ECOLE POLYTECHNIQUE - ESPCI - ECOLES NORMALES SUPERIEURES

CONCOURS D'ADMISSION 2019

MARDI 23 AVRIL 2019 - 14h00 – 18h00
FILIERES MP, PC et PSI - Epreuve n° 6

Durée totale de l'épreuve écrite de langue vivante (A+B) : 4 heures

L'utilisation de dictionnaire et traductrice n'est pas autorisée pour cette épreuve.

COMPOSITION D'ANGLAIS (XEULCR)

PREMIÈRE PARTIE (A)
SYNTHÈSE DE DOCUMENTS

Contenu du dossier : trois articles et un document iconographique pour chaque langue. Les documents sont numérotés 1, 2, 3 et 4.

Sans paraphraser les documents proposés dans le dossier, le candidat réalisera une synthèse de celui-ci, en mettant clairement en valeur ses principaux enseignements et enjeux dans le contexte de l'aire géographique de la langue choisie, et en prenant soin de n'ajouter aucun commentaire personnel à sa composition.

La synthèse proposée devra comprendre entre 600 et 675 mots et sera rédigée intégralement dans la langue choisie. Elle sera en outre obligatoirement précédée d'un titre proposé par le candidat.

SECONDE PARTIE (B)
TEXTE D'OPINION

En réagissant aux arguments exprimés dans cet éditorial (document numéroté 5), le candidat rédigera lui-même dans la langue choisie un texte d'opinion d'une longueur de 500 à 600 mots.

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A – Document 1

What do we mean by human enhancement?

The New York Academy of Sciences
May 15, 2018

Recent advances in human enhancement technologies offer new and unique opportunities to redesign ourselves. Such efforts have a long history, as people have been attempting to overcome their biological limitations or remove supposed flaws for millennia. As George Church, PhD, from the Wyss Institute at Harvard University explained, before the 21st century human enhancements included anything from: vaccines preventing smallpox, polio, and measles; to cars and jets that moved people across the world at previously unimaginable speeds and distances; to the smartphone you may be reading this article on; and the cup of coffee you drink every morning to help wake up. Dr. Church believes that the latest human enhancement efforts in fields like gene editing and artificial intelligence are only following this well-trod path.

Eventually, Dr. Church suspects that human enhancement technologies could provide resistance to diseases such as malaria, tuberculosis, and Lyme disease, allow for up-to-date diagnostic readouts in healthcare, and even reverse aging. Advancement in genome editing technologies such as CRISPR could have the greatest impact by targeting, for example, human genes like CCR5 — an essential gene for HIV virus entry into target cell — and lead to a functional cure for HIV infection.

Such promises for the future of enhancement technologies are exciting, but not without potential risk. Critics have questioned the ethics of using these technologies to fundamentally alter human biology, and have called for careful investigations of the risks and potential complications before we can safely apply these new technologies. Moreover, there may be additional considerations if these new technologies are used for non-therapeutic purposes. As Josephine Johnston, LLB, MBHL, at The Hastings Center explained, "If you have a sick person and you're thinking about using a new drug to help them, risk is always tolerated — because the person's life is at stake. But when you're thinking about enhancement technology, it's a slightly different risk-benefit calculus because that person isn't necessarily dying or suffering, they're receiving an enhancement."

Additionally, she argued, "by definition, an enhancement technology claims to improve a person or a group of people. What it means to be improved, to be better, is very much a socially and culturally constructed notion. I would worry most about social pressure to conform to limited visions of the good and the improved, and our failure to adequately question and interrogate those visions."

It is critical to discuss the principles that govern the ethical conduct of human enhancement. Dr. George Church stated that the NIH [National Institute of Health] requires grantees to teach the responsible conduct of research to young scientists. He added that "most engineering disciplines have safety and security components and a code of ethics." However, Ms. Johnston maintained that individual scientists alone shouldn't be required to focus on the ethics of the individual use of the technology they develop. "I don't think they should ignore it, but that's not primarily the work that scientists are trained to do and it would be an unreasonable thing to place on [their] shoulders." However, she continued, "I do think that it's crucial for scientists as a collective group to be involved in discussions for developing policy."

While there have been, and will continue to be major technology revolutions in human enhancement, Ms. Johnston believes that human enhancement raises long standing questions about what it means to be human. "There are going to be upsides and downsides to these different enhancement technologies, but that complexity might be difficult to see at first and we might not agree on it. How will we know when we're seeing something that really, truly can improve people's lives? These questions about what makes for a good — or even a better — life are questions we've been grappling with for a long time. I'm not sure that I see a brand new question. Just new iterations of old questions about what it means to live well."

A – Document 2

The power to upgrade our own biology is in sight — but is society ready for human enhancement?

By Raya Bidshahri
Singularity Hub
February 15, 2018

Upgrading our biology may sound like science fiction, but attempts to improve humanity actually date back thousands of years. Every day, we enhance ourselves through seemingly mundane activities such as exercising, meditating, or consuming performance-enhancing drugs, such as caffeine or adderall. However, the tools with which we upgrade our biology are improving at an accelerating rate and becoming increasingly invasive.

In recent decades, we have developed a wide array of powerful methods, such as genetic engineering and brain-machine interfaces, that are redefining our humanity. In the short run, such enhancement technologies have medical applications and may be used to treat many diseases and disabilities. Additionally, in the coming decades, they could allow us to boost our physical abilities or even digitize human consciousness.

[...]

Ethical challenges of enhancement

There are many social and ethical implications of such advancements.

One of the most fundamental issues with cognitive and physical enhancement techniques is that they contradict the very definition of merit and success that society has relied on for millennia. Many forms of performance-enhancing drugs have been considered "cheating" for the longest time.

But perhaps we ought to revisit some of our fundamental assumptions as a society.

For example, we like to credit hard work and talent in a fair manner, where "fair" generally implies that an individual has acted in a way that has served him to merit his rewards. If you are talented and successful, it is considered to be because you chose to work hard and take advantage of the opportunities available to you. But by these standards, how much of our accomplishments can we truly be credited for?

For instance, the genetic lottery can have an enormous impact on an individual's predisposition and personality, which can in turn affect factors such as motivation, reasoning skills, and other mental abilities. Many people are born with a natural ability or a physique that gives them an advantage in a particular area or predisposes them to learn faster. But is it justified to reward someone for excellence if their genes had a pivotal role in their path to success?

Beyond that, there are already many ways in which we take "shortcuts" to better mental performance. Seemingly mundane activities like drinking coffee, meditating, exercising, or sleeping well can boost one's performance in any given area and are tolerated by society. Even the use of language can have positive physical and psychological effects on the human brain, which can be liberating to the individual and immensely beneficial to society at large. And let's not forget the fact that some of us are born into more access to developing literacy than others.

Given all these reasons, one could argue that cognitive abilities and talents are currently derived more from uncontrollable factors and luck than we like to admit.

[...]

Another major ethical concern is equality. As with any other emerging technology, there are valid concerns that cognitive enhancement tech will benefit only the wealthy, thus exacerbating current inequalities. This is where public policy and regulations can play a pivotal role in the impact of technology on society.

Enhancement technologies can either contribute to inequality or allow us to solve it. Educating and empowering the underprivileged can happen at a much more rapid rate, helping the overall rate of human progress accelerate. The "normal range" for human capacity and intelligence, however it is defined, could shift dramatically towards more positive trends.

Many have also raised concerns over the negative applications of government-led biological enhancement, including eugenics-like movements and super-soldiers. Naturally, there are also issues of safety, security, and well-being, especially within the early stages of experimentation with enhancement techniques.

Brain-machine interfaces, for instance, could have implications on autonomy. The interface involves using information extracted from the brain to stimulate or modify systems in order to accomplish a goal. This part of the process can be enhanced by implementing an artificial intelligence system onto the interface — one that exposes the possibility of a third party potentially manipulating individual's personalities, emotions, and desires by manipulating the interface.

A tool for transcendence

It's important to discuss these risks, not so that we begin to fear and avoid such technologies, but so that we continue to advance in a way that minimizes harm and allows us to optimize the benefits.

[...]

A – Document 3

Building a better human with science? The public says, no thanks

By Gina Kolata
The New York Times
July 27, 2016

Americans aren't very enthusiastic about using science to enhance the human species. Instead, many find it rather creepy.

A new survey by the Pew Research Center shows a profound distrust of scientists, a suspicion about claims of progress and a real discomfort with the idea of meddling with human abilities.

The survey also opens a window into the public's views on what it means to be a human being and what values are important. Pew asked about three techniques that might emerge in the future but that are not even close to ready now: using gene editing to protect babies from disease, implanting chips in the brain to improve people's ability to think, and transfusing synthetic blood that would enhance performance by increasing speed, strength and endurance.

The public was unenthusiastic on all counts, even about protecting babies from disease. Most, at least seven out of 10, thought scientists would rush to offer each of the technologies before they had adequately tested or even understood them.

Two-thirds say they would not want the enhancement technologies for themselves. And even though genetic manipulations appear more frightening than a chip or artificial blood, which might be removed, the public finds it slightly more acceptable to change a baby's genes than to enhance human abilities.

Religion affected attitudes on these issues. The more religious people said they were, the less likely they were to want genetic alterations of babies or technologies to enhance adults. The differences were especially pronounced between evangelical Protestants and people who said they were atheists or agnostics.

For example, 63 percent of evangelical Protestants said gene editing to protect babies from serious diseases was meddling with nature. In contrast, 81 percent of atheists and 80 percent of agnostics said it was not fundamentally different from other ways humans have tried to better themselves.

Cary Funk, an associate director at Pew and the lead researcher for the survey, said she was surprised by the extent of the public's worries. "These are appealing ideas: being healthier, improved minds, improved bodies," she said.

And she was surprised that the public seemed nearly equally worried about all three of the technologies. After all, she said, "these are three different kinds of technologies, for different purposes."

[...]

The three specific technologies noted in the Pew survey are recent advances. Gene editing has been taken up by thousands of laboratories around the world with the recent discovery of a method that allows researchers to home in on a gene of interest and delete, replace or alter it. The method, known as Crispr, is still under development — it can lead to the unintended alteration of other genes — and no one is ready to start altering genes of babies.

Even if Crispr were perfected, there are other problems with gene editing to prevent disease. For example, how and when would you alter these genes? And what diseases are you thinking of eliminating? Most involve many genes acting together in ways that are not understood, so even the

idea of altering a gene to protect a baby from disease seems, for now, to be limited to a very few disorders, like sickle cell, which involves a single mutation that can be corrected in blood cells that are easily accessible.

The idea for synthetic blood came from a report out of Britain last year that scientists were planning to start giving synthetic blood as a substitute for donated human blood. There was no thought of making people stronger or faster. But if synthetic blood could, for example, carry more oxygen, the possibility of enhancement exists. Once again, though, it is a futuristic notion.

This year, researchers reported that they had put a chip in the brain of a quadriplegic man that transmitted signals to a sleeve around his arm, allowing him to use it. Of course, that is a far cry from implanting brain chips to make people smarter or better able to concentrate, something that scientists do not know how to do.

Conversations in focus groups reflected the trends in the survey, with people saying they worried about what is natural and about the risks of altering humans. Nearly half said it would be acceptable to use synthetic blood, for example, if it simply restored a person's peak abilities. But more than three-quarters were opposed to using it to make people faster or stronger than would otherwise have been possible.

[...]

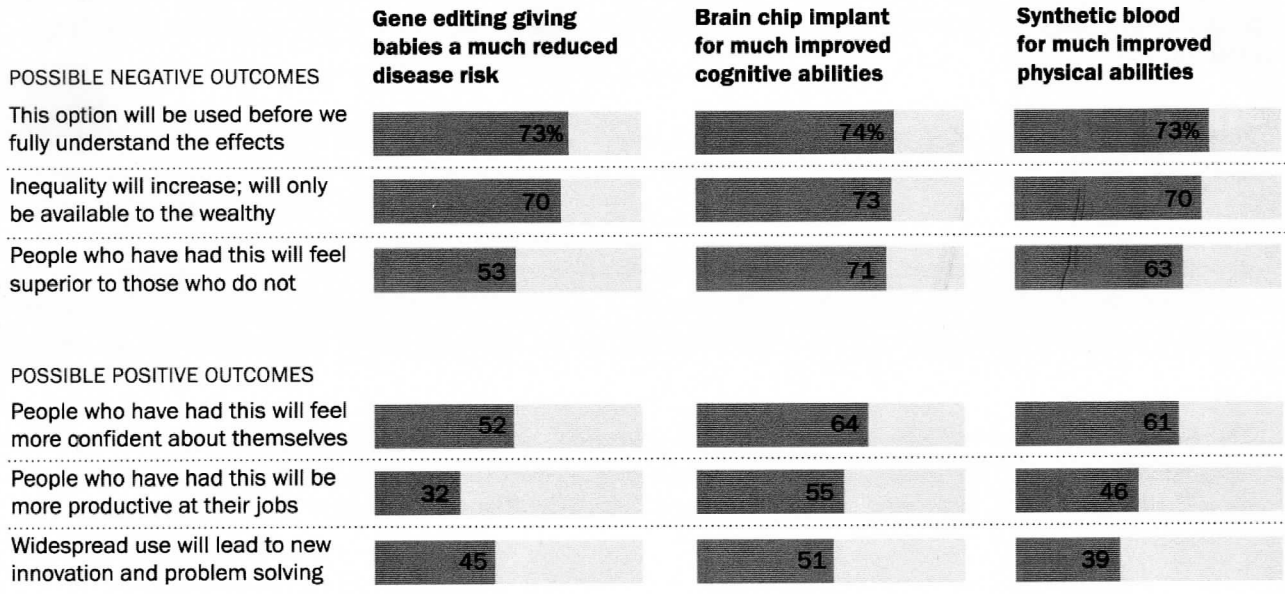
A – Document 4

U.S. public wary of biomedical technologies to 'enhance' human abilities

By Cary Funk, Brian Kennedy and Elizabeth Sciupac
Pew Research Center
July 26, 2016

Most Americans expect more negative than positive outcomes from each of these enhancements

% of U.S. adults who say _____ is likely to happen if each of these enhancements becomes available



Note: Respondents who said "not likely" or did not give an answer are not shown.

Source: Survey of U.S. adults conducted March 2-28, 2016.

"U.S. Public Wary of Biomedical Technologies to 'Enhance' Human Abilities"

PEW RESEARCH CENTER

B – Document 1

Can technology make us even more human?

By John Nosta
Fortune
April 5, 2018

Humans are on the verge of transcending their relationship with the world around them. This emergence, though, is not due to philosophical revelations or spiritual enlightenment. Instead, it's being driven by technological advances that create a new and richer reality, expanding our perceptions and introducing new sensory and computational skills to our physiology.

Without technological augmentation, we live in a world where we only experience a small part of the broader reality. Consider vision and smell, for example. These two senses reflect just small subsets of the vast reality in which we live.

We see just a very small part of the electromagnetic spectrum. This vast energy field — from X-rays to radio waves — engulfs our reality, yet we are only passive participants in this other visual world. And our sense of smell, fine-tuned for our individual needs, is certainly constrained by our biology. From mystics to physicists, the notion that we live in an illusion appears to be true.

So, then, what is the role of technology in augmenting and enhancing our human experience? Can technology facilitate a "new normal" for our broader perception of reality?

The truth is that technology is already reshaping our reality, though in subtle ways that most people don't realize. The examples are numerous. Prescription eyeglasses, contact lenses, or laser eye surgery can give us better than 20/20 vision. Hearing aids and cochlear implants now offer programmable features to allow users to modify their soundscapes and create unique aural experiences. Prosthetics now compete with limbs, in both form and function. And genomics can help rewrite our DNA source code with techniques like CRISPR.

Cognition also rests at the forefront of human enhancement. From neural implants to nootropics (drugs that can increase brain function), we are at the precipice of advances that will fundamentally expand our ability to process information and comprehend both simple and abstract ideas.

This all leads me to feel a bit sorry for our human self as it exists today, and even to question the notion that the human construct is definitive. Our human form and functionality is certainly not!

Technology allows us to expand the richness of life to experience more — more sights, sounds, thoughts, and perhaps other senses that we haven't even discovered. These experiences challenge the fundamental aspects of our being. They allow us — no, demand us — to charge forth, as in the 19th century doctrine of manifest destiny. Only this time, the unchartered territory to conquest is humanity itself.

What emerges will be something more. Dare I say, it'll be something even more human.