporal realization of temporal happiness? To what extent has it recognized the value of satisfying his physical and emotional needs? The answer to this question must rather primarily be sought - apart from explicit biblical or aggadic statements of attitude – in areas of Halakhah which

either define or reflect a perspective upon man's relation to the mundane.

("Mah Enosh" 12)

In seeking to answer this question, Rabbi Lichtenstein conducts a thorough analysis of two halakhic elements: first, Halakha's "moral and religious demands imposed by the Torah as a program for human life under ordinary circumstances;" and second, "provisions the Halakha has made for superseding its usual norms in emergency situations in which these conflict with essential human needs. He concludes, "[i]n the final analysis, the Halakhah cannot satisfy the demands of the radical secular humanist. For its humanistic strain is, although not muted, nevertheless counterpoised; or rather, as the committed Jew prefers to think, counterpoised" (49). This tension speaks to the notion of a "religious perspective" that Rabbi Lichtenstein first defined almost in passing: that our concern for our physical well-being can only be evaluated in terms of its contribution to our spiritual development. The transcendence of man that Rabbi Soloveitchik and Rabbi Lichtenstein describe is not an unfettered, egotistical pursuit of perfection; rather it is the duty to improve the human condition such that mankind can serve God to the fullest extent.

From this I think emerges a dichotomy much clearer than "therapy" vs. "enhancement," and much more effective at assessing moral value. Spiritual growth is an intensely personal process; so if physical improvement is merely a conduit for spiritual growth, then advances in physical improvement must be evaluated in terms of their orientation toward the individual versus the collective. Furthermore, if physical improvement is strictly a means to end, we should be wary of any instance in which the improvement is presented as an end unto itself. Progress in medicinal science, however groundbreaking, is typically directed towards treating individuals (albeit a great many individuals) of ailments

plaguing them here and now (or incredibly likely to plague them in the near future). Our acceptance of such discoveries and other technology which improves our quality-of-life stems from the fact that we are harnessing these technologies to maximize the religious and spiritual development of such individuals.

However, the development of transhumanist technology is typically accompanied by radically different motivations. While the improvement may manifest at the level of individual human beings, ultimately transhumanism's stated goal is to enhance humanity as a species. The enhanced capability of these "post-humans" is essentially the end goal of such a pursuit. This is perhaps the most egregious form of attempting to alter the Divine Creation, as human beings are the only of God's creations created "in His image." The intensely secularist pursuit to transform man into gods stands diametrically opposed to Judaism's imperative to improve man to best serve God. Admittedly, these definitions are not sufficient to completely eliminate the struggle of classifying acceptable technological enhancements; nevertheless, evaluating all new technologies by their motives and potential to bolster or hinder our spiritual development may be the key to maintaining our religiosity and our humanity in the years to come.

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