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<center>The Convoluted Ethics of Cybernetic Enhancements</center>

In a world where new scientific breakthroughs are made every day, a vast new field has emerged: cybernetics. Norbert Wiener, Ph. D and founder of the field, defined cybernetics as the "scientific study of control and communication in the animal and the machine." Cybernetics covers how to combine biological, or natural, functions with mechanical or man-made alternatives. In the past, cybernetics has mainly been used to create prosthetics, which aid people who may have been born without or lost a certain body function. However, in recent times, Human Enhancement Technologies (HETs) are being developed that have the capability to improve human functionality, rather than just repair it. In his book *Truly Human Enhancement*, Nicholas Agar, professor of ethics and Ph. D, claims that two main types of HETs exist. The first, moderate enhancements, improve "significant attributes and abilities to levels within or close to what is currently possible for human beings" (2). On the other hand, radical enhancements improve attributes and abilities to levels which "greatly exceed what is currently possible [for humans]" (2). HETs have given rise to many debates centered on the ethical problems raised by such enhancements. However, almost every controversy associated with enhancements is centered on a single, deceptively brief question: is human enhancement both beneficial and ethical? After researching the opinions of both sides of the debate, I have found that many arguments both against and for human enhancements are wrought with flawed logic and reasoning. Regardless, if proper restrictions are set in place, I agree with Agar that moderate enhancements will prove themselves to be both beneficial and ethical for humanity but radical enhancements should be avoided at all costs.

Before one can enter the debate, they need understand exactly what enhancement encompasses and what it does not. In cybernetics, enhancement refers to the improvement of human functionality via mechanical or biotic changes to the human body. In his article "Ethics of Human Enhancement", Fritz Allhoff offers another definition: "[s]trictly speaking, 'human enhancement' includes any activity by which we improve our bodies, minds, or abilities—things we do to enhance our well-being" (203). Examples of enhancement range from taking pills that improve one's cognitive abilities to replacing organs with 3D-printed alternatives. Enhancements can be either permanent or temporary improvements. It should be noted that in the field of cybernetics, the term augmentation is often used interchangeably with enhancement, but they are not the same. Augmentations are physical additions to the body, such as mechanical arms, that permanently improve functionality. Therefore, all augmentations are regarded as enhancements, but not all HETs are augmentations.

In addition to augmentations, enhancements are often confused or associated with prosthetics and physical therapy. Prosthetics are similar to enhancements and augmentations, but with one major difference: prosthetics improve human functionality just like enhancements, but only improve it for those who have a physical disability. In other words, HETs attempt to push human abilities past their current levels of functionality, while prosthetics just repair damaged abilities to their previous levels. As Bjørn Hofmann wrote in "Limits to human enhancement: nature, disease, therapy, or betterment", "therapeutic enhancements allow a patient to perform better than before their disease or accident" but "non-therapeutic enhancements improve natural human abilities or create new abilities" (4). In addition, Hofmann claims that because prosthetics and physical therapy are part of the medical field, they should never be associated with HETs because "medicine is about treatment, not enhancement" (4). This is a very important distinction

to draw between these two fields, as it also discredits any arguments that claim HETs are a medical issue rather than a scientific. In order to avoid the issues this distinction raises, we will be focusing on the ethics behind significant enhancements that are almost never associated with medical therapy.

Now that enhancement has been clearly defined, the arguments of both sides of the ethical debate need to be examined. One side of the debate consists of those who argue against radical human enhancement and augmentation. The more radical of these activists, who believe HETs should be outright banned from existence, are referred to as human purists. Their arguments are generally divided into two main categories: moral and logical objections. Logical objections focus on the potential long-term damage of HETs, but moral issues are sourced from personal moral objections (Agar 55). On the other side, those who believe human augmentation is ethical normally claim that HETs can drastically improve our way of life by modifying one of three unique areas: "human cognitive abilities, physical prowess, or health" (Agar 23). Cognitive enhancements can range from increased memory to computational power in the human brain. Covering biological improvements outside of the brain, enhanced physical prowess normally refers to increased speed, strength, or agility. For example, military veterans and others that have lost one or both of their legs often choose to augment themselves with prosthetics superior to their previous limbs, at least in terms of speed. Recall the distinction between using prosthetics and augmentations. In this case, their prosthetics are actually considered augmentations, because their prosthetics improve their legs' functionality rather than just repair it. Finally, improving human health is normally associated with increasing humanity's lifespan - often regarded as the most controversial issue in cybernetic ethics - or improving the body's ability to fight off disease and illnesses. Many arguments in favor of enhancements are based on the flaws found in the

views of those who oppose HETs, and therefore anti-HETs views need to be examined before some pro-HETs views can be understood.

One of the largest flaws with arguments against enhancements is found in the previously discussed set of concepts: moderate and radical enhancement. A question that comes to mind about these concepts is simple: why do they exist? Why can those who argue against HETs not view all enhancements as a whole instead of dividing these enhancements into sub-categories? The answer is because even the most outspoken purist uses enhancements on a daily basis. Recall the previous definition of cybernetic enhancement: the improvement of human functionality via mechanical or biotic changes to the human body. Even drinking a cup of coffee in the morning, if done for the sole purpose of using the caffeine to aid in waking up, is technically enhancing your body beyond its normal functionality using a crystalline compound. In addition, some medical treatments such as vaccinations, which are utilized solely to prepare for an illness rather than treat it, fall into the category of human enhancement because they increase our bodies' ability to fight off disease beyond their normal abilities. With these examples in mind, it becomes clear that arguing to ban all HETs is not only pointless; it is virtually impossible. Agar summarizes this point in a clear, concise claim: "[e]nhancement as improvement seems to be an indispensable part of being human" (18). Therefore, all who argue against human enhancement are forced to sort each enhancement into our two different subcategories. This act of sorting, this thin borderline between moderate and radical enhancements, is the focal flaw in any argument against HETs: it results in an extremely opinionated issue because one person's definition of radical enhancement generally differs from another's.

In addition to a worrying diversity of opinions on radical enhancements, other arguments against HETs suffer from accusations of being overly opinionated and biased. In particular, moral objections to HETs are most often criticized for these reasons. Regardless, moral objections still encompass a large portion of arguments against HETs (Agar 113). In his book *Biotechnology and the Human Good*, Ben Mitchell, professor of ethics, discusses a wide variety of such arguments. Most moral arguments, Mitchell claims, are focused on the "danger of becoming victims of our own ingenuity [by using HETs], in which we make our utopias into dystopias" (111). Mitchell argues that while HETs provide many promising advancements, some of the technologies' potential is frightening. A common phrase used by those against HETs is that "[m]an ought not to play God" (Mitchell 87). While some believe that allowing humans to control their own evolution is both desirable and beneficial to humanity, others claim the opposite. With regard to radical enhancements, Mitchell notes that human-controlled evolution via cybernetics could lead to worrying complications in the future. In particular, he warns that HETs will allow people to change themselves into society's view of a perfect human. After people begin altering their bodies and minds to conform to these social "blueprints", Mitchell claims that humanity will reinforce "irrational societal prejudices" and begin to lose individual diversity (92). Perhaps this is the strongest moral argument against HETs: if enhancements begin to alter aspects of human nature, are they really enhancing humanity or are they changing humanity into something entirely different?

While arguments against HETs can suffer from diverse opinions and a lack of general consensus, those who argue for radical human enhancement, often referred to as transhumanists, present a unified approach: unrestricted enhancements for all. For example, consider computers and phones. Every year, new advances are made which exponentially improve the technology

found in such devices. Transhumanists urge "that we take the same approach to human mental and physical capacities and technologies that could enhance them" (Agar 25). Just as our technology is drastically improving with time, transhumanists want our bodies and minds to improve as well. However, each of the three aspects transhumanists wish to improve (cognitive abilities, physical prowess, and health) bring with them their own challenges.

Because transhumanists consider our brain's cognitive ability to be almost identical to the circuits and chips found in a computer, an excellent way of examining the issues that cognitive enhancement creates is to consider the parallel world of computer technology (Agar 82). According to Moore's Law, the computational power of new computer chips designed each year roughly doubles the power of the previous year (Moore). As a result, far more powerful computer chips replace older, outdated models each year. Aside from increased price, "it is difficult to imagine making a case for the superiority of a chip to another that performs twice as many instructions per second but is identical in all other respects" (Agar 25). When viewed in this regard, it makes sense for humans to want to drastically increase their cognitive abilities without restraint. The problem with cognitive enhancement is that, despite the wishes of transhumanists, a human cannot be directly compared with a computer. A computer is a tool, something people use to aid themselves. It has instrumental value to us by having the capability to compute mathematical operations at a speed far greater than that of an average human brain. On the other hand, the human brain, and therefore our cognitive ability, is a major factor in what makes us human. By wanting to significantly change the structure and capability of our brains, transhumanists are not arguing for "Human" Enhancement Technologies. They are arguing for enhancements that change our very human nature.

Scottish Philosopher Alasdair MacIntyre brilliantly, although indirectly, depicts this issue of human nature and cognitive ability in his book *After Virtue*. Utilizing the example of a child learning chess, MacIntyre states that chess (or any other exercise of our cognitive abilities) is played for one of two reasons. The first is to receive some kind of reward or external good: in his example, the prize money for winning a national chess tournament. The second reason is for internal goods or rewards. With regard to chess, the internal reward is the difficulty of deciding upon the right move, the endless replaying of possible outcomes in one's head, the experience of the game. When viewed from a totally logistical standpoint, if a player's only goal was to receive the prize money associated with the tournament, he should consider stealing the money rather than take the time necessary to become a chess master. This external good, the prize money, can be completely separated from the game of chess when viewed as a reward and only has instrumental value to the player. However, as humans, we take pleasure in challenging ourselves with problems that are difficult for us to grasp, problems that do not have an easy solution. These challenges, or internal rewards, are inseparable from their respective exercises of cognitive ability and therefore have high intrinsic value to humans. Improving our cognitive ability with HETs will allow people to more easily obtain instrumental rewards and solutions to problems. However, once our cognitive abilities are increased to the point where solutions to our current problems and exercises can be found with ease, we will lose the intrinsic rewards of completing difficult tasks. I argue that removing these intrinsic rewards also removes a part of our humanity. Drastically improving our cognitive ability does not enhance humanity: it changes humanity, potentially for the worst. How can any human predict the consequences of changing the very structure of their own mind? No amount of theorizing or research can prepare us for such a drastic change. If a problem arises that requires such massive computational power as to require

radical cognitive enhancement, we can simply use a tool such as a computer to solve it instead of attempting to edit human nature.

While radical cognitive enhancement has the dangerous potential to drastically change humanity identity, physical augmentations require an entirely different viewpoint. It is extremely difficult to argue against moderate physical augmentations, such as enhancing the body's ability to fight diseases with vaccines. Similarly, augmentations that improve speed or strength by a moderate amount appear to have few downfalls. With regard to physical augmentations, one of the only issues I have consistently found discussed is centered on competitions and sports. Recall the previous example of the veterans who replaced their amputated legs with superior prosthetics. Should these veterans, who can run a fair bit faster than an identical individual with biological legs, be allowed to compete in races? If they are allowed to compete, but only with fellow amputees, should their enhancements be viewed as sporting gear and regulated by officials? While they will require some discussion, these issues and questions are insignificant compared to the single most controversial issue of HETs: radical life extension. Unlike both cognitive and physical enhancements, which attempt to change humanity, life extension accomplishes the opposite: it prevents humans from experiencing the changes that are caused by aging (Agar 113). After extensively researching this particular issue, I have yet to find two authors who share the same opinion on the topic. Some argue that increasing humanity's lifespan by a moderate amount, for example 50 years, would be morally acceptable. Others argue against increasing our lifespan by a single day. Still more argue that immortality itself should be achieved in order to benefit humanity. Once again, those against this technology fail to offer a remotely unified consensus on the subject. As a result, until more extensive discussions and debates occur, I will be forced to conclude with only my own brief opinion on the subject. I

believe death is the single greatest motivator for humanity and changing the aging process will accomplish nothing other than delaying the inevitable. Whether or not increasing someone's lifespan causes him to increase his productivity and accomplish more with his life remains to be seen.

Overall, Human Enhancement Technologies cannot be considered merely "good" or "bad" for humanity. Completely banning them will have just as dire consequences as fully embracing them. As a result, a middle ground needs to be found. After careful consideration, I believe that any enhancements that drastically improve human functionality (radical enhancements) should be lawfully banned from existence. Therefore, if legislation is to be enacted that restricts certain enhancements, then those particular enhancements and augmentations need to be clearly defined so as to avoid the confusion and differing opinions that plague current arguments against HETs. On the other hand, moderate enhancements, specifically those regarding physical and health-related augmentations, should not only be lawful, but encouraged. As time goes on and new technology becomes available, our opinions on what we consider to be radical enhancements will inevitably change. However, I hope that by discussing and debating these technologies and issues now, before they become readily available, humanity will be able to safely and cautiously embrace the new abilities that we discover for ourselves.

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