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MILITARY APPLICATIONS OF HUMAN ENHANCEMENT: AN ETHICAL ANALYSIS

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INTRODUCTION

In the past months, when someone asked me what I was researching on, I struggled to find an easy and readily identifiable label to describe the topic of my work.
This is because the issue that I analyzed – and that I am going to introduce in a moment – is complex, specific, and, most notably, almost completely unknown. It is also because of its almost-unknown feature that we need more debate and public discussion on this topic, especially given the fact that this issue will most probably affect our lives deeply in the next decades.
This dissertation proposes an ethical analysis of the military applications of human enhancement – in a word, the ethics of soldier's enhancement. At this point, one would probably ask what soldiers' enhancement is. The answer is easy and difficult at the same time. Simply put, the enhancement of soldiers is the application of substances and interventions of human enhancement on combatants – or, more broadly, military personnel. The reason why I said that this answer was also difficult is that even within its ethical debate we lack a common, agreed-upon, definition of human enhancement.

In Chapter I, indeed, the discussion over the definition of human enhancement is going to be presented. One of the main problems faced when trying to define human enhancement is that humans have always tried to improve themselves. One could say that the history of human evolution itself is the history of the enhancement of our species. From an ethical standpoint there is nothing that seems particularly troubling with the phrase "human enhancement".
What there is an ethical debate about, however, is a different type of human enhancement. In the last years, in fact, the innovations in science and technology have allowed us to affect humans' biology and abilities in a way that was unconceivable a few decades ago. Substances able to improve our memory consolidation, our ability to focus and to control our sleep cycle exist already, and are becoming more and more widespread as off-label "cognitive enhancers". Recent fields such as neuroscience and robotics are working on new technologies that enhance these abilities even more. An example is the project called *Electrical Prescriptions* (ElectRx), which "aims to help the human body heal itself through neuromodulation of organ functions using ultraminiaturized devices, approximately

the size of individual nerve fibers, which could be delivered through minimally invasive injection." Speeding up the healing process through the injection into the body of an external micro device seems part of the plot of a scientific novel, but ElectRx is actually a program of the US Defense Advanced Research Projects Agency (DARPA), the agency of the US Department of Defense responsible for the development of emerging technologies and, of course, their military application.

The reason why the military is interested in these scientific fields is easy to be explained. Science and innovation have always played a crucial role for issues of national defense. Developing and possessing a new technology unknown to the enemy gives a competitive advantage that could make the difference between winning and loosing a battle or even the war.

On the one hand, thus, this dissertation deals with the ethical debate surrounding a very recent issue, given how cutting edge these technologies are.

On the other hand, however, soldiers' enhancement is not a new phenomenon, and it precedes by thousands of years the birth of human enhancement as we intend it today.

The ethical underpinnings of a subcategory of human enhancement, soldiers' enhancement, are the topic of this dissertation. The work is structured as follows.

In the first chapter, as we have seen, the debate surrounding the definition of human enhancement is going to be presented. We will establish a working definition, which will be utilized for the rest of the present work.

In the second chapter, we will defend the statement according to which human enhancement is not inherently wrong, from a moral point of view. In fact, if the general category of human enhancement were inherently wrong, with no exceptions, then also the subcategory of soldiers' enhancement would be always wrong, and there would be no point in further analyzing it. Defending human enhancement in the way just mentioned is different from advocating for it. In a way, it is a much more modest goal. What we are going to is to reply to the most common critiques to human enhancement, highlighting their inconclusiveness, or internal contradictions.

The critics we are going to analyze belong mostly to three different categories.

The first category is the one of the "human nature and the natural" critiques, which usually entails either a sense of deference for nature – the work of which is considered perfect and stable, and we ought not touch – or a disillusion regarding the

possibilities of improving our current human state – because the product of nature is too complex, and too fragile, to be altered without unintended and catastrophic consequences.

The second category of critiques exposes the issues of self-manipulation, cheating and inauthenticity. According to these critiques, human enhancement would entail either treating ourselves as mere objects, cheating, or loosing our authenticity. We will demonstrate that these fears are questionable, and anyway not strong enough to sufficiently justify a complete ban on enhancement.

A different kind of critiques is the one belonging to the third category, that of distributive justice. According to these, human enhancement should be banned not because it is wrong in itself, but because it would increase sharply the inequality within our society. According to many authors, in fact, human enhancement could worsen the existing inequalities, adding a new social division, namely, the one between enhanced and non-enhanced individuals. We will state that the likelihood of this outcome depends on the distribution of and access to human enhancement technologies, but not on human enhancement itself.

In the third chapter, the history and the current applications of soldiers' enhancement are going to be presented. As highlighted before, the combatants have always used intoxicants. The reasons are mainly three: to suppress fear, enhance their abilities, or as a way of dealing with post traumatic stress disorder. The ancient Greeks used opium, as later the Indian and Chinese troops. Hashish was common in the Middle East already from the Middle Ages, whereas coca leaves were extremely widespread in South America. It was only in the twentieth century that artificial substances such as LSD were created. Amphetamines are still extremely common among the military, but now they are accompanied by a new set of "safer" pills, that present similar features but far less side effects. Then we will explore the use of substances and more sophisticated neuroscientific intervention as "truth machines", and many ongoing researchers.

The third chapter, however, will also include an ethical analysis, regarding the position of soldiers when they are the *subjects* of an experiment, and when they are ordered by their superiors to assume enhancers. Because of their belonging to an extremely hierarchical system, we will demonstrate that the soldiers are a

"vulnerable population". For this reason it is mandatory to implement extra care and caution regarding actions that could affect their wellbeing.

Finally, the fourth chapter will analyze the effects of soldiers' enhancement on just war and equality. Regarding just war, the traditional tenants of *jus ad bello* and *jus in bello* are going to be presented, in order to establish whether enhanced soldiers are more at risk of breaching international law than non-enhanced ones, or not. As some enhancers do indeed present troubling side-effects, that could for example render the solder too aggressive or making him loose empathy (to the point of inflicting unnecessary sufferings, or harming civilians), we will propose the creation of an international treaty regulating which enhancers are legal and which ought to be banned.

The last part of the chapter will recall the issue of inequality. Three different scenarios, with different pattern of enhancers' distributions among civilians and the military, are going to be presented. Further in-state regulation of enhancers and access to enhancers are recommended. However, research and development in this recent field should continue, as it has the potential for not only revolutionizing our lives, but also improving them.

CHAPTER I

Defining Human Enhancement

1.1 What is Human Enhancement?

Humans have always tried – and often succeeded - to improve themselves. At a very fundamental level, the history of human evolution corresponds to the history of its own enhancement. Increasing their knowledge has allowed humans to dramatically improve their abilities, and thus the quality of their lives. Each scientific, philosophical and artistic innovation enhanced the human species in its own way. The most noticeable examples are the invention of agriculture, that of writing, and later the industrial revolution. These important steps brought the evolution and progress of humankind, revolutionizing humans' lifestyle and allowing them to do things previously considered impossible.

The enhancement of the species as a whole, indeed, results from the sum of the efforts that every single individual makes in order to expand his knowledge and improve his abilities. In a way, one could say that the majority of the activities undertaken by humans are meant to enhance them[1].

Education is a paramount example -- the reason why we attend school is to *enhance* our knowledge, and thus our capacities.

The same line of reasoning can be applied to an infinite number of activities: training at the gym and doing sport enhance our physical capacities; practicing at the piano or guitar enhances our ability to play that instrument, etc.

The reason why it is so easy to consider these activities a form of enhancement is that the definition of the latter is extremely broad, simply meaning "an increase or improvement in quality, value, or extent"[2].

If the regular activities cited before are indeed a form of human enhancement, why is there an ongoing ethical and scientific debate on this issue?

We know that there is nothing morally challenging about activities such as studying, training, practicing. Actually, quite the opposite is true. Our society greatly values the efforts undertaken by individuals to improve their abilities and knowledge, to the

[1] Bear in mind that there is no such a thing of as a "general" enhancement –it always regards one or multiple traits of the individual, or one of multiple of his/her abilities.

[2] *Enhancement*, Oxford Dictionaries Online, http://www.oxforddictionaries.com/definition/english/enhancement

extent that the mere processes of practicing, training and learning are considered praiseworthy *per se*, not only when they bring successful results.
Moreover, if two persons show the same level of proficiency in a determined skill, we consider more praiseworthy the one who worked harder to reach that level, compared to the one who was more advantaged by his natural skills and had to work less.
This is because, at an intuitive level, we feel that the first one "earned" his achievement more than the second one. An example of this common intuition is the respect and admiration generally felt for "self-made men" who built their fortune and wealth from scratch.

In the last decades, however, new discoveries in science and the development of new technologies have greatly impacted the ways in which we can enhance ourselves, to a level never reached before. Fields as neuroscience, nanotechnology and robotics are giving us the possibility to enhance our capacities in a very direct and profound way.
This kind of new enhancement could "save us time", for example with a pill that improves our mnemonic capacities so that it takes us considerably less time to memorize notions. But it could also give us a kind of control on our bodies and minds that we have never reached before. Imagine pills that can alter our mood or our attitude, or that are able to reduce the decrease of cognitive capacities caused by sleep deprivation.
These examples do not derive from a sci-fi novel, or from proposed plans for future studies and research. Pills such as the ones listed above already exist. Adderall, for example, is an amphetamines-based drug currently prescribed to cure narcolepsy and attention deficit hyperactivity disorder. Adderall is also used off label because of its demonstrated cognitive-enhancement effect – when consumed in low, therapeutic doses[3]. This drug increases working memory, memory consolidation (which in turn improves the recall of information), and in general attention[4].

[3] R. C. Spencer, D. M. Devilbiss and C. W. Berridge, *The Cognition-Enhancing Effects of Psychostimulants Involve Direct Action in the Prefrontal Cortex*, Society of Biological Psychiatry, Elsevier Inc., Vol. 77, Issue 11 (2015).
[4] K. S. Bagot and Y. Kaminer *Efficacy of stimulants for cognitive enhancement in non-attention deficit hyperactivity disorder youth: a systematic review*, National Center for Biotechnology Information, Vol. 109(4) (2014).

Modafinil, a similar drug, improves memory, reaction time, logical reasoning, and problem solving[5].

These are just two examples of substances that are currently purchasable with a medical prescription strictly for treating specific disorders, but there are indeed extremely widespread for their off label use.

Research and innovations in the next decades could give us the tools to enhance ourselves even more dramatically and profoundly. This is the kind of human enhancement that interests ethicists, who wonder about its morality and its repercussions on society.

1.2 A Working Definition

It is not easy, however, to define this type of human enhancement precisely.

One way is to contrapose it to therapy.[6] If therapy encompasses "what is necessary to restore or sustain health" [7] then enhancement is what goes *beyond* therapy, including all the "biomedical interventions that are used to improve human form or functioning beyond what is necessary to restore or sustain health."[8]

This definition, provided by Erik Parens, is apparently the most used one among scholars[9]. Note that, according to it, there are no technologies that qualify as therapy or enhancement *per se*. Rather, an intervention will be considered either therapy or enhancement depending on its aim and result, not on the means and the technology adopted. The same scientific discovery or technology could be used alternatively as enhancement or as therapy.

As noted by Lin and Allhoff, "taking Ritalin to treat attention-deficit hyperactivity disorder (ADHD) is aimed at correcting the deficit; but taken by otherwise-normal students to enable them to focus better in studying for exams is a form of human enhancement."[10]

Juengst and Moseley used the same line of reasoning in formulating the following example: "when ankle-strengthening surgery is used to improve a bicyclist's

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[5] *Ibidem*.

[6] N. Bostrom and R. Roache, *Ethical Issues in Human Enhancement*, in *New Waves in Applied Ethics*, Pelgrave Macmillan (2008), 1.

[7] E. Parens, *Enhancing Human Traits*: *Ethical and Social Implications* (Georgetown University Press, Washington DC, 1998), 29.

[8] *Ibidem*.

[9] N. Bostrom and R. Roache, *Ethical Issues in Human Enhancement*, 1.

[10] P. Lin and F. Allhoff, *Untagling the debate: The Ethics of Human Enhancement,* in *Nanoethics*, Volume 2, Issue 3 (2008), 253.

competitive edge, it might raise enhancement concerns, but as a treatment for a bicyclist's ankle injury, it does not." [11]

The two authors also noted a second important feature of the definition of enhancement presented above. Parens, in fact, considers enhancement only *biomedical* interventions, leaving out electronic and robotic tools more or less integrated with the human body or under human command. [12]

However, especially in the military field, as we will see, this kind of enhancement is extremely widespread, and cannot be ignored. Moreover, if we define enhancement depending on the outcome of the process and not on the means used, it would make no sense to exclude *a priori* this typology. For these reasons, enhancement will be hereby considered to encompass also electronic and robotic innovations, when it is the case. The problematic distinction between enhancement and technology is going to be briefly analyzed at the end of this chapter.

The following section, on the other hand, will deal with the distinction between therapy and enhancement – implied by Parens' definition. Despite its intuitive appeal, in fact, it is extremely problematic.

1.3 The Therapy/Enhancement Distinction

As we have seen in the previous section, the distinction between enhancement and therapy does not depend on the means or the technology used for an intervention, but rather on its outcome.

This ambiguity would leave enough room for enhancement developers to find a therapeutic application for their work, making it extremely difficult to outright ban their innovations, despite their possible enhancing application[13].

This, of course, constitutes a problem only for those who believe that the distinction between therapy and enhancement does not have only a *descriptive* value, but also a *prescriptive* one – meaning those who find enhancement morally wrong.

Who sustains this position, in fact, will consider an intervention moral or not depending on the category in which he believes it belongs, either therapy or enhancement.

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[11] E.Juengst, and D. Moseley, Edward N. Zalta (ed.), *Human Enhancement*, The Stanford Encyclopedia of Philosophy (Spring 2016 Edition), 2.
[12] *Ibidem.*
[13] *Ibidem.*

On the other hand, those who do not regard enhancement inherently immoral might as well do not consider *every* type of enhancement morally permissible, facing the problem of where to draw the line between moral and immoral enhancing interventions.

Before analyzing whether the distinction between therapy and enhancement has some normative value, however, we need a way to operationalize it. In fact, even if this resonates well with our intuition, in practice it is not always easy to decide which interventions really qualify as humane enhancement and which not.

Juengst and Moseley classified three possible ways to operationalize this distinction, each of which – according to them – is superior to the previous one[14].

The first one is called "Professional Domain Accounts", according to which medical professionals are the ones who should judge whether an intervention qualifies as therapy or enhancement[15].

In the absence of a codified standard, this account is too subjective - different doctors may qualify very similar situations (or even the same one) in a different way. As enhancement is a very recent issue, in fact, it lacks customary norms, such as the ones to which the professional practice standards refer to for disclosure[16]. The consequence would be that a doctor could arbitrarily decide not to provide a medical service because he considers it enhancement and not therapy. In fact, the obligation to treat the patient would probably not apply in case the intervention qualifies as enhancement and not as therapy.

The Professional Domain Accounts raises also a second problem. Doctors' decisions - both when they are part of a standard and when they are not - might clash with the autonomy of the patient, the respect of which is one of the four principles of medical ethics identified by Beauchamp and Childress[17].

From a liberal standpoint, if a fully competent individual seeks a certain intervention, it should not even matter if that (according to him, to the doctor, or to anybody else) qualifies as therapy or enhancement – it should be a right of the individual to have the intervention performed, unless it harms someone.

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[14] *Ibidem,* 5.
[15] *Ibidem*.
[16] T. Beauchamp, and J. F. Childress, *Principles of Biomedical Ethics* (Oxford University Press, New York, 2013), 126.
[17] *Ibidem.*

But this liberal view obviously does not help us to operationalize the distinction between therapy and enhancement. Since this approach is too subjective, we move to the next account analyzed by Juengst and Moseley, the Normal Function Account.

According to the "Normal Function Account", therapy encompasses those interventions that aim at restoring the "normal" functions of the individual.[18]
Involving the concept of normality might do more harm than good for the aim of simplifying and making some sense of the distinction between therapy and enhancement. However, at some basic intuitive level we do have the idea that therapy aims at restoring our normal capabilities, while enhancement does something *more*.
Juengst and Moseley try to define the "normal" status of the patient as the "individual's functional capability to the species-typical range for their reference class, and within that range to the particular capability level which was the patient's genetic birthright."[19]
Despite their noteworthy effort, the authors themselves recognize that this definition faces some problems.
Humans are born with and develop throughout their lives talents and abilities to such different degrees from one another, that it is impossible to define normality. Attempting to define a "normal" range with some statistical formula[20] would imply considering those who were born or "naturally" got (through diseases, accidents etc.) outside this range as not normal.
This might first of all be insensitive and insulting for of those born with disabilities; secondly, it does not seem too helpful in clarifying the distinction between enhancement and therapy. How should we consider those compensatory technologies that allow the disable not only to reach the normal functions level (whatever it is supposed to mean), but also to go beyond it? Should these technologies be considered enhancement interventions? Juengst and Moseley rightly ask:

[18] E.Juengst, and D. Moseley, *Human Enhancement*, 6.
[19] *Ibidem.*
[20] N. Bostrom and R. Roache*, Ethical Issues in Human Enhancement*, 2.

"Should powered wheelchairs be designed to slow and stop at the same distance that walking humans would succumb to fatigue, in order to keep them from *enhancing* their users' abilities? "[21]

On the other hand, under a strict normal functions account those born with specific talents and above-average abilities might not be entitled to interventions aimed at restore their health. In fact, one could argue that a drop in their capacities simply made them reach the average level, and that for this reason restoring their previous functions level would qualify as enhancement[22].

We can see that if the professional domains seemed too subjective, the normal functions account now faces the opposite problem, being too rigid and fixed, on the base of some alleged "species-typical range".

Moreover, the typical range of the *homo sapiens* species is not constant – as noted earlier, the history of humans' evolution is in the end the history of its *enhancement*.

We have also seen that individual abilities change dramatically throughout our life span. Training, studying and experience greatly enhance our capacities, whereas accidents and diseases may diminish them – not to mention aging, which involves a general decrease of efficiency in multiple abilities.

We might indeed have an intuitive notion of "normal" that tries to reconcile both the species-related range and the personal natural talents and efforts of an individual, but it is obviously too vague, and most of all, too subjective.

Another critique to the normal function accounts regard the so-called "challenge of prevention",[23] referring to the difficulty of classifying those interventions that do not directly *cure* a disease, but aim at preventing it entirely, or at least render them less probable. [24]

Vaccination, for example, could be considered either an "immunity system enhancement"[25] or a "preventive therapeutic intervention"[26].

In my opinion, the case of vaccination is far less problematic that what it may appear *prima facie*. If, in fact, it is indeed true that vaccines enhance the immune system, it

[21] E.Juengst, and D. Moseley, *Human Enhancement*, 7.
[22] Bear in mind that we are assuming enhancement would be considered outside the standard medical coverage, and thus not automatically provided to the patients–we are using these examples just to show the difficulty of distinguishing between therapy and enhancement, without moral considerations.
[23] E.Juengst, and D. Moseley, *Human Enhancement*, 7.
[24] N. Bostrom and R. Roache*, Ethical Issues in Human Enhancement*, 1.
[25] *Ibidem*.
[26] *Ibidem*.

is also true that they do not *improve* any human ability, let alone giving to the individual *new* abilities that he did not possess before. Simply put, vaccines do not make a person better off – rather, they avoid him or her getting worse off. The final result is the maintenance of the *status quo*.

Also looking back at Parens' definition of therapy and enhancement, it is pretty clear that vaccines are a means to "sustain health", and thus fall under the category of therapy.

A more challenging example of preventive therapy is that of dramatically slowing down or stopping entirely the process of aging.

Bostrom and Roache rightly ask: "if an intervention enables an 80 years old person to have the same physical stamina, visual acuity, and reaction time as he had in his twenties, does that constitute therapy or enhancement?"[27]

Most of us would consider this type of intervention as enhancement, but also in this case, the enhancer would simply avoid the decrease of the person's abilities, without actually making him better off. We have an intuition that this would constitute an enhancement, while a vaccine would still be a therapy. To recollect this apparent contradiction, we have to turn to the last account considered by Juengst and Moseley.

The third way to operationalize the distinction between therapy and enhancement identified by the two authors is the "disease-based account"[28]. In order to distinguish between therapy and enhancement, this account considers the *object* of the intervention. Simply put, an intervention is considered therapy when it is meant to have an effect on an illness or a disease. Enhancement, on the other hand, is not related to a malady.

Following this line of reasoning, vaccines would qualify as therapy and not as enhancement, because their aim is to prevent a disease. And this could also help us to reply to the preventive challenge posed by aging, as aging is not considered an disease, but a natural process and phase of the human life cycle. Bare in mind that this is different from saying that aging, being a natural process, should not be slowed or stopped – we are simply categorizing this kind of intervention as enhancement, with no moral considerations attached.

Even the disease-based account, however, faces some difficulties.

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[27] N. Bostrom and R. Roache*, Ethical Issues in Human Enhancement*, 2.
[28] E.Juengst, and D. Moseley, *Human Enhancement*, 7.

First of all, it implies a correspondence between medical practice and diseases or injuries that in reality is common, but not absolute.

Health care, in fact, encompasses also interventions that are not meant to cure diseases or injuries *strictu sensu*[29], such as palliative care, cosmetic surgery, contraceptive devices, fertility treatments and the sort.

For palliative care, it is easy to notice that, even if they do not constitute a *cure*, they are nonetheless prescribed because of the presence of a disease.

Contraceptive devices are not meant to cure either, but they are anyway associated to a medical condition, that is, pregnancy. We do not consider pregnancy an illness itself, but this condition is anyway associated to various diseases, and indeed maternal mortality is still extremely high in many parts of the world.

Fertility treatments on the other hand are usually used when there is a deficiency in the individual's fertility.

A different point can be made about cosmetic surgery. It is true that usually in order to classify it as therapy it is seen as a cure for "diagnosable psychological suffering"[30] - especially for obtaining insurance coverage – but the reason why they do not qualify as enhancement interventions, in my opinion, is not their alleged link with a mental disease.

Beauty surgery by definition *enhances* beauty. Beauty, however, is one of the most difficult things to evaluate objectively. Actually, not everybody would even agree on the efficacy of cosmetic surgery to enhance beauty. In my opinion, this kind of intervention might qualify as a medical intervention when really related to a psychological condition. In other cases, it can simply be a personal decision of the individual, but it falls out the category of enhancement, also because it does not improve directly any ability.

The disease base account faces also a second problem. According to it, in fact, an intervention or a substance should be considered therapy when they operate on a disease. However, the classification of diseases is not constant. It would thus be easy for enhancers' developers (or advocates) to coin new diseases in order to "switch" the label of the service they provide from enhancement to therapy[31].

[29] N. Bostrom and R. Roache*, Ethical Issues in Human Enhancement*, 1.
[30] E.Juengst, and D. Moseley, *Human Enhancement*, 8.
[31] *Ibidem*.

In addition to that, once a technology or an innovation is applied as therapy, it would be difficult to avoid entirely its off-label use – that is, as enhancer.

This is not only a hypothesis for future innovations, but also a concrete reality for many drugs, as we have seen. Modafinil, Adderall and Ritalin are used to cure the deficit of attention disorder, but are now widespread among students to improve their academic performance (enhancing memory, focus, alertness etc.).

When the same substance can be used as a medicine or as an enhancer, depending on the medical situation of the person who assumes it, it is reasonable to imagine that doctors would have to diagnose a disease before prescribing it. The distinction between therapy and enhancement, then, could have a legal impact on doctors' duties and on the limits of proper health care.

Despite the issues faced by the disease-based-account, this interpretation still remains the best way to operationalize the distinction between therapy and enhancement.

In conclusion, notwithstanding the difficulties of finding an exact definition of human enhancement and of distinguishing it from therapy, for the rest of this dissertation we will consider as a working definition the one provided by Parens, enlarged to encompass also electronic and robotic means, not only biomedical ones, and interpreted according to the disease-based account proposed by Juengst, and Moseley.

1.4 Another Problematic Distinction: Enhancement/Technology

Before moving to the ethical analysis of human enhancement, we have to briefly mention another problematic distinction, that is, the one between enhancement and technology.

As noted by Bostrom and Roache, there seems to be an intuitive "internality constraint" according to which we perceive a tool or device as enhancement or therapy depending on how much it is integrated in our bodies:

> "[W]e may wonder how "internal" an intervention has to be in order to count as an enhancement (or a therapy). […] Without some requirement that an intervention be "internal", all technologies and tools would constitute enhancements in that they give us capacities to achieve certain outcomes more easily or effectively than we could otherwise do. If we insist on an internality constraint, as we must if the concept of

> enhancement is not to collapse into the concept of technology generally, then we face the problem of how to define such a constraint." [32]

As noted by Lin and Allhoff, the problem is not only how to define this constraint - that is, where to draw the line between enhancement and technology - but also, more fundamentally, to decide whether there is a real difference between the two things:

> "What is so different about incorporating tools as part of our bodies, as opposed to merely using them externally? […] A neural implant that gives access to Google and the rest of the online world does not seem to be different in kind to using a laptop computer or Pocket pc to access the same."[33]

The authors rightly suggest that the constant/permanent access to these devices would qualify as a substantial advantage compared to the non-enhanced one.
The issue will not be discussed further here, but before proceeding it is important to have it in mind, as in a later part of this dissertation we will try to highlight the real discriminant between technology and enhancement.

[32] N. Bostrom and R. Roache*, Ethical Issues in Human Enhancement*, 2.
[33] P. Lin and F. Allhoff, *Untagling the debate: The Ethics of Human Enhancement,* 253.

CHAPTER II

Ethical Issues on Human Enhancement

2.1 Anti-Anti-Enhancement

The focus of this dissertation is on soldiers' enhancement, a subcategory of human enhancement. In the next chapters, we are going to analyze soldier's enhancement from a historical and ethical standpoint. Before doing so, however, it is necessary to state and demonstrate logically that human enhancement, in general, is not inherently wrong. In fact, if the general category of human enhancement were inherently wrong, with no exceptions, then also the subcategory of soldiers' enhancement would be always wrong, and there would be no point in further analyzing it.

Therefore, in the present chapter we will not try to state that human enhancement is *good*, or that we have to actively pursue it. Instead, our conclusion will be that human enhancement, as most of the other innovations in human history, has no moral value *per se*, and its moral admissibility or inadmissibility depends on how it is pursued by and distributed among the population.

As noted by Allen Buchanan – whose bright analysis exposed in *Beyond Humanity?*[34] was essential for the development of this chapter – the two main positions that have been taken by ethicists regarding this issue are not *anti-enhancement* and *pro-enhancement,* but rather, in Buchanan's words, *anti-enhancement* and *anti-anti-enhancement.* According to the former view "enhancement as such and across the board ought to be avoided"[35] whereas according to the latter "enhancement is sometimes permissible".

As stated earlier, our aim is not to defend a pro-enhancement stance, but to refute the anti-enhancement one.

This chapter is divided in two parts. The first one is going to present and reply to the most common critiques to enhancement itself, which can be divided in two groups: critiques related to the human nature and the natural and critiques related to the issues of self-manipulation and inauthenticity.

Regarding human nature and the natural, we are going to question the so-called position of "deference to nature", and the analogies of the Master Engineer and of the House of Cards.

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[34] A. Buchanan, *Beyond Humanity?* (Oxford University Press, Oxford, 2011).
[35] *Ibidem*, 13.

Moving to self-manipulation, we will analyze the critiques regarding the atrophy of moral values, cheating, and spontaneity. Inauthenticity will be discussed mainly in two different domains: the one of feelings and the one of moral virtues.

The second part of the chapter is going to address those views according to which we should ban human enhancement not because it is wrong in itself, but because it would have adverse consequences on society. The main issue will be distributive justice. According to many authors, in fact, human enhancement could worsen the existing inequalities, adding a new social division, namely, the one between enhanced and non-enhanced individuals. We will state that the likelihood of this outcome depends on the distribution of and access to human enhancement technologies, but not on human enhancement itself.

The possible distributions resulting from the usage of human enhancement by the military will then be analyzed in Chapter IV.

2.2 Human Nature and the Natural

According to a widespread critique, human enhancement should not be permitted, because it is not our role – as human species – to change human nature, and especially human biology.

It would be a mistake, however, to consider biomedical human enhancement as the first human activity capable of shaping our own nature and biology.

A paramount example is the one of the agricultural revolution, which "significantly changed human beings' bodies by overcoming the stunting effects of under-nutrition, and altered their minds by facilitating neurological development."[36] Another example is the one of literacy, which concretely changed our brains[37].

Why should we judge biomedical interventions differently? Why should we accept the mainstream biomedical enhancement exceptionalism?[38]

We need to distinguish between the *means* of enhancement, that could matter morally, and the *mode* of enhancement[39]. The biomedical mode *per se* does not seem problematic.

The only real difference between the biomedical mode and the previous ones (aka agriculture, literacy etc.) seems to be that for the first time humans "are becoming

[36] *Ibidem,* 39.
[37] *Ibidem.*
[38] *Ibidem.*
[39] *Ibidem,* 43.

capable of changing their biology deliberately, in accordance with what they value, on the basis of scientific knowledge, rather than haphazardly."[40]

Under this perspective, biomedical enhancement does not seem morally different from other kinds of human enhancement – and it actually seems superior to them. Indeed, when the intervention is deliberate, the result is usually more closely watched and controlled, and also for this reason we can hypothesize that remedying to unintended consequences would be easier.

Simply put, a controlled and deliberate human intervention, aimed exactly at improving human biology, could be superior, in the outcomes, to the ones brought about by human interventions that were not supposed to change our biology (the agriculture revolution and the advent of literacy changed human biology as an unintended consequence, it was not their *goal*), and that have been further randomized by the evolution of the species, of the environment, and of the mutual interactions among these two factors, that shape each other.

This opinion is not shared by those who criticize human enhancement stating that we are not the ones in charge of affecting human biology, and that indeed we are not in charge of it because nature and evolution take care of it much better than how we could ever do.

Some authors explicitly express a form of "deference to nature". One of these is Francis Fukuyama, who expressed his ideas in the book *Our Posthuman Future: Consequences of the Biotechnology Revolution*[41].

Fukuyama is skeptical about the human capabilities of improving themselves through "causal intervention[42]", and believes, in his own words, that the "blind process[43]" of evolution could do better. This, according to the author, is due to the fact that our nature is far more complex than we usually think, and the "good" and the "bad" inherent in us are extremely intertwined[44].

The author's fear, therefore, is that a direct intervention on our biology would disrupt this fine equilibrium reached after thousands of years of evolution.

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[40] *Ibidem,* 1.
[41] F. Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution,* (Farrar, Straus and Giroux, New York, 2002).
[42] *Ibidme,* 97.
[43] *Ibidem,* 98.
[44] *Ibidem.*

Moreover, according to Fukuyama as well as Habermas[45], this alteration of our nature could "undercut our ability to ascertain the good"[46]. Fukuyama writes:

> Human nature is what gives us a moral sense, provides us with the social skills to live in society, and serves as a ground for more sophisticated philosophical discussions of rights, justice, and morality. What is ultimately at stake with biotechnology is not just some utilitarian cost-benefit calculus concerning future medical technologies, but *the very grounding of the human moral sense*[47], which has been a constant ever since there were human beings.[48]

The author expresses an assumption that "human nature provides a perspective without which we cannot make coherent, defensible judgments about what is good"[49].

Why, however, should we consider our moral sense completely dependent on our nature – so dependent that altering our nature could jeopardize it entirely?

For Fukuyama our nature is what gives us the ability to judge what is right and what is wrong. But we can also judge human nature itself, as the author himself does, saying that "good" and "bad" are both present in us.

The simple fact that we can make judgments *about* and *on* our own nature contradicts Fukuyama's assumption, as noted also by Buchanan, according to whom "we [human beings] possess a conception of the good by which we can and do evaluate human nature. This means that we have an evaluative perspective that is to some extent independent of our nature."[50]

Jeopardizing our moral sense, however, is not the only concern of those who criticizes human enhancement for its effects on human nature, which is seen as a "complex whole."[51] The idea that different traits are highly interconnected among each other means that trying to enhance a specific characteristic or ability could inadvertently alter – for the worse – also the traits we intended to preserve[52].

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[45] J. Habermas*, The Future of Human Nature* (Polity, Cambridge, 2003).
[46] A. Buchanan, *Beyond Humanity?*, 35.
[47] Emphasis added.
[48] F. Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (2002), 101-102.
[49] A. Buchanan, *Beyond Humanity?*,117
[50] *Ibidem*.
[51] *Ibidem*, 134.
[52] *Ibidem*, 154.

Also those who sustain the anti-anti-enhancement view acknowledge the risk of unintended bad consequences. Acknowledging the risks of an action or intervention, however, does not always require to ban entirely that action or intervention.

Indeed, recognizing that caution is needed when enhancing a specific trait, because of its probable connectedness to others, is different from stating that "[t]he human body and mind, highly complex and delicately balanced as a result of eons of gradual and exacting evolution, are almost certainly at risk from any ill-considered attempt at "improvement," as we can read in a report of 2003 by the President's Council on Bioethics.[53]

There is the idea, in these words, that the human species as it is right now is a "fragile […], finished product created by a Master Engineer – that is, a stable, completed masterpiece that can only be ruined by any human attempt to improve it."[54]

The analogy with a Master Engineer, however, is in contrast with modern evolutionary biology. As noted by Buchanan, first of all evolution does not act according to a plan, as an engineer would do. Secondly, evolution is never *completed*, but always a process – there are no stable organisms. And even if our species were a complete, stable product, evolution "does not produce harmonious flawless objects: it cobbles together unstable products [and] the fact that natural selection *has* operated on a trait does ensure that the trait *is* optimal."[55]

We tend to confuse, indeed, the mere fact that evolution shaped us the way we are now, with the idea that this form is definitive and perfect, and that evolution could not transform us in something very different in the future – even a different "post-human", if you like, species, that is exactly one of the things feared the most by the anti-enhancement authors - forgetting that evolution itself could indeed evolve us into a different species. One of these authors is Nicholas Agar, who in his book *Humanity's End* firmly rejects what he calls "radical enhancement", that is "likely to create beings that do not belong to the human species."[56]

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[53] President's Council on Bioethics, *Beyond Therapy*, National Bioethics Adivsory Commission, Whashington, DC (2003), 287.
[54] A. Buchanan, *Beyond Humanity?* 156.
[55] *Ibidem.*
[56] N. Agar, *Humanity's End – Why We Should Reject Radical Enhancement*, 12-13.

Moreover, evolution shapes the species for "reproductive fitness, *not what human beings rightly value*."[57] So even if our organism were a flawless object, stable and complete, it would be so for the aim of the *species' survival*. There is no reason to assume that this would coincide with what we care about, especially from a moral standpoint[58].

It is important to note that Fukuyama himself wrote something very similar regarding the nature of evolution, in a somewhat contradictory fashion with his idea regarding human nature. Indeed, the author wrote: "evolution may be blind process, but it follows a ruthless adaptive logic that makes organisms fit for their environments."[59]

Buchanan brightly replied also to a different analogy of evolution, the one of the House of Cards, that in a sense is opposed to the Master Engineer.

According to the House of Cards analogy, we should restrain from any intervention on our biology not because it constitutes "the result of a masterful design, but because they are so poorly designed they are exceedingly fragile."[60] The equilibrium reached by different elements is precarious, and thus any intervention could easily disrupt it, with sure adverse consequences.

This argument, however, can actually be used to advocate *in favor* of human enhancement: "if the human organism is so poorly designed as to be exceedingly fragile, then we may need to improve it if we are to survive."[61]

However, we have to remember that the analogy of the House of Cards is not appropriate, just as the Master Engineer's one. In fact, our biology is neither a perfect and stable product – as the Master Engineer analogy assumes – nor the result of an incredibly fragile balance that could be altered and ruined at the minimum intervention. The fact that evolution is a process, and that our species continues to change and be reshaped, does not imply the fragileness of each of its stages.

Buchanan has identified another flaw of these analogies of evolution, which ignore "the fact that organisms not only react to their environments but also shape them."[62]

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[57] *Ibidem,* 158.
[58] *Ibidem.*
[59] F. Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution*, 98.
[60] A. Buchanan, *Beyond Humanity?*, 158.
[61] *Ibidem.*
[62] *Ibidem.*

In this paragraph, we have replied to those who criticize human enhancement stating that "it is not our role to alter our biology" showing that, indeed, we did it before and we constantly do so shaping the environment in which we live. We have also replied to the critics according to which every trial of improvement is doomed to fail – and would have unintended bad consequences – showing that these assumptions are based on wrong analogies of evolution. This is not to say that there is no risk of unintended bad consequences. Rather, we are saying that there is not the certainty that bad – very bad – consequences will unfold, and without this certainty there is not reason to ban human enhancement all together, without discerning among different kinds of intervention and without studying further the probability and gravity of these unintended consequences. In the next paragraph, we will analyze a different set of critiques, concerning self-manipulation and inauthenticity.

2.3 Self-Manipulation and Inauthenticity

There is little doubt that human enhancement can be considered a form of self-manipulation, if this label is used without any moral judgment. The practice inherently involves humans trying to improve either themselves or their species through different kinds of alterations and interventions. If we could take a pill that makes us smarter, or more confident, or more focused etc., the act of taking it is out of doubt a form of self-manipulation.

There is no reason, however, to consider self-manipulation morally demeaning or wrong. There are many instances in life in which we consider ourselves as objectives – objectives of our own acts. Self-blinding, restricting options or setting up rewards are "strategies" that we use to manipulate ourselves into doing what we consider the right thing at the moment we pose the manipulation.

Indeed, in many circumstances self-manipulation is not only tolerable, but is a moral obligation[63]. Self-manipulation *per se* is not morally wrong. We need to distinguish, of course, between appropriate and inappropriate self-manipulation.

There is no reason, however, to conclude that human enhancement belongs all together to the latter category.

[63] A. Buchanan, *Beyond Humanity?*, 158.

Buchanan analyzed what he believes to be the chief moral risks of self-manipulation –namely atrophy of the moral values, cheating and loss of spontaneity – in order to see if any of them is especially great in the case of biomedical enhancement[64].

Regarding the *atrophy of the moral values*, some authors are concerned that getting used to enhancers (which give us a quick fix to our problems), we might lose – or at least weaken - our capacity to deliberate morally.

A similar, more general, worry is usually pronounced in the opposition of various forms of technology, especially "technological shortcuts". However, saying that avoiding the use of the shortcut would be *better*, does not imply that it is not morally permissible. For example, it might be better to use our own sense of orientation to get to our destination while driving, but this does not imply that using a GPS is *wrong*[65]. "Life is not a contest in which the goal is to do everything in the most difficult way"[66], writes Buchanan. And in my opinion this is an important point that we should never forget when talking about human enhancement. Overcoming difficulties with great efforts can be praiseworthy, or can be stupid, depending on whether cleverer and less demanding ways to overcome the same problem were available. Sometimes it is both things. We tend to have the idea that shortcuts are always wrong, that they involve something that we should not do, or that they qualify as *cheating*.

Cheating is one of the major critiques against the use of enhancers, especially in the fields of sports and academia[67].

In a broad sense, we can agree that using enhancers in these fields qualify as cheating –at least right now. In fact, both sectors do not tolerate the usage of enhancers to boost performance, be it physical or cognitive. This is particularly evident in the case of sport, where doping is explicitly banned and severely punished.

In the academia, the use of cognitive enhancers qualifies as cheating because those substances are being used off label, being prescribed exclusively as a cure to deficit-of-attention-related diseases.

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[64] Ibidem, 93-94.

[65] Moral powers are not so different from technologies: "traditional moral education involves technologies, such as rule-following, that are designed to replace moral deliberation about particular matters", writes Buchanan, *Ibidem,* 95.

[66] *Ibidem*, 95.

[67] E.Juengst, and D. Moseley, *Human Enhancement*, 9-11.

These, however, are cases related to two very specific fields, that do not concern us neither now, while analyzing the general category of human enhancement, nor later, when we will be dealing with soldiers' enhancement.

We can briefly highlight the fact that, as we just stated, enhancers qualify as cheating in these sectors *because of the current rules*. Rules could obviously change in time. Moreover, concerning sport, for example, certain advantages are considered "unfair" while others just unfortunate, but still permissible[68].

If we agree on saying that "the virtuous perfection of natural talents is the point or goal or end of sport"[69], enhancers could be considered an unfair advantage, but this statement could be easily attacked. If all the athletes had access to the enhancers, the playing field would be even. With the same "help" the difference in performances would be attributable again to natural talents alone. And if this raises concerns of indirect coercion on athletes, a possible reply would be the establishment of a "Super Olympics, featuring athletes universally equipped with the latest modifications and enhancements" [70], proposed by some authors.

In my opinion, however, we should be aware of slippery slope in this case, as this could represent the first step towards fostering the development of enhancements that we do not actually *need*, or are useful, but are simply *entertaining*.

Regarding academia, here we will just hint at to two different points.

First of all, the fact that many students feel the need to take enhancers in order to respect course-related deadlines as well as engage in extracurricular activities clearly indicates the exhausting level reached by some top-tier universities, that are simply too demanding.

Second, the use of enhancers in this field is usually criticized because of a) the off-label use of the substances b) the assumption that these enhancers are "magic" pills that do all the job at your place c) the fact that assuming them deprive the students of the process of learning, that is far more valuable than merely knowing things, as it entails also learning how to focus, to self restraint etc. We can briefly analyze these points.

Point a) simply entails the adherence to a rule, but says nothing on the moral value of this rule. Here it will suffice to remind that, as we have seen in Chapter I, the

[68] *Ibidem.*
[69] *Ibidem,* 10.
[70] *Ibidem,* 9.

distinction between therapy and enhancement – on which this point depends – is far more complicated than it seems at first glance.

The other two points are interconnected: enhancers could seriously hinder the process of learning (with all its value attached) only if they were *extremely* powerful, to the point of completely eliminating the effort of the students. It seems to me, however, that the substances developed so far do not reach this level.

Would the use of enhancers bring about the atrophy of moral values of the students? I doubt so, given the fact that spending the whole day and night studying help shaping only a very limited set of moral values.

We will not develop a fully analysis of this issue here, however, and thus it is not possible to conclude strongly in favor or against the use of enhancers by students. I will just suggest remembering Buchanan's quote, cited above: "life is not a contest in which the goal is to do everything in the most difficult way".

Enhancers boost our abilities in certain fields – the current and most widespread at the moment improves our concentration, attentiveness and memory. The most evident and probable side effect is that of becoming addicted to the enhancer. The substances could become necessary for us to complete certain tasks. The risk of atrophy is not that of the atrophy of morality, but that of our ability to, for example, focus without external aid.

It is more difficult to reply to the cheating critiques. But this is because cheating inherently depends on relative, not absolute parameters: objective rules established for the correct behavior while performing a certain activity (especially competitive ones), and the behavior and performances of the other competitors.

Cheating in the end means getting a grade, a ranking, etc., that you did not deserve. And you did not deserve it because – in the case of the enhancers – you received an extra aid that is either prohibited by the rules, or unfair -- as it gives an advantage that the other competitors do not have.

As noted before, however, rules can change. They usually do not embody an absolute moral value. In the case of sports, we saw that a simple solution – even if it has to be taken carefully – would be the one of establishing different categories for the athletes taking enhancers. We can see that it is not taking enhancers itself that constitutes cheating, but the fact that they give an unfair advantage. If we can eliminate this advantage, the issue of cheating disappears.

Moreover, this applies to the field of sports and not only the general field of sport, but sports *competitions*. The purpose of the competition is seeing who arrives first, who wins. Can we say the same about education? In my opinion, any model of education that qualifies the students as competitors, and that has as main purpose ranking the best students, has worst moral problems than cheating.

The goal of academia is studying, learning and increasing knowledge.

If enhancers actually help the students to learn and, for example, consolidate memories better, can we still qualify it as cheating? Who are the competitors that are suffering from the unfair competition?

I have personally met many students who take enhancers, and many others who do not. Of course the few cases I know about cannot be considered a real statistic, but from my experience I noticed that usually, the ones with the highest grades are not taking enhancers – they do not *need* them to excel.

Moreover, if we move the analysis from the students to professors and researchers, we have to ask ourselves the following question. If taking an enhancer could help a scholar to greatly improve his research, with various positive outcomes not only for his careers but also for his field of interest, would we still consider it *cheating* because other researchers do not use enhancers? I doubt so.

The discussion held so far is not exhaustive, but we can highlight the fact that enhancers themselves do not qualify as cheating. Cheating depends on relative parameters that can change with time, and vary greatly from field to field. In the specific field of soldiers' enhancement, for example, the issue of cheating is not a real matter of concern. It would be unrealistic and illogical to state that a soldier taking a pill that improves his chances of survival is *cheating* because some of his fellows do not do the same, nor that it is unfair that the enemies do not dispose of the same enhancers.

The presumption in favor of soldiers' enhancement, however, is going to be analyzed in chapter IV. Now, we can turn to another moral risk self-manipulation analyzed by Buchanan, beside the atrophy of moral value - namely, that of the *loss of spontaneity.*

According to this critics, using enhancers to control and improve every aspect of our life – both our performances and our feelings – would be morally wrong as it entails treating ourselves as *mere things* and giving up on any form of spontaneity.

As noted by Buchanan, there are already people who more or less think and act in this way, even without taking enhancers.[71]

Could enhancers worsen this situation? Possibly. Is this a disadvantage great enough to discourage us to develop and use enhancers all together? Hardly. Especially because this obsessive use of enhancers would be pursued by the same people who already have this kind of mindset and lifestyle *without* using enhancers.

Moreover, using this kind of reasoning to ban enhancers would, in my opinion, qualify as a great violation of respect of autonomy, and in general with the individual freedom of choice – a choice that does not harm others.

It seems to me that the loss of spontaneity actually hints at two different problems: the risk of an abuse of these substances, and the inauthenticity (that we are going to analyze in the next paragraph).

The risks related to the *abuse* of a substance are usually different with the risks (especially the moral ones) related to its simple *use*.

Consider the following two examples. There is nothing morally wrong with the consumption of alcohol, but its abuse can arise concerns of various natures; in a similar way, medicine are most certainly helpful and socially accepted, but wrong and excessive doses could be lethal.

Simply put, the risks related to the abuse of enhancers are not a reason strong enough to ban their use – as we do not ban other substances for the risks related to their abuse.

Having replied to the critique of self-manipulation, with its two major risks (atrophy of moral values, especially through cheating, and loss of spontaneity), we can now turn to the inauthenticity issue.

Do enhancers render us *inauthentic*? The action we pursue, or even the thought we have while on the effect of mood-enhancing drug like Prozac, still count as authentic?[72] The answer could have not only moral underpinnings, but also legal ones, connected to the legal accountability of a person under the effect of some enhancers, especially the mood-boosting ones, that generally trade off – to different degrees – some level of lucidity.

[71] A. Buchanan, *Beyond Humanity?*, 97.
[72] *Ibidem*, 101.

There are two ways to explore this question. One has to do with our intuitive assumption that "artificial" equals "inauthentic". We will see that enhancers do not necessarily render us less authentic – actually, quite the opposite is true. Later, we will explore the possibility that this is the wrong question to be asked all together.

Starting with the first point, I think it is important to note that not only enhancers but also our personal, "natural" condition makes us feel and act in a way that we do not consider authentic. Consider, for example, the fact that people who suffer of depression often describe the effect of this pathology as "not feeling like themselves". Depression and other forms of mental illness can hinder us from pursuing an "authentic life". When these disorders are severe, they might indeed control and affect entirely the life of the individual. And if you are not in control of your own life, how can it be authentic?

Sometimes our own biology, even in the absence of any disease, tricks us. Perfectly healthy women experiencing Pre Menstrual Syndrome know this feeling too well. In this case, a high, unmotivated sensitivity, completely "natural" (= biological) is perceived as extremely inauthentic, in so far those feelings are disconnected to any real fact or events – they are simply the consequence of a hormonal change.

We can consider this "natural inauthenticity" another example of the deficiency of our biology, and another reason for which we should not uncritically consider "natural" a synonym for "better" or "authentic".

Indeed, artificial substances can help us to restore our authenticity, hindered by natural (=biological) conditions. This is the case of mood-enhancers, or in some circumstances painkillers. If an artificial substance counterbalance the inauthenticity caused by a natural condition, we clearly see the fallacy of the assumption that something artificial is more prone than something natural to cause inauthentic acts.

There might be substances that render us inauthentic, and there are a variety of reasons why we should be wary of this inauthenticity (the most important one in my opinion regards the legal accountability). However, there might be also substances that in specific cases make us *more* authentic, not less, as we have just seen. This is enough to conclude that the inauthenticity issue demands a case-to-case analysis, but we cannot rule out completely the category of enhancers (especially mood enhancers, that are the most targeted ones by this critique), because of their alleged effects on our authenticity.

At a deeper level, we should ask ourselves whether the inauthentic consequences of an authentic (meaning, rationally and well informed) act could really be considered inauthentic. If when we chose to take a pill we know that it might give us feelings that are not authentic - in the sense that without that substance we would have not experienced them – we are still authentically choosing to take the substance and to have those feelings. Can we really consider this is "inauthenticity"?[73]
In my opinion, this issues concerns *desirability* more than morality. Framed this way, the debate around mood-enhancing pills reminds me of Nozick's famous Experience Machine:

> "Suppose there was an experience machine that would give you any experience you desired. Super-duper neuropsychologists could stimulate your brain so that you would think and feel you were writing a great novel, or making a friend, or reading an interesting book. All the time you would be floating in a tank, with electrodes attached to your brain. Should you plug into this machine for life, preprogramming your life experiences? [...] Of course, while in the tank you won't know that you're there; you'll think that it's all actually happening. [...] Would you plug in? *What else can matter to us, other than how our lives feel from the inside*?"[74]

Nozick formulated this provocative experiment to refute ethical hedonism, but we can clearly see how those who critique enhancers because of their alleged inauthenticity could use the author's argument. As noted by Nozick, we do not only want to *feel* certain things, but we also want to *do* certain things, and *be* a certain person. "Someone floating in a tank is an indeterminate blob", writes Nozick.[75] Obviously, his example is too extreme to represent an accurate analogy for mood-enhancers – in the end, people who use mood-enhancers still get to do things, and be whatever they want to be. As we have seen, enhancers can actually help them to do things in a more authentic way and in being more authentic.
Nozick's point, however, is as powerful as intuitive. We do not want just to feel good – we want that happiness to be authentic, meaning, to be caused by something that is real.

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[73] A similar reasoning can be used to justify the use of enhancers in general, not only for mood enhancers: "if one has freely chosen to use an enhancement on the basis of speech and deeds, it is unclear how those enhancements are passive or less authentic than traditional methods of improving one's capacities", write Juengst and Moseley, *Human Enhancement*, 12.
[74] R. Nozick, *Anarchy, state, and utopia* (Basic Books, New York), 1974, 44–45.
[75] *Ibidem*, 45.

When a person is happy, but ignores the fact that his/her partner is unfaithful, one could say that his/her happiness is inauthentic. We would think that part of that happiness depends on a deception, and that that person would probably not be happy if he/she were fully informed of the facts.

It is very easy to agree with what we said so far. However, two things have to be noted regarding the resemblance between the inauthenticity caused by enhancers and the one of the Experience Machine. First of all, Nozick's example is, obviously, provocative, and it has to be intended as directed against hedonism, to demonstrate that we do not care exclusively about mere pleasure and pain. However enhancers, - even mood-enhancers, do not have the exclusive goal of making us feel better. These substances can enable individuals to *do* real things, in the real world (not in a tank) that can in turn increase our well being and that define us as a person much more than the mere label of "enhancers' user". Secondly, the intuitive answer to Nozick's Experience Machine might be dependent on how the two alternatives (living an unhappy, real life, or a happy life in the tank) are framed. According to some authors, the choice not to live trough the Experience Machine is heavily affected by the so-called "status quo bias", and the issue of inauthenticity is marginal. Dan Weijers reports the general, intuitive preference of people for the maintaining of their status quo, especially when the alternative offered is unfamiliar.

The experiment of the Trip to Reality can be considered a test and a reply to the Experience Machine's one. In the scenario proposed by this experiment, the status quo entails living already in the experience machine. When given with the opportunity to switch and experiment the "real" outside the machine, we might find out that many things are extremely different from our status quo, and in some regards worse. At this point, you can chose to go back to your previous life. You will also forget that that life is not in fact real. Dan Weijers writes:

> "In my experience of presenting the two scenarios, dramatically more people choose a life in an experience machine when considering the Trip to Reality thought experiment than when considering the experience machine thought experiment. Initial empirical results from experimental philosophy endorse this claim. "[76]

[76] D. Weijers, *Intuitive Biases in Judgements about thought experiments: The Experience Machine Revisited*, Philosophical Writings, N. 50&51 (2011).

Framed this way, the prospect of inauthenticity becomes less pressing and less important than our desire to feel better. Authenticity, simply put, is not an absolute value, is not a *sine qua non* required in order to live a valuable, happy and moral life. Of course, it is desirable. But we should not forget two main points. First of all, we demonstrated that inauthenticity is not an inherent consequence of enhancers. Even when some degree of inauthenticity is indeed caused by the enhancers – for example regarding our mood – they can enable to pursue authentic tasks and goals, with an overall positive balance in an hypothetic "authenticity scale".

Secondly, authenticity is desirable, and I am quite sure that an individual suffering from depression would choose to feel better thanks to more "authentic" means than pharmacological substances. But the reason why people feel the need to take mood-enhancers is that "natural" happiness is not an option. We can agree on saying that we might chose to have a fulfilling and happy life without any artificial help – but this might simply not be one of our alternatives.

When someone is suffering from severe depression, but more socially acceptable therapies (as talking with a professional) do not work, would you tell him that he should restrain from any pharmacological help because that could, possibly, make him feel better in an inauthentic way? Even if that feeling better could actually help him have a more authentic life, or could establish a virtuous circle that could eventually make them reach the same level of happiness also without the mood-enhancers?

In my opinion, this is the question that we should ask ourselves, and the answer should be a straight forward no.

The issue of inauthenticity, however, does not entail only concerns regarding inauthentic *feelings*, but also one regarding inauthentic *virtues*.

Ingmar Persson and Julian Savulescu wrote a whole book on the possibility and desirability (indeed, the *need*) of our moral enhancement[77]. According to the authors, the moral capacities that we are currently equipped with are insufficient to manage the challenges our species now face – namely, the unsustainability of human life on earth in the long run. For them, the solution to climatic and environmental problem is not entirely technological, or political, but also to a great degree moral:

[77] I. Persson and J. Savulescu, *Unfit for the Future: The need for Moral Enhancement* (Oxford University Press, Oxford, 2012).

> "Without a willingness to make personal sacrifices for the sake of people in remote countries and in the remote future, there will in all probability not be enough of an effort to develop and put to full use a technology that could arrest or significantly lessen anthropogenic climatic and environmental degradation. […] [We] must exercise a stronger motivational influence and overcome the limitations of our altruism and sense of justice." [78]

In order to do so, Persson and Savulescu advocate what they called moral bioenhancement – that is, new biomedical interventions able to enhance our ability to choose and act morally.

The authors acknowledged some of the critiques that their idea faces, as the one according to which, if the moral bioenhancement took place, it would "turn us into mindless robots who do not act for reasons."[79] This critique is, in the end, a critique of inauthenticity, as noted by Buchanan. Virtues created artificially are not real virtues, are pseudo-virtues, the critics goes – real virtues are not created in this way.

But in *what* way? "The development of will never comes about solely through the efforts of the individual's exercise of will"[80], writes Buchanan. Indeed, to a greater or lesser degree, our moral virtues depend on our moral *education*. Parents usually employ different "technologies", such as punishment and exposure to good behavior, in order to ensure that their children develop certain moral values and virtues[81]. These methods are employed without the child's consent, and might also entail coercion. When not exaggerated, they are part of a mainstream education.

Two important lines of reasoning can depart from what we have just said.

First of all, Persson and Savulescu argue that moral biomedical enhancement should be included as part of a normal child education, as there is no substantial difference with the methods that we already utilize[82] - this type of enhancement would restrict their freedom and responsibility in the same way of the current methods.

Secondly, Buchanan highlights the fact that when an adult consciously decides to assume a pill that will enhance his moral abilities (for example, his sense of justice and his altruism), he is exercising his own free will much more than a child does while receiving his parents' education[83]. In a way, the virtues an adult decides to

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[78] *Ibidem,* 104-105
[79] *Ibidem,* 112.
[80] A. Buchanan, *Beyond Humanity?* 110.
[81] *Ibidem.*
[82] I. Persson and J. Savulescu, *Unfit for the Future: The need for Moral Enhancement*, 113.
[83] A. Buchanan, *Beyond Humanity?* 111.

possess assuming an enhancer are *more* authentic than the ones arousing as a consequence of education.

For these reasons, I do not believe that moral enhancement could qualify as inauthentic. But ounce again, we have to ask ourselves if the issue of inauthenticity is so important for us that it trumps any other considerations.

Assume for a moment that, indeed, virtues caused by moral enhancers are inauthentic. They are still *virtues*, even if developed through an "artificial" way. Virtues are not only a value *per se*, but also because of the positive outcomes that they usually generate, in a more direct or indirect way. Being altruist, for example, is praiseworthy not only because of the abstract value of altruism, but because it concretely increases others' wellbeing. From a utilitarian point of view, the increased wellbeing of others[84] – as well as the one of the individual the gains could outweigh the losses.

This line of reasoning is similar to the one that we have applied when replying to the critique of inauthenticity towards mood-enhancers. The positive utility generated from something inauthentic can outweigh the negative utility of inauthenticity itself, with an overall positive balance.

As we can see, even assuming that enhancers make our choices, acts and feelings inauthentic – and we have seen that this is not the case – this critic is not strong enough to ban all together their use, unless one argues that *all that matters* is authenticity. This would be an unrealistic standard that would imply condemning all together every form of education or self-restraint, *de facto* suggesting we should go back to prehistoric times.

Self-manipulation and inauthenticity are certainly issues that we have to be aware of, so that we can implement a strategy to avoid the worst-case scenarios (or any negative scenarios) they highlight.

These issues, however, are not contingent enough to conclude that human enhancers are *inherently* morally wrong. Moreover, as we have noticed, they often refer to specific cases or fields in which the enhancers are assumed (sports and the academia for the self-manipulation and cheating issue); or to a specific type of enhancers (as mood-enhancers and moral bioenhancement for the inauthenticity issue).

[84] As well as of the person being altruistic, as it is usually stated that helping others has a variety of beneficial effects not only for those who receive, but also for those who give their help.

Therefore, we can now move to the third and last issue that is going to be analyzed in this chapter – namely, distributive justice.

2.4 Distributive Justice

Issues of fairness and inequality are probably the most common concerns regarding human enhancement. Every author expresses his distributive justice worries in a specific way, but many share the bottom line of this critique, which can be summarized as follows.

If there were enhancers capable of making us – or our children - smarter, stronger, and healthier, they would be extremely expensive, being a cutting edge technology able to bring about incredible benefits to those who utilize it. This would mean that only the wealthiest ones, the better off, could have access to them.

For the medium and lowest strata of the society, competing with the advantages given to the upper socio-economical classes is not easy even today. If the benefits of the enhancers were to be added to those of wealth, the competition for jobs and key roles in society would be even harder – if not impossible – for the worst off. Some authors note that the enhanced could also "band together and exploit the unenhanced."[85]

Therefore, social mobility would be more difficult than today. A situation of complete social immobility could be reached, the critique goes on, if the enhancements were genetically encoded, and thus it was possible to transmit them to future generations. In this case, the enhanced could even evolve into a different species, most likely in possess of the majority – if not the totality - of wealth and power.

To sum up, many authors are concerned about the risk of human enhancement to greatly increase the existing inequalities. There are various ways to assess this critique.

First of all, we have to remember than in the history of humanity, especially in the last two centuries, with the industrial revolutions, the latest technologies have always been accessible only to the wealthiest one, *right after* their development. After this initial period, however, when the production becomes more efficient and widespread, with a consequent decrease in prices, the innovation spread among other social

[85] Bostrom, Nick and Roache, Rebecca, *Ethical Issues in Human Enhancement*, in *New Waves in Applied Ethics* (2008), 15

classes, benefitting them as well. Even if human enhancement is not usually described as a "technology" for sure it is an innovation that entails sellable goods - as enhancers pill or services, as biomedical interventions.

It is true that by the time the initial technology is available to at least the middle class, there will probably be an improved version of that technology – in this case, obviously, the enhancers – that is again accessible only to the better off.

This is the case, however, not only for enhancers, but also for the majority of the products of cutting edge technologies. Why should we consider this inherent inequality tolerable for any given type of innovation, but not for enhancement? It would be a sort of unjustified biomedical exceptionalism.

One could reply that the inequality caused by enhancement would be greater in degree than the one produced by more "common" types of technologies. This would be because the advantages given by the enhancers are much more functional to compete for jobs and key positions in society than those provided by the latter[86].

Simply put, the inequality in access to enhancement has a greater effect on the inequality of wealth, resources and political power than unfair access to other goods and services.

This argument, however, is flawed. This is because enhancement is more similar to a technology, depending heavily on research and innovation, than, for example, to education.

A technology, as we said before, improves rapidly. This means that, even if the better off will always have exclusive access to the latest version of an enhancer, that version will not be the most up to date for a long period of time. Meaning that the other social classes will be able to catch up with the previous version fast enough to avoid the further widening of the gap between them and the elites. The gap could hardly ever become wide enough to cause social immobility, simply because of the fast improvement of technologies.

It is important to note that the potential speed of research and development in this field is acknowledged also by those who critique human enhancement, as does Nicholas Agar referring to Kurzweil's law of accelerating returns[87] - based on a

[86] G. Bognar, *Enhancement and Equality,* in Ethical Perspective 19, no. 1, Centre for Ethics, KULeuven (2012).
[87] N. Agar, *Humanity's End*, 37.

generalization of Moore's law – according to which technological change is exponential, and not linear.

A service like education, on the other hand, is influenced by innovations in a much slower way - meaning that the *content* of what is taught may change rapidly in certain fields, but the mode of the service itself does not.

Being born in a wealthy family in a developed country increases dramatically the chances of getting admitted to - and, more importantly, of being able to afford the tuition of – a prestigious university, which in turn is often fundamental to reach a certain socio-economic position.

Those who do not have the resources to get a higher education might as well reach the same position. However, we have to recognize that the advantage given by education, for example attending a prestigious university is huge.

We can imagine that the impact of enhancement would be similar to that of education.

However, the gap between the education accessible to the better off and the worst off would still be greater than the gap in enhancement levels. This is due to the fact that we consume products and interventions at a faster pace than education, and that those products and interventions evolve and improve more rapidly than education.

Simply put, the middle class might be able to afford the same enhancers that the elites used two or five or ten years before – but it might never get into an Ivy League school.

Another way to address the inequality issue is to remember that the distinction between therapy and enhancement might play an important role in shaping the fairness and equality of access to enhancers. The more they are considered as therapy, the more is probable than pills and interventions would be covered by health insurances, or in many states by national health services. If this were the case, then there would not be any reason to assume that only the better off would have access to enhancers.

This, however, is a political (as well as ethical) problem that has to be assessed once it is already established that a complete ban on human enhancement should not be enforced. What we are trying to demonstrate here, however, is the previous step – that such a ban is not necessary.

The risk of an unequal and unfair distribution of enhancement is real, and we should be aware of that. This does not imply that this risk is great or certain enough to conclude that human enhancement should not be pursued.

Enhancement critiques raise another inequality concern, due to the fact that the goods provided by human enhancement are often considered *positional goods*. Bognar defines them as "goods that confer an advantage only if other have less of them"[88], and gives height as an example - "if height-enhancement technology is provided to everyone, the advantages disappear. Positional goods are inherently scarce."[89] For this reason, there will be "an incentive to try to restrict the access of others to the therapy."[90]

One way to reply to this critique is saying that the goods most likely to be targeted by enhancement interventions, such as intelligence, are not purely positional, as they "provide benefits in absolute (rather than purely relative) terms."[91]

Buchanan presents this reply in a more developed and sophisticated way. First of all he states that human enhancement is likely to increase productivity, thus benefitting society at large, and not only the enhancement-holders.

Moreover, according to the author "the enhancements that are most likely […] to become widespread […] will often exhibit what economists call *network effects*: the benefit to an individual of being enhanced will depend upon, or at least be greatly augmented by others having the enhancement as well."[92]

For example, intelligence - one of the most debated on and targeted topic by enhancement's critiques - is usually considered a good having network effects.[93]

There are no conclusive arguments to state whether the effect of enhancement on inequality would be positive or negative in the long run. Are the risks of an increased inequality so great that we should avoid developing enhancement all together? From the analysis presented above, I doubt so. But is this even the right question to answer?

In the end, issues of equality and fairness are concerned with the *distribution* and the *access* to a good or service, not with the *morality* of that good or service. As noted

[88] G. Bognar, *Enhancement and Equality,* 17.
[89] *Ibidem.*
[90] *Ibidem.*
[91] *Ibidem,* 21.
[92] A. Buchanan, *Beyond Humanity?*, 26-27.
[93] G. Bognar, *Enhancement and Equality,* 21.

by Fritz Allhoff, we have to differentiate between enhancement *itself* and its *distribution*[94].

According to the author under a libertarian model, as the Nozickean one, an unequal distribution could occur, but other models exist:

> "A Rawlsian, for example, could argue that the upper class may make themselves better off […] only insofar as they improve the situation of the least well-off class. […] Perhaps genetic enhancement fort he wealthy would only be permissible if the wealthy subsidized the genetic enhancement of the non-wealthy. There are, of course, other distributive schemes as well. […] Regardless, the obvious point is that genetic *enhancement procedures alone will not lead to unjust results; there would have to be an unjust distributive scheme to enable the injustice to come about.*"[95]

Saying that we should not develop and practice human enhancement because its distribution would be unfair is different from saying that human enhancement is wrong.

If enhancement were morally wrong, there would not be a distribution fair enough to make it morally acceptable. We would not even care about its distribution - we would stop at the step before. But we cannot reverse the argument – we cannot say that since a distribution of that good could be morally wrong, than that good is also wrong. Concerns over inequality cannot be used to demonstrate the inherent moral wrongness of enhancement.

The risk of unfair distribution and access exists, and we should not underestimate it. We demonstrated, however, that an unfair distribution is not the only possible outcome. For the purposes of this chapter, this conclusion is enough - we do not need to embark in an analysis of different models of distribution, or to try to assess if the probability of an unfair distribution is so great that it does, indeed, discourage us from promoting enhancement.

In fact, the aim of this chapter was way more modest. We analyzed the morality of human enhancement, replying to its most common critiques, and we can now conclude that human enhancement is not inherently morally wrong. This, however, does not automatically imply that in practice every enhancement intervention is

[94] F. Allhoff, *Germ-Line Genetic Enhancement and Rawlsian Priamry Goods*, in Kennedy Institute of Ethics Journal, Vol 15, No. 1, The Johns Hopkins University Press (2005), 44.
[95] *Ibidem,* 44-45.

always admissible. There are risks that we have highlighted and analyzed, and that we have to be aware of, as the inequality issue.

2.5 Conclusion

In this chapter we have analyzed and replied to the most common critiques against human enhancement. These can be divided in three groups: the ones related to nature and the natural, the ones related to self-manipulation and authenticity, and the ones of distributive justice.

Regarding human nature and the natural, we highlighted first of all the fact that we have already altered our biology through past evolutionary steps and innovations, such as literacy and the agriculture revolution. Our nature, our biology, is not a final, stable and perfect product, as the analogy of the Master Engineer implies. On the other hand, it is not even so fragile that any intervention could disrupt a precarious internal equilibrium with catastrophic effects, as the House of Cards' position suggests. We also noted that the fact that we can judge the morality of our nature – stating, for example, that the human nature encompasses both good and bad – implies that our sense of morality is independent and in a way external to our own nature. This means that altering our biology is not bound to disrupt our sense of morality.

For the self-manipulation critique, we have analyzed the critiques regarding the atrophy of moral values and spontaneity. We have focused on the complex issue of cheating, showing that cheating depends on relative parameters such as rules – that might change with times and anyway might be unrelated to strong moral values – and the actions pursued by competitors, or other persons in the same field.

Regarding spontaneity, we briefly noted that self-manipulation is already a common "lifestyle", not dependent on enhancement, and that it entails a liberal, autonomous choice of the individual, a choice that we should respect.

After this, we moved to the authenticity issue, in two different domains: feelings and virtues. We have demonstrated that enhancers do not imply inauthenticity; actually, they can render our actions more authentic. This becomes evident when we break the assumed absolute correlation between "natural" and "authentic". Moreover, we showed that authenticity is desirable, but not a *sine qua non*. Its lacking can be easily counterbalanced by various positive outcomes, both in a hedonistic way – feeling

better – and in an utilitarian way – when our enhancers-boosted actions also generate increased utility for others (and for us as well).

Finally, we analyzed the critique according to which developing and selling enhancers would increase inequality within the society. We replied with four different points.

Firstly, we compared enhancement to technological innovations. It is possible that at the beginning only the best off would have access to enhancement (as usually occurs with technological innovations), and in a second moment they would have a privileged access to the latest development of enhancers. But the fact that new versions would be available soon means that the prices of the previous ones would decrease in a short period of time. In this way, the middle and lower strata of the society would have access to enhancers fast enough to catch up with the higher strata, or at least fast enough to avoid the widening of the existing gap.

Secondly, we highlighted the fact that, depending on how enhancement will be considered and regulated, it might be that health insurances and national health services will cover their costs, partly or entirely. This would diminish or even eliminate the risk of an unequal and wealth-driven access to enhancers.

Thirdly, we replied to the critique according to which enhancers are positional goods using Buchanan's point, according to which many of the abilities targeted by enhancement have positive network effects.

Finally, we distinguished between enhancement itself and its distribution. An unfair distribution of a good or service can qualify as a moral wrong, but this does not imply the moral wrongness of that good or service.

In the following chapters, we will present and analyze the use of human enhancement applied in the military field. A range of issues are going to be discussed, among which also the inequality one.

Simply put, if in this chapter the aim was simply to demonstrate that is not *inherently* wrong from an ethical standpoint, while analyzing soldiers' enhancement it will not be enough.

Indeed, saying that human enhancement, in general, is not wrong, does not imply that all of its applications are morally acceptable.

We will look both at the morality of soldiers' enhancement *per se*, but also at the morality of its possible consequences, and at the balance between risks and benefits.

We might conclude or not that for certain applications the risks outweigh the benefits – or that certain applications are admissible only under specific circumstances.

CHAPTER III

Soldiers' Enhancement Applications: History and Present Practices

3.1 Introduction

Before exploring its ethical underpinnings, it is fundamental to understand what soldiers' enhancement actually entails, and what substances and interventions fall under this category. As we have learned with human enhancement, finding a definition might prove difficult, with blurred semantic, practical and ethical lines between enhancement and therapy or technology. In a sense, defining soldier's enhancement is easier. From one point of view, it is simply a subcategory of human enhancement. Indeed, if we knew what qualifies as human enhancement, we could say that the same substances, interventions or devices qualify as soldiers' enhancement when the subject receiving or using that enhancer is a soldier. Not having a clear definition of human enhancement, however, this obvious line of reasoning is not helpful to the aim of defining soldiers' enhancement.

Another way to delineate the concept of soldiers' enhancement is to look at the substances historically used by the military in order to enhance the performances of the combatants on the battlefield, and the current military applications of and research in the field of neuroscience.

Soldiers' enhancement, then, consists of all the substances and interventions that have been used, are currently used, and the future ones which will be used to improve the performance of the soldiers. With improving the performance of the soldiers, we refer especially to the "disease-base-account" interpretation of enhancement. Meaning that, even if we will briefly report also drugs used as medication, or that are used exclusively as painkillers, the focus will be on those that are not related to any disease or injury, and that have the sole purpose of enhancing the combatants' performances and abilities.

In this chapter we will present these enhancers, following a chronological order. We will start with an overview of how the military employed various drugs and substances in the past, from "natural" drugs as opium and mushroom to the experiments with LSD and other artificial substances. The subsequent sections will present an analysis of the substances currently used by the military, as well as more sophisticated neuroscientific intervention. The applications overview of this chapter

will be concluded by another section exploring future possible scenarios of military applications starting from on going researches – especially the ones proposed and/or funded by the US Defense Advanced Research Projects Agency (DARPA), the agency of the US Department of Defense responsible for the development of emerging technologies and, of course, their military application.

As stated above, the aim of this chapter is to provide some background information and understanding of the current situation of the applications and studies of soldiers' enhancement, a topic that at a first glance could be misunderstood as belonging more to science-fiction than the reality of the battlefield, whereas indeed it has always been part of military's strategy and history.

This chapter, however, will also include in the last section a specific moral consideration –regarding the position of soldiers when they are the *subjects* of research (and in this case we are considering *research ethics* issues) and when they are ordered by their superiors to assume enhancers. Can we consider the armed forces a "vulnerable population"? What is the role of informed consent – the most important ethical principle in research ethics – when it comes to the military?

This ethical part has been included in this chapter as the point of view adopted is different from the one of the following chapter. This, in fact, will question the morality of the consequences of soldiers' enhancement – simply put, on its effects on warfare, on *jus in bello*, on civilians' immunity, and on the inequality with the rest of society.

Before embarking in any moral analysis, however, we have to present the past, current and possible future applications of soldier's enhancement. As stated above, we will proceed in chronological order.

3.2 Why Do the Armed Forces Use Enhancers?

Science and innovation have always played a crucial role for issues of national defense. Developing and possessing a new technology unknown to the enemy gives a competitive advantage that could make the difference between winning and loosing a battle or even the war. History is full of cases in which this was proven true – just think about the use of the radar or the atomic bomb in World War II.

The recent surge of fields such as neuroscience, human machine interactions, robotics etc., has a direct impact on the military. As a new scientific field is born and develops, the military applications are promptly studied and employed, specifically

for the over mentioned importance of possessing a technology unknown to the enemy.

"Soldiers' enhancement", however, greatly precedes the birth of neuroscience as a scientific field.

The "pharmacological construction of the great warrior"[96] is as ancient as war itself, and as noted by Barbara Ehrenreich "almost any drug or intoxicant has served, in one setting or another, to facilitate the transformation of man into warrior."[97]

Łunask Kamieński, in his newly published book "Shooting Up: A Short History of Drugs and War", retraces the history of the usage of drugs in the military, from the ancient Greek until the Gulf and Kosovo wars.

Before presenting the results of his historical research, however, Kamieński lists the three reasons why the military uses enhancers.

First of all, soldiers "are afraid of the fear of the battle"[98]. On one hand, they fear that the fear itself, during the battle, would paralyze them, thus putting at risk their own lives. On the other hand, they perceive "fear" as a sign of weakness and cowardice, a very deplorable trait for a warrior. Fear, however, is an almost unavoidable feeling and reaction when one is facing a serious danger. In order to cope with this type of anxiety and stress, soldiers can either try to change the nature of the stressful environment, or, and this is the case relevant for us, might seek to change their *reactions* to stressful situations[99]. Hence, the soldiers restore to alcohol and drugs in order to "create the impression that problems are less serious than they are in reality"[100], and to instill courage.

Secondly, and most obviously, soldiers seek to enhance their abilities when on combat, so to increase their chances of winning the battle, surviving, and behaving honorably.

Kamieński summarizes these ambitions as the desire "to maintain and improve physical strength and endurance, enhance cognitive abilities, improve mood, and transcend the limits of the human body."[101]

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[96] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War* (Oxford University Press, New York, 2016), 1.
[97] B. Ehrenreich,, *Blood Rites*: *Origins and History of the Passions of War* (Metropolitan Books, New York, 1997), 11.
[98] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 2.
[99] *Ibidem,* 3.
[100] *Ibidem.*
[101] *Ibidem.*

The third target of drugs assumed by the military is related to the instances that can trigger in the soldiers high levels of stress and anxiety, during and after the war, beside the fear of the battle itself.[102]

Experiences such as killing other human beings, risking your own lives, loosing your companions, seeing wounded and mutilated bodies, the violence of combat, the feel of closeness to death etc., can be traumatizing, and can have lasting and severe consequences, in certain cases developing into posttraumatic stress disorder (PTSD).[103]

To avoid the likelihood of this traumatizing effect, the strategies adopted involve screening and selecting candidates more likely to cope efficiently with high levels of stress and reduce the soldier's exposure to fighting. Beside these measures, soldiers assume drugs of various natures in order to prevent, reduce, cope with, or eliminate combat trauma. Needless to say, avoiding the mental breakdown of the troops is not only crucial for the well being of the soldiers, but also strategically fundamental for their effectiveness during combat, and thus for the positive outcome of the war.

Kamieński, therefore, categorizes the drugs used by the military depending on the reason why they are assumed, and for their desired effect: fighting fear, enhancing the combat performance and reducing the emotional distress and general anxiety caused by the experience of the war.

The author proposed also another way to categorize these drugs, probably more useful for its ethical underpinnings, as we will see later. In this case, Kamienski divides the psychoactive substances not according to the type or the emotion that they are supposed to control, but according to who makes the soldiers use them. The author identifies three categories: substances administrated by the military, substances self-prescribed by combatants, and substances used as potential psychochemical weapon (thus, provided by or directed to the enemy).[104]

Of course, the two categorizations are not mutually exclusive. Indeed, they have to be used together. About every period of time we can say which psychoactive substances were used, which was the physical or mental state that the army wished to provoke by using them, and who provided them.

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[102] *Ibidem,* 4.
[103] *Ibidem.*
[104] *Ibidem,* 286.

This is what Kamieński did in his book, and what we are going to summarize in the following section.

3.3 The Historical Use of Drugs by the Military

Opium, the juice obtained by the opium poppy (*Papaver Somniferum*) was already known and used by the Assyrians and Sumerians. Opium then arrived in Greece from Egypt, and it was used especially for religion-related activities, among which is notable the inducement of hallucinations during mysteries and rites. One of the first references to the use of opium in the Greek literature can be found in Homer's *Odyssey*, in which a "drink of oblivion called *nepenthes* relieved the sorrow for the deaths of companions[105].

The Greeks usually dissolved opium in alcohol. The solution so obtained, according to Kamieński, might have been used not only for the aftermath of battle, but also in before it, to inspire courage. As we will see soon, this was just the beginning of the long relationship between opium and the military.

Moving to the Arabic countries, there is a widespread conviction that the members of the Nizari Ismaili – a radical and terrorist sect of the Muslims of the Shia minority, established in the 1080s – were "calculating, competent, ruthless and disciplined"[106] because of their consumption of hashish (the extracted product from the resin of the Cannabis plant). Indeed, they were called "hashish eaters" (*hashish, hashishiyya or hashishiyyin)*, and this name became *Assassins* after the Christian crusades in Syria – which later translated in the noun still present in many languages, with its obvious meaning.

Kamieński, however, reports that this common belief is misguided, and that actually the Nizari "true intoxicant" was not hashish, but "religious faith, coupled with crazy fanaticism."[107]

Even if the common affiliation of Nizari with hashish might be wrong, it is indeed true that hashish was the most common hallucinatory substance in the Muslim countries from the Middle Ages on.[108]

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[105] Nepenthes contrarily to what was previously thought, was not hashish but opium, writes Kamieński.
[106] *Ibidem,* 34.
[107] *Ibidem,* 36.
[108] *Ibidem,* 52.

When Napoleon led his campaign in Egypt, in 1789, his troops had to adapt to the local tradition and culture. Because of the strict prohibition enforced in many Muslim countries, they had to give up on alcohol, on which they were heavily dependent. Alcohol consumption, however, was soon replaced with the local consumption of hashish. In India this substance was known and used as well, both as a relaxant and an enhancer, to reduce fatigue. The Hindu warriors assumed flowers, seeds and leaves of the cannabis plant with milk or water (an infusion called *bhang*[109]) before a battle both as an energizer and as a relaxant to relieve fear.

On the contrary, the effect on Napoleon's troops, proved catastrophic soon enough. Hashish "was undermining fighting power and jeopardizing the moral of the troops. […] It was generating laziness and sluggishness."[110] This is in direct opposition with the rumors fueled by British propaganda, according to which it was the boosting effect of hashish that sustained the performance of Napoleon's troops in the hot Egyptian climate.[111]

This is not the only case in which an intoxicant substance had negative effects on the performance of the military. In the 1830s, the majority of the Chinese troops were addicted to opium, and the high quantities consumed of this substance rendered them ineffective for duty.

Quite the opposite is true for the Indian military, where "opium eaters are sober, quiet, obedient, enterprising and attentive to their duties. They can stand hard marches under the influence of the drug. […] It staves off hunger, and keeps the user from the effects of exposure to cold or heat", as wrote the general in command of the Indian state army in Indore, Balmukund Gayadeen. [112]

The different impact of opium on Chinese and Indian troops can probably be explain by the fact that the former abused of this substance, and kept consuming it because of addiction, whereas the latter used it "advisedly, and for the pragmatic reason of gaining combat advantage."[113]

Opium was also extremely common in North America in the XIX century. In the 1830s it was the most prescribed drug in America, but its consumption was also

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[109] *Ibidem*.
[110] *Ibidem,* 52-53.
[111] *Ibidem,* 54.
[112] J. Mann, *Turn on and Tune in: Psychedelics, Narcotics, and Euphoriants* (Royal Society of Chemistry, Cambridge, 2009), 120.
[113] . Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 63.

related to nonmedical functions, as to heal "existential pain" and brighten the mood[114].

In the military field, during the Civil War (1861-1865), physicians and surgeons heavily relayed of opium and morphine to operate and assist the wounded, probably without recognizing the highly addictive feature of these substances.

As we have already seen with the Greeks, however, opium was also used to deal with the physiological effects of the battle, as sever anxiety, flashbacks, fear and mental breakdowns. "Nostalgia" was the name used at the time of the Civil War to refer to what we call today "posttraumatic stress disorders" (PTSD).[115]

Beside opium and hashish, also mushrooms played an important role as intoxicant in premodern times. In the North Asian steppe, indigenous inhabitants – and warriors - used muscimol, the principal psychoactive constituent of the mushroom *Amanita muscaria*, which has both a boosting and hallucinogenic effect. The mushrooms, however, were extremely expensive, and thus accessible only to the wealthy ones. It was soon discovered that the urine of a mushroom eater has the same effect of the mushroom itself. It is in this form, that, according to oral traditions, the Siberian warriors used to take muscimol, especially before a battle.

According to various studies, also the Vikings consumed mushrooms before entering into combat, although of a different kind from the *Amanita muscaria*. They allegedly used the fungus *Amanita pantherina*, which has a greater concentration of psychoactive constituents and knowingly produce mania. This could explain the incredible fury of these warriors during battle[116].

In South America, another coca leaves served similar functions, but their effects are milder than the substances listed so far – also for this reason, on the other hand, they were more wide spread across society. Coca leaves, which to the surprise of the first Spanish conquistadores were continuously chewed by the Indians - as Amerigo

[114] Interestingly, opium, as well as morphine, was a "feminine" drug: in the XIX century, in America, over 60 percent of the addicts were women. This is also due to the fact that, contrarily to men, they could not find refuge in alcohol, as getting drunk was considered indecorous for a woman. *Ibidem,* 70

[115] *Ibidem*, 76-77

[116] Kamieński also reports a specific feature of this mushroom, as described by Erish Hesse in 1946: "the intoxicated person imagines himself to have been changed into some animal, and the hallucinosis is completed by the sensation of the growing of feathers and hair.". This resonates with Vikings mitology, according to which Odin chose the best warriors and make them fury as wild animals. *Ibidem,* 41.

Vespucci reported in his journal in 1499[117] - were crucial for many religious, ritual and therapeutic functions, but their energizing effect was also fundamental to sustain the life at the high altitudes of certain Southern American country, as Peru. Coca "allows for better performance, especially at high altitude […], by speeding up the heart rate, it improves respiratory function."[118]

According to recent studies, coca leaves were already consumed in South America in 6000 BC[119].

Coca leaves contain proteins, minerals, and also various alkaloids. The cocaine alkaloid content of a sample of the most grown variety of coca leaf (the E. Coca variety) is between 0.5 and 1 percent[120]. It is this small percentage of cocaine that alleviates the feelings of hunger, thirst and cold, and that gives to the coca leaves their energizing effect.

The enhancing effects of coca leaves were known and exploited also by warriors. For example, during the Indian anti-Spanish revolt at the end of the XVIII century, when Juliàn Apasa Nina led the famous siege of the Bolivian city of La Paz - in 1781 – the Indian military refused to keep fighting if not regularly supplied with coca leaves[121]. The extremely difficult and strenuous situations of the siege proved the leaves fundamental not only for the military outside the city, but also for those who were blocked inside. It was not until some decades after, however, that Europeans began the extraction of coca from its leaves, and exploited, among others, by the European militaries.

The first research on the stimulating effect of coca leaves was conducted in Europe in 1859, by the Italian neurologist Paolo Mantegazza, after a travel in Latin America[122]. A few years later, in 1862 a German pharmaceutical company (Merck of Darmstadt) began to manufacture cocaine. The possible military use of coca was tested on the British soldiers by Field Marshal Sir henry Hvelyn Wood in 1893, who wanted to establish whether coca was efficient in allaying thirst. The experiment was

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[117] *Ibidem,* 46.
[118] *Ibidem*, 47.
[119] T. D. Dillehay, J. Rossen, D. Ugent, A. Karathanasis, V. Vásquez and P. J. Netherly, *Early Holocene coca chewing in northern Peru,* in Antiquity, Cambridge Journals, Volume 84, Issue 326, (2010).
[120] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 46.
[121] *Ibidem,* 50.
[122] *Ibidem,* 92.

successful, as the soldiers, after having chewed 1/8th ounce of leaves each, reported "great benefit" and "the feeling of thirst at one being allayed."[123]

Before the First World War, the soldiers used cocaine mainly for its reducing-appetite effect. Right before and during the war, however, a real "cocaine boom" occurred – "never before and never after did the military consume such large amounts of this drug as it did in 1914-1918, not only for medical purposes, but also for the enhancement of the performance."[124]

Even if German pilots used it to maintain lucidity during long flights, cocaine was more common among infantrymen.

During and after the war, however, one problem became evident – that of addiction. And addiction was also considered a threat to the effectiveness of the army. The issue was considered so problematic that in 1916 Britain banned the sale of cocaine and opium-based products to soldiers, except when physicians and pharmacists, with a prescription, sold them[125]. After the war, however, the consumption of and the addiction to cocaine became a problem not only for the veterans, but also for the civilians. Therefore, in1920 the ban imposed four years before became part of the peacetime legislation. This law marks the beginning of the first "substance control regime".[126]

If cocaine was the most common drug among the troops during the First World War, during the Second World War soldiers restored mostly to amphetamines and methamphetamines as performance-enhancers and uppers.

Tested for the first time by the chemist Gordon Alles in 1928, amphetamines in the 40s were widely used as a remedy for various medical conditions, among which narcolepsy, epilepsy, schizophrenia, Parkison's disease and obesity. [127]

The effects of amphetamines are similar to those of cocaine – they both trigger the release of dopamine, causing euphoria, they increase alertness, cognitive capacities while suppressing appetite. [128]

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[123] *Ibidem*, (quoted).
[124] *Ibidem,* 96.
[125] *Ibidem,* 102.
[126] *Ibidem,* 103.
[127] H. Abadinsky, *Drug Use and Abuse: A Comprehensive Introduction* (Thomson Wadsworth, Belmont, 2008), 151
[128] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 105.

The Nazis were the first ones to exploit the potential of amphetamines during combat. Even if, in general, intoxicants were considered as a poison to the purity of the "Arian race", an exception was made for the military, due to the higher purpose of winning the war[129].

The German troops during the war heavily relayed on methamphetamine, a derivative of amphetamine with similar but stronger and longer lasting effects, in the form of Pervitin – an early version of the modern crystal meth[130]. The drug "increases self-confidence and willingness to take risks; sharpens concentration; enhances alertness; and significantly reduces hunger, thirst, pain sensitivity and the need for sleep."[131] Pervitin, which sometimes caused also "extremely aggressive behavior" was successfully used during the war, until some of its side effects were discovered. One of them was, of course, its addictive nature.

Moreover, a sort of drug hangover left the soldier or pilot unable to combat or fly the day after having taken Pervitin for an operation. For these reasons, starting in 1942 Germans tried to limit the military's consumption of this drug.

In the meantime, a new stimulant, called D-IX, was under study. This new stimulant - a mix between five milligrams of cocaine, three milligrams of Pervitin and five milligrams of Eukodal – was tested in 1944 on eighteen prisoners at the Sachsenhausen concentration camp[132]. The results were considered successful, but Germany lost the war before the drug could be deployed by military.

When they found out the use that the Nazis were doing of these substances, the British and the American armies started to emulate them.

The Americans during World War II included amphetamines tablets in the medical kits of the soldiers, recommending one five-milligram pill every six hours[133]. Even if exact data are not available, Kamieński reports that according to a research conducted at an American military hospital, 25% of the patients abused amphetamine and 89 % consumed it regularly when on duty.[134]

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[129] *Ibidem,*110.
[130] *Ibidem.*
[131] *Ibidem.*
[132] The prisoners "were forced to march for twenty-four-hours without rest, carrying twenty-kilogram backpacks. Some of those guine pigs managed to walk up to ninety kilometers a day before falling to the ground dead or barely alive." Reports Kamieński in *Shooting Up: A Short History of Drugs and War*, 116.
[133] *Ibidem,* 121.
[134] *Ibidem,* 121-122.

A special case is that of the Finnish, among which the use of heroin was extremely widespread even before the war, and even among civilians. Heroin was in fact contained – in small amounts – in many medicaments. During the war, the Finnish restored not only to opium, heroin and cocaine, but also Pervatin, when the country became cobelligerent with Germany[135].

Amphetamines kept being provided to the American soldiers also after WWII, with a pick of consumption during the Korean War, and also later, during the Vietnam War. Moreover, during the latter, drugs were not just provided and administrated by the military, but also self-prescribed by the soldiers[136]. Among the servicemen in Vietnam, 92% reported the use of alcohol, 69% that of marijuana, 38% of opium, 34% of heroin, 25% of amphetamines, and 23% of barbiturates[137].

During the Soviet-Afghan war (1979-1989), yet another use of psychedelics substances was employed. This time, the army did not consume the intoxicants in order to boost the combatants' performance. On the contrary, the side effects of these substances were exploited as weapon to be deployed directly *against the enemy*. Mujahideen and Americans provided drugs to the Soviet army in order to affect its combat abilities.[138] A French-American operation called Mosquito, included the project of supplying Soviet troops with drugs "to undermine their morale and operational capacity." The project was officially abandoned, but as reported by Kamieński a number of factors seem to indicate that the American implemented the plan, even if with a much smaller scale. In fact, according to various accounts, Soviet troops often found abandoned drugs - among which cocaine, at that time not produced in South Asia - allegedly thrown by the Afghan.

The idea of using drugs to affect the enemy's effectiveness during combat was not new.

The psychedelic drug LSD – lysergic acid diethylamide – was synthesized for the first time in 1938 by Albert Hofmann, a chemist working at the Sandoz laboratories, in Switzerland. Hofmann did not consider useful the substance, and abandon it for five years. When, in 1943, he decided to synthetize it again, by accident some part of

[135] *Ibidem,*132-137.
[136] *Ibidem,*191.
[137] L. N. Robins*, The Vietnam Drug User Returns: Final Report, Special Action Office for Drug Abuse Prevention*, Washington, DC (1974), 29.
[138] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 225.

the compound entered his body. As he recalls in his autobiography, he soon started to feel "a remarkable restlessness, combined with a slight dizziness. […] I perceived an uninterrupted stream of fantastic pictures, extraordinary shapes with intense, kaleidoscopic play of colors."[139]

Given this experience, on the 19th of April 1943, Hofmann tested the substance on himself.

He soon started to feel too badly to keep working, and asked his assistant to take him home, where a doctor visited him, and found normal pulse, blood pressure and breathing, the only abnormal thing being his extremely dilated pupils. It is interesting to read Hofmann's telling of LSD effects on human subjects:

> Every exertion of my will, every attempt to put an end to the disintegration of the outer world and the dissolution of my ego, seemed to be wasted effort. A demon had invaded me, had taken possession of my body, mind, and soul. I jumped up and screamed, trying to free myself from him, but then sank down again and lay helpless on the sofa. […]
> The horror softened and gave way to a feeling of good fortune and gratitude, the more normal perceptions and thoughts returned. […] Kaleidoscopic, fantastic images surged in on me, alternating, variegated, opening and then closing themselves in circles and spirals, exploding in colored fountains, rearranging and hybridizing themselves in constant flux. It was particularly remarkable how every acoustic perception, such as the sound of a door handle or a passing automobile, became transformed into optical perceptions. Every sound generated a vividly changing image, with its own consistent form and color.[140]

The strong hallucinogen and psychedelic effect of LSD was thus discovered, and the interest of the military in this new substance did not arrive late.

To overcome the problem of the lack of volunteers, in 1955 it was decided to conduct the medical experiments with LSD directly on soldiers, more precisely, the ones stationed at the Edgewood Arsenal base, in Maryland[141]. A new recruitment procedure was created, so to include the soldiers' consent to the experiments. We will explore in a different section of this chapter whether or not the consent given by the soldiers can be considered *informed consent*, the one required when conducting experiments on humans.

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[139] A., Hofmann, *LSD - My Problem Child*, McGraw-Hill Book Company (Mc Graw Hill, 1980), 15.
[140] *Ibidem.*
[141] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 163.

Setting aside for now the ethical issues, it is also known that certain experiments entailed giving LSD to soldiers without their knowledge[142]. The soldiers were then sent to their routine training, but due to the effect of the drug they were not able to accomplish their tasks, bursting into laughers and being evidently disconnected with reality.

The British Army conducted similar experiments in 1964, and a footage – from the archives of the Imperial War Museum, but available also online - clearly shows the effects just described above[143].

Given Hofmann's telling of his experience with LSD and, even more, the effect on soldiers during training, we can understand easily the reason why the military was interested in this new substance.

Indeed, in this case it was not meant to be used to enhance the soldiers, but as a nonlethal weapon. How, exactly, was LSD supposed to be used against the enemies? The idea of paralyzing the enemy's cities contaminating water reservoirs and dispersing gas – in order to enter and occupy the city without resistant from the intoxicates – even if fascinating, was not practically possible to enforce[144].

Looking for other means to intoxicate the enemies, the Americans also tested another substances, BZ, known as "Agent Buzz".[145] This agent was tested in clinical trials held between 1959 and 1975 on 2800 soldiers at Edgewood Arsenal[146]. Its effects are similar to that of LSD, but ten times stronger and longer lasting.

A practical way to intoxicate enemies with psychedelic substances was not found, but the same substances could be use also for different aims by the army.

LSD, indeed, was also tested as a possible truth serum, as we are going to see in the following section.

3.4 Truth Serum and Truth Machine

Before LSD, a number of other substances had been tested as possible truth serums: mescaline, several barbiturates, scopolamine, and anabasine. Often, these tests were

[142] *Ibidem,* 177.
[143] *Ibidem,* video at: https://www.youtube.com/watch?v=KWodyapGNxI
[144] *Ibidem,* 174-174.
[145] *Ibidem,* 178.
[146] *Ibiden,* 179.

run without the informed consent of the subjects, as the aim of the test itself was perceived as so important to overcome other ethical issues[147].

How important it could be for the military to dispose of an efficient truth serum is self-evident. Its applications for the intelligence, as for interrogating prisoners, or to unmask possible spies, are infinite. However, all the substances testes were rejected as not enough efficient and reliable.

In addition to the substances mentioned above, the American army tested, again at the base of Edgewood Arsenal, also poisonous gases, BZ, sedatives, marijuana, morphine and LSD.

Between 1955 and 1958, LSD was given to over 1000 military, but in a later stage of the same project, the substance was also administrated to "unknowing civilians and soldiers, who were given LSD and then questioned."[148]

However, in 1963 experiments with this drug were suspended because of their inconclusiveness.

Today is neuroscience that presents some promising technology for detecting lies and deception. In particular thanks to the functional magnetic resonance imaging (fMRI). The magnetic resonance imaging uses magnetic charges to visualize anatomic details. Active nerve cells metabolize oxygen in the blood surrounding them. This alter their magnetic charge, so that more active cells can be distinguished from less active ones.[149] This technology can already be utilized to "detect simple lies, such as whether an individual recognizes a certain face."[150]

Daniel Langleben and his team at the University of Pennsylvania discovered that the difference between telling the truth and lying correlates in a neural difference that is detectable with fMRI. This is one of the two main ways of employing fMRI in lie detection – telling the difference between a truthful and a deceptive statement – and it is called Differentiation of Deception. The second one, Concealed Information Test, aims to "confirm or disconfirm a suspect's knowledge of an even."

The tests run with fMRI could be combined with different approaches, as voice and facial expressions analysis.

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[147] *Ibidem,* 181.
[148] *Ibidem,* 183.
[149] J. D. Moreno, *Mind Wars: Brain Science and the Military in the 21st Century* (Bellevue Liberty Press, New York, 2006) 117.
[150] *Ibidem,* 120.

The most obvious application of this technology in the military would be the interrogation of terrorist's suspects, as well as prisoners, in a way far more ethical (and possibly, effective) than torture. Another possibility could be its employment during the screening of perspective soldiers during recruitment process, or of those applying to get a high security clearance.

However, at the moment neuroscientists agree in saying that fMRI is too unreliable to be used as evidence, especially in a legal trial. What are, then, the current practices and projects under development for soldiers' enhancement?

3.5 Contemporary Applications and Latest Projects

Beside the new opportunities of enhancement offered by the new field of neuroscience, the more "traditional" way of boosting soldiers' enhancement through drugs is still extremely widespread.

If the hashish consumption by the terrorist group later called "Assassins" in the Middle Ages, then proved to be wrong, the same cannot be said about the use of drugs as enhancers for contemporary irregular armies. The well-known effects of drugs on combatants– suppressing fear, pain, fatigue, hunger and rendering them ruthless - render the irregular armies even more unpredictable, and thus, dangerous, for the regular forces.

The combatants of the Islamic State of Iraq and Syria (ISIS) consume regularly Captagon, a synthetic drug invented in 1961, classified by the UN Office on Drugs and Crime as an "amphetamine type stimulant" (ATS). Indeed, its effects are the ones already described for amphetamines: "it numbs the fear and suppresses the pain, alleviates hunger, reduces the need for sleep, and induces strength. [...] It is said that the drug turn [the jihadists fighting in Syria and with Isis] in fearless fighters who easily perpetrate unusual violence."[151]

A related problem is that of intoxicated child combatants, in many parts of Africa, Asia and Latin America. Ruthless state or non-state forces overcome the ethical and legal ban of both intoxicating and recruiting as soldier children for many reasons. As noted by Kamieński, children are a readily accessible resources, are less expensive and more obedient and agile than adults, they "lack a proper understanding of hazards", and, finally, they might render ineffective the enemy, that facing the ethical

[151] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 236.

dilemma of fighting against a child can decide not to shoot, or simply have a slower reaction -- slow enough to be exploited by the enemy[152].

Beside the extreme case of child soldiers, also regular forces keep consuming substances to enhance, in one way or another, their performance.

The reasons why the military employ enhancers, and the targeted areas of soldiers' performances targeted for improvement, have not changed. Indeed, many of the substances presented in the pages above are still used. However, the recent field of neuroscience is now providing new insights on the human brain functioning and chemistry, which allows the creation of new substances – as well as entirely new means – for soldiers' enhancement.

The control over sleep and fatigue has historically been, and still is, one of the main areas targeted by soldiers' enhancement.

The effects of sleep deprivation are one of the major problems of soldiers and pilots. Indeed, the effects of sleep deprivation are comparable to that of intoxication by alcohol.

We have seen that throughout history soldiers have experimented many substances to combat fatigue and stimulate energies – above all, cocaine and amphetamines.

Now, a new generation of synthetic agents, divided in "go-pills" - that help prevent falling asleep - and "no-go pills" -- that, on the contrary, help falling asleep.

In the early 2000s, DARPA – the Defense Advanced Research Projects Agency – launched the Preventing Sleep Deprivation (PSD) program, responsible of the research on "prevention of degradation of cognitive performance due to sleep deprivation." [153] We can understand easily why this is a key goal for the military. Consider, for example, the phenomenon of fatigue-induced errors, as sometimes is the case with "friendly fire", but also the fact that "combat systems become more and more sophisticated and reliable, the major limiting factor for operational dominance in a conflict is the warfighter."[154]

[152] *Ibidem,* 235-236
[153] J. D. Moreno, *Mind Wars: Brain Science and the Military in the 21st Century*, 138.
[154] PSD announcement, quoted in J. D. Moreno, *Mind Wars: Brain Science and the Military in the 21st Century*, 138.

DARPA's Defense Sciences Office further described this problem:

> "Continued assisted performance really asks a basic question. Can you prevent the cognitive deficits that occur in sleep deprivation from occurring? If you can prevent bad decisions from being made during sleep deprivation, you can dominate the battlefield by limiting the requirement for sleep. If you cannot prevent these chances from occurring, can you reverse them when they have occurred? Or can you alternate pathways and expand the available memory space, so that people can retain cognitive function under tremendous stress and sleep deprivation?"[155]

The problem is, of course, finding a stimulant with little side effects, both in terms of the soldiers' health and in terms of its other capacities -- for example, a stimulant that also renders maniac or gives hallucinations would hinder the combat potential of the soldier, even if it could prevent him/her from falling asleep.

Among some of the new substances now in use there is Dexedrine, an amphetamine stimulant created in the 1930s, now mainly used by pilots to combat fatigue. The effects of 10 mg of this substance are comparable to two strong coffees. However, critics point out to the side effect of this agent, which has a high risk of abuse and little therapeutic application[156].

There are other new substances, however, that cause similar effects to amphetamines, but without their side effects – for this reason they are frequently called "*eurogenics*" from the Greek *eu* (good) and *egeirein* (arousal).[157] The most famous one is Modafinil, created for the first time in the late 1970s to treat narcolepsy and currently produced under the name of Provigil.

The advantages of Modafinil are numerous[158]. It increases alertness, it has a mood-boosting effect, it enhances memory and mental acuity and it sharpens attention and concentration. Given the addiction problem of the veterans in the past, it is important to not that this substance does not seem to be addictive, which lowers the risk of its abuse. There are few side effects - especially if we compare them with the ones associated with amphetamines – as irritability, dizziness, headaches, nausea, heartburn and loss of appetite.[159] Another advantage of Modafinil is the fact that it

[155] *Ibidem*.
[156] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 267-273.
[157] *Ibidem,* 276.
[158] *Ibidem,* 277.
[159] *Ibidem*.

does not alter the circadian cycle, thus allowing the person who took it to remain lucid, but without preventing him from falling asleep when he wants to, without giving insomnia – a common side effect of stimulants. Another valuable aspect of Modafinil is the fact that, usually, after periods of forty-sixty hours awaken, fourteen hours of sleep are required to be fully rested, whereas with Modafinil the normal eight hours period is sufficient.

However, Modafinil is still a "controlled substance", with therapeutic use to treat narcolepsy, but it does not target healthy people. Despite this fact, its popularity as cognitive enhancer increased greatly in the last ten years, with profits from its selling increasing from five million dollars in 2005 to one billion in 2009, and an expected ten billions in 2018.[160] This increase is due to the extremely widespread use of Modafinil among civilians. Many professionals - as well as students - rely on these pills to enhance their concentration, and work or study harder and longer.

However, even if Modafinil really seems to be a safer drug, the effects of its long-term use, as well as the effects of a prolonged period of little (or close to none) hours of sleep, are not yet well understood.[161]

Other possible substances to prevent the cognitive deficits usually caused by sleep deprivation are at the moment under study. A company called Hypnion, based in Massachusetts, is allegedly developing an improved version of Modafinil; at the same time, a DARPA-funded study experimented the efficacy of a nasal spray containing orexin A, a brain hormone. The spray, tested on sleep-deprived monkeys, boosted their cognitive capacities to normal levels, while having no effects on monkeys that were not sleep-deprived.

Another class of drugs is under study: the ampakines[162], which have a possible use also for treating dementia and symptoms of schizophrenia. Ampakine CX717, like orexin A, was tested on sleep-deprived monkeys. Before taking the drug, the time reactions of the monkeys doubled, and their performance was reduced fifteen to twenty percent. After having taken the drug, however, the effects of sleep deprivation were eliminated. Moreover, a human trial showed that after a night without sleep, men performed better after taking the drug, both on memory and attention tests.

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[160] *Ibidem,* 278.
[161] J. D. Moreno, *Mind Wars: Brain Science and the Military in the 21st Century*, 2006, 137.
[162] *Ibidem,* 138.

The management of sleep, however, does not include only preventing falling asleep and preventing the effects of sleep deprivation. Another important aspect for the military, from this point of view, regard the ability of soldiers to rapidly fall asleep when they have the opportunity to do so. The general discomfort of the experience of war, the stress and the changes of time zones can hinder the ability of soldiers to catch the sudden opportunity of both falling asleep, and sleep in a regenerating way. This is what the "no-go pills" are being used for. The substances currently in use aim at decreasing neural activity stimulating the neurotransmitter GABA (gamma-Aminobutyric acid), but the future medications – some of which already developed and on sale in the United States[163] – act as antagonist of orexin A, that as we have seen is a brain hormone that stimulates alertness.

In general, due to the number of research underway, and the results already achieved, it is highly probable that the human control on sleep – his timing, duration, and effectiveness, as well as its importance for normal cognitive performances – will greatly increase in the near future.

The control of sleep, however, is only one of the neuroscientific fields that interest the military for their soldiers' enhancement potential.

A DARPA's project called Metabolic Dominance aims at creating a neuraceutical, "a pill with nutritional value that would vastly improve soldiers' endurance."[164] Controlling the soldiers' metabolism would be as important as controlling their sleep, but progresses in this area seem more difficult to achieve, and thus more distant in time.

Another crucial field targeted by DARPA is the enhancement of military personnel's memory. The combat instructions are usually long and complex, and the confusion and stress of the battle do not help soldiers and pilots to keep all the details in mind, even if, of course, it would be crucial. A long-term project entails the possibility of directly connecting the human brain with a computer memory, in order to store information safely, and then have direct and instant access to them.[165]

[163] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 281.
[164] J. D. Moreno, *Mind Wars: Brain Science and the Military in the 21st Century*, 137.
[165] *Ibidem,* 144.

Another project consists of a chip – currently under development - dubbed "brain prosthesis"[166], that is intended to restore damaged brain activities. If it can help people with memory impairment, it could also be used to enhance memory in healthy people.

The advancement of our understanding of genes and DNA could make the enhancement of memory with genomics and proteomic medicine possible[167]. Even if this way was actually practical, however, there are a number of issues. First of all, who would volunteer for such a trial? Secondly, there is the risk of enhancing too much the subject's memory, making him/her able to remember every single detail of the information received. This overload of could actually be counterproductive (as well as possibly maddening).

Another DARPA's project, LifeLog, intended to "create a database with every communication people have written, all pictures taken of them, and every bit of information about them, and then to use the global positioning system to track all their movements and sensors to record what they say, see, and hear, and add that information to the database. The unfolding events in a potential terrorist's life could be reconstructed in all their dimensionality."[168]

It is not difficult to understand why this project was perceived as seriously endangering civil liberties, and the private sphere of the individual. DARPA dropped the project, also because of the opposition it faced. However, a similar program was launched in 2004, the Advanced Soldier Sensor information System and Technology (ASSIST). As the name suggests, the idea is the same of LifeLog, but applied only to soldiers' experiences during combat.

Sometimes, however, the goal of the military can be not enhancing the memory, but quite the opposite. Indeed, painful memories of experiences lived during the war can be at the core of PTSD in veterans. Because of the functioning of the amygdala, when we feel a strong emotion it is easier for us to learn new things and consolidate new memories.

Therefore, inhibiting this process could avoid the formation of unpleasant memories for soldiers. The same beta-blockers that are usually used as a treatment for heart

[166] *Ibidem.*
[167] *Ibidem,* 145.
[168] *Ibidem,* 146.

disease could have the ability "to block neurotransmitters that consolidate emotion with long-term memory", some evidences suggest.[169] One of the most used beta-blockers during experiments is propranolol. Other substances that seem to be promising for curing or prevent PTSD are MDMA (ecstasy) and morphine (administrated shortly after a traumatic injury).
Moreover, through its program Enabling Stress Resistance, DARPA is trying to understand the physiology of stress. It developed a new neuroimaging system that could revolutionize the diagnosis of PTSD and brain injuries.

The interest in enhancing our understanding of the human brain is shared also by the White House. Indeed, in 2013 the US President Barack Obama launched the "Brain Initiative", with the aim of understanding "how individual brain cells and complex neural circuits interact at the speed of thought."[170] This in turn would allow to exploring "how the brain records, processes, uses, stores, and retrieves vast quantities of information, and shed light on the complex links between brain function and behavior."[171]
DARPA has taken part to this initiative with a number of projects, listed on its website. They include, among others, the following programs:

- *Electrical Prescriptions* (ElectRx), which "aims to help the human body heal itself through neuromodulation of organ functions using ultraminiaturized devices, approximately the size of individual nerve fibers, which could be delivered through minimally invasive injection."
- *Hand Proprioception and Touch Interfaces* (HAPTIX) that has the goal of "create fully implantable, modular and reconfigurable neural-interface microsystems that communicate wirelessly with external modules, such as a prosthesis interface link, to deliver naturalistic sensations to amputees."
- Neuro Function, Activity, Structure and Technology (Neuro-FAST) "seeks to enable unprecedented visualization and decoding of brain activity to better characterize and mitigate threats to the human brain, as well as facilitate development of brain-in-the loop systems to accelerate and improve functional behaviors."

[169] *Ibidem,* 151.
[170] The White House, Office of the Press Secretary, *Fact Sheet: BRAIN Initiative* (April 2, 2013), https://www.whitehouse.gov/the-press-office/2013/04/02/fact-sheet-brain-initiative
[171] *Ibidem.*

- Reliable Neural-Interface Technology (RE-NET) "seeks to develop the technologies needed to reliably extract information from the nervous system, and to do so at a scale and rate necessary to control complex machines, such as high-performance prosthetic limbs."[172]

As we can see, the military is very involved in the cutting-edge research, especially in a country like the United States, which leads innovation and progress globally in many scientific and technologic fields.

Some of these are directly related to the soldiers and human enhancement, as the experiments led in order to test the effectiveness of certain intervention to make healthy people *smarter*.
How is this possible, beside pills able to enhance our alertness, mental acuity and concentration? The answer seems to be: through electricity, as this is also how the brain operates. Two main ways of exploiting electricity to enhance our mental capacities are currently being tested.[173] The first one is called direct stimulation, or DC polarization, and it involves the direct release of a tiny amount of electricity to the brain through an electrode to be applied on the scalp. Researchers found out that when the electricity is activated, the volunteers' verbal abilities improve by 20 percent.
The second way of exploiting the electricity potential for the brain entails the use of magnetic pulses that pass through the cortex thanks to a magnetic coil placed over the head. Both of these means are painless, and the electricity used is minimal – thus, safe. Their long-term effects, however, are still unknown.

If we think again at the reasons why, historically, soldiers have used – and abused – many different type of substances before or after combat, we can recall resisting to pain, fatigue, hunger, thirst, and, of course, *fear*. Fear can be paralyzing or anyway can induce errors, thus reducing the chances of survival of the soldier and of winning the battle. It is also perceived as cowardice, as a sign of weakness, and as an improper trait for a warrior.

[172] *DARPA and the Brain Initiative,* http://www.darpa.mil/program/our-research/darpa-and-the-brain-initiative.
[173] *Ibidem,*145-146.

A 2005 study reported that a gene called stathmin is associated with fear, both innate and conditioned[174]. Tests on mice seem to confirm this research, but in humans probably there is not a one-to-one correspondence between lower levels of stathmin and lower levels of fear. But even if it was possible to identify the genetic cause of fear, and if we were able to lower its level or eliminate it, should we do so? Beside the issue of the ethics of eugenics, and in general of human enhancement, explored in the previous chapter, eliminating fear could also prove counterproductive for the soldiers' combat performance, as well as counterrevolutionary. Indeed, fear is a trait shown by every animal, with a clear and critical survival value. Eliminating it would likely cause unintended consequences. And then, who would volunteer for such an experiment? Yet another problem: supposing that this type of intervention was effective enough to become routinely among the military. Would it be ethical to impose it to every soldier, perhaps making it a requirement for enrollment in the army, navy or air forces?

The ethical issues regarding the military applications of human enhancement are going to be analyzed in greater details in the following chapter, whereas the last section presented below will focus on a different ethical problem. We are going to analyze the ethics of soldiers' enhancement form the point of view of those who, in the end, are affected by it more than anybody else – namely, the soldiers themselves.

3.6 Soldiers: a Vulnerable Population

We have seen that the armed forces are often the subjects of experiments concerning the effect of drugs, as LSD, and that in many places and times of history they took enhancers as part of their normal work routine. These two instances arise various ethical concerns.

First of all, we will analyze the case of experiments conducted on soldiers.

The general rule for the admissibility of research on human subjects is that of their *informed consent.* Among the other principles established by the Nuremberg Code in 1947, informed consent is considered to be the most important one, as "the voluntary consent of the human subjects is absolutely essential."[175]

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[174] *Ibidem,* 149.

[175] The Nuremberg Code, 1947, from HHS.gov, US Department of Health and Human Services.

The informed consent is described by Beachamp and Childress as "an individual's autonomous authorization of a medical intervention or of participation in research."[176]

As we have seen in other sections of this chapter, often experiments were run on soldiers without their knowledge. Sometimes, even when the soldiers gave their consent, a part of the information regarding the research were not disclosed, often with the justification that greater details would have not been useful for soldiers, who lacked the education to understand them.

We can analyze better the ethical issues of the case applying the principles of biomedical ethics identified by Beauchamp and Childress.

The first one is the respect of autonomy[177], from which we derive the need to obtain the informed consent of the subjects, so to respect their autonomous decision on whether taking part to the study or not. The informed consent is composed of three parts: information, voluntariness and comprehension. In this case, we can say that part of the information was not disclosed, and thus the full comprehension of the subjects was missing. Therefore, we cannot say that the principle of the informed consent was fully respected. Moreover, we also know that in other experiments run to test its effectiveness as truth serum, in the 1960s, LSD was administrated to both military personnel and civilians without their knowledge – a clear breach of the rule of informed consent.

According to the principle of non-maleficence[178], medical professionals should not inflict evil or harm. Were the experiments conducted on soldiers an act of maleficence? Did they cause harm? We do not know exactly if there were long-term effects on the subjects. In general, the substances seemed to cause not great harm beside the possible discomfort while the drug was having effect.

In some instances, however, the risks imposed on the soldiers are much higher, as in the Desert Rock experiments, in the 1950s, when the US military carried on various nuclear testing, exposing the soldiers to the high risk of radiation. It is difficult to assess whether the soldiers that later in life developed cancer had it as a consequence of the experiments, but we cannot rule out completely this possibility either.

[176] Beauchamp, Tom L. and Childress, James F., *Principles of Biomedical Ethics* (2013), 122.
[177] *Ibidem,* 101.
[178] *Ibidem,* 150.

Most of the soldiers involved did not give their informed consent, simply following their superiors' orders. The justification for these tests, in years when the Nuremberg Code had already been established, was that those tests did not qualify as human experiments, but as training of soldiers in the nuclear battlefield.

There is the risk, therefore, that with the justification of "training" certain types of experiments that would not be considered admissible for civilians are not contested when applied to the military.

This qualifies, in my opinion, as a violation of the direct application of the principle of justice to the ethics of human experimentation, that is, the selection of the subjects[179]. According to this principle, an extra care should be in place when the subjects are part of a vulnerable group, such as institutionalized people, racial minorities and the economically disadvantaged.[180] The extra care would consist in being sure that the vulnerable position of the subjects is not exploited and that the consent is fully informed – e.g. the subjects have really understood the implications and the risks of the study, and gave their consent to it.

In a sense, for the considerations just exposed, we can classify the soldiers as a vulnerable group. For this reason, and for the principle of justice, the experiments run on soldiers should receive an even more rigorous judgment before being allowed, not a less rigorous one.

Being in a highly hierarchical institution, in fact, the soldiers are supposed to obey the orders without questioning. This creates the possibility of direct coercion, or at least of lack of informed consent – the decision of doing what our superiors tell us to do is not always an autonomous one, if we are facing some kind of punishment for our disobedience.

An incredible example of the vulnerable position of the soldiers is the one provided by the Japanese kamikazes in World War II. In Japan, "taking stimulants to enhance performance was a mark of patriotism". Kamikazes were supplied with *Totsugeki-Jo* or *Tokkou-Jo*, meaning, "storming tablets".[181]

The use of intoxicants by Japanese kamikazes is particularly important if we consider the fact that most of them were not volunteers, in contrast to Japanese propaganda. Consider this exert from Kamieński:

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[179] National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, *The Belmont Report* (1979).
[180] *Ibidem,* 11.
[181] Ł. Kamieński*, Shooting Up: A Short History of Drugs and War*, 129.

"Air force squadrons were converted into special *tokkotai* units from day to day, and pilots were left with very little choice. Formally they could opt-out; this would, however, bring the stigma of cowardice upon them and their families and a disgrace to which […] was equivalent to committing "social suicide"."[182]

One could argue that soldiers are in the end ready to die for their country, especially while on combat, so what is the difference in this case?

The difference is that the attempts to the lives of the soldiers and to harm them should come only from the enemy, not from their own state. Their state should, on the contrary, protect them as much as it can, not only for the strategic reason of, of course, winning the war, but also because of the service they render to their country, and because of their vulnerable position.

This vulnerability is a factor to bear in mind also when analyzing the last principle, the one of the one of beneficence, which is somewhat more complicated. This principle calls for a careful assessment of the balance between risks and benefits in order to determine whether a medical action – or in this case, a human experiment – is acceptable or not.[183]

Samuel Thompson, who was the head of psychiatric research at the Naval Medical research Institute[184], within the program CHATTER, tested many substances – scopolamine, mescaline and anabasine, as we have seen – on human subjects, in order to assess their effectiveness as truth serum. The subjects were neither volunteer nor informed of the nature of the experiment. Thompson was aware of the fact that these tests were unethical, but he also said: "We felt we had to do it for the good of the country"[185].

Can the *raison d'état* be enough to justify these experiments? We can imagine the enormous benefits of possessing a truth serum or a truth machine, for example, in terms of security. For sure, this consideration could make us more tolerant regarding the full compliance of certain principles, but where is the limit?

This leads us to a different matter. Even if the benefits of the experiment had outweighed the risks, would it have been enough to counterbalance the violation of the other principles?

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[182] *Ibidem*.
[183] T.L. Beauchamp and J.F. Childress, *Principles of Biomedical Ethics*, 207.
[184] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 182.
[185] *Ibidem,* 183.

From this point of view, in my opinion it really depends on how we consider the rule of informed consent. In the traditional biomedical ethics, there are some morally admissible exceptions to it or to one of its elements, such as the one of therapeutic privilege[186].
Moreover, Beauchamp and Childress did not put the principles in a hierarchical order. This means that in theory it is possible to balance them with one another, depending on the specific case.
These cases, however, are not a traditional medical case, but a human experiment. The Nuremberg Code was already established when these experiments started to be carried on, and as we have seen it clearly reports the informed consent of the subjects as a *condicio sine qua non* for the moral admissibility of the study.

We have seen that because of their status as vulnerable population, experiments on soldiers should be judged even more carefully than others.
The same applies not only in the case of experiments, but also when, for example, they are told to assume substances that could enhance their mental or physical capabilities. As we have seen, the use of substances by the military is not a new trend, but with the modern progresses in the field of neuroscience, the range of possible enhancements could increase incredibly, as well as their accuracy.
Soldiers risk both direct and indirect coercion into taking these substances. Indeed, if enhancers become more effective and tailored, it is possible to imagine that they would become a requirement for being accepted in the military. Once joined the defense forces, then, the soldier could be ordered by their superiors to take the enhancers (direct coercion) or, alternatively, seeing all the others taking them, he could feel pressured to feel the same to have the same performances, much as what happens in sports (indirect coercion).

To analyze the ethics of use of enhancers by soldiers, from the perspective of their wellbeing, we can still apply the framework of the principles of biomedical ethics, given the use of medical drugs on human subjects. In this sense, it would be fundamental to ensure that the consent of the soldiers is a truly informed and autonomous one, especially because of their vulnerable position – so to respect the

[186] T.L. Beauchamp and J.F. Childress, *Principles of Biomedical Ethics*, 127.

principles of respect of autonomy and of justice. The substances should not be dangerous for the health of the soldiers, so to respect the principle of non-maleficence. According to the principle of beneficence, the benefits should counterbalance the risks. The benefits of the soldiers' enhancement are pretty straightforward – a more effective military, thus a better defense of the country and possibly saving the lives of many people, including the ones of the soldiers themselves. The risks would depend on the nature and the effect of these substances.
For example, as we have seen, beta-blockers could be used to relieve stress and avoid PTSD in soldiers after having committing violence and even killing during conflicts. In this way, they could be used as "anti-conscience" pill.[187] As the name suggests, a possible risk of its usage would entail less "morality-driven" soldiers, resulting in unnecessary killing and violence - the same outcome is a risk when considering substances that could increase the aggressiveness of soldiers, or decrease their fear. Natural evolution selected and improved certain natural human instincts and feelings over thousand of years, as the one of fear and thus the strive for survival. Altering them artificially could actually be counter-reproductive not only from a moral standpoint, but also for the efficacy of the military operation. This does not entail, of course, the sort of "deference to nature" that we have ruled out in Chapter II. Simply put, caution is needed, but caution should not become a paralyzing factor for research and development. Experiments – even on human subjects – are an essential part of developing new substances and interventions. They must, however, be run adhering to the principles of research ethics, with no tolerable exceptions.

3.7. Conclusion

In this chapter we presented the substances and interventions deployed by the military, following a chronological order – from opium, hashish and cocaine to the advent of amphetamines and LSD, until the latest neuroscientific projects. Among the three military applications of these substances, combating fear, intoxicating the enemy and boosting the combatants' performance, the latter has been the most prominent one.
In the last section we have tried to analyze the ethical issues arising from experiments on soldiers, and from their consumption of enhancers.

[187] J. Moreno, "*Building Better Soldiers", Mind Wars*, 2012.

We have highlighted the fact that soldiers, being part of an extremely hierarchical system, face the risk of both direct and indirect coercion. For this reason, they can be classified as a vulnerable population, which means that when they are the subjects of an experiment, extra care should be in place. In general, the rule of informed consent is paramount when human experimentation is entailed.

To establish whether an enhancer can be administrated to soldiers, the four biomedical ethical principles of Beauchamp and Childress –respect for autonomy, non maleficence, beneficence and justice - can be used, with a special emphasis on the well being of the soldier.

In the following chapter we are going to analyze the ethics of soldiers' enhancement from a different ethical point of view – rather than from the perspective of the soldier, we will discuss the effects of human enhancement in the military on the *jus in bello* and inequality with civilians.

CHAPTER IV

The Effects of Soldiers' Enhancement on Just War and Inequality

4.1 Introduction

In the previous chapter we presented the long history of the substances and experiments employed to enhance soldiers' performances, from the opium used in Ancient Greece, through the massive use of cocaine and amphetamines during the WWI, until the more recent synthetic drugs, as LSD, and a new generation of pills such as Modafinil.

The development of neuroscience as a field, and the improvement of our understanding of brain's anatomy and functioning triggered the research and development of new interventions and substances able to improve soldiers' abilities in various ways.

Neuroscience renders enhancement - of the humans in general, and of the soldiers in particular - more pervasive and effective, opening possibilities for changing our abilities in a way that just a decade ago would have considered more appropriate for a science fiction novel than for scientific projects.

However, even if - thanks to technological innovations - soldiers' enhancement is changing, we have to inscribe it in its greater historical context. Simply put, we should not forget that the willingness of improving a soldier's performance in battle, through external means, has always been present in the military.

The fact that the military has always restored to some sort of substance or intervention to improve the performance of the armed forces – as well as to higher the chances of survival and to distress after combat - does not imply that these types of actions are morally right.

The mere fact that humanity has always acted in a certain way does not morally justify that action. "We have always done it" is not a sentence that should discharge us from evaluating the morality of that action. Indeed, many "normal" and widespread, both in time and space, human attitudes are exactly the ones that we almost universally consider wrong, such as killing, stealing etc.

Indeed, studying the ethics of soldiers' enhancement has a lot to do - in a more or less direct way - with killing. Especially with one of the few instances in which killing is not only tolerated, but also, in a certain case, the goal of the mission or of the combat.

How can we talk about ethics in this realm? If we suspend one of the most fundamental pillars of our morality – killing another human being is wrong – how can we pretend to talk about morality at all?

War, however, does not entail a complete halt of our morality. Indeed, we make a distinction between *just* and *unjust* wars A war, despite its great deal of killings and other activities usually considered unethical, is *just* when it is "an unavoidable part of our attempts to stop something that was even worse", notes George Lucas in his book *Military Ethics*, "simply put, the use of lethal force is morally justifiable only if war is the only remaining way we have available to us to prevent or avoid something even more terrible."[188]

The international laws regulating what we consider a just and an unjust war are called *jus ad bello*, literally, right to war - the set of international rules that determine when it is permissible and just to go to war (we are going to explore these rules with greater details in the following section).

Once we have decided to go to war, if our goal is winning so to avoid the worse evil, and if war entails violating some of our most fundamental moral principles, why should we constrain warfare with moral rules? Wouldn't it be better to win in the least time possible, using every means available, so not to prolong the suffering and harm caused by the war?

Morally, and also legally, we cannot use every means available in warfare. We have to remember that war is considered a means of last resort, deployed in order to avoid an even worse evil. But warfare itself cannot be worse than the evil it was trying to prevent, or it would not be a just war anymore.

Moreover, we should not forget that being part of the military is a profession, and as such it has its own professional code of ethics to respect, that the military personnel has to respect, in the same way a doctor or a journalist have to comply with their professional codes.

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[188] G. Lucas, *Military Ethics: What Everyone Needs to Know,* Oxford University Press, New York, 2016, 15.

The branch of international law regulating the actual warfare - establishing which activities and weapons are legal and which not - is called *jus in bello*. *Jus in bello* is the collective name of the laws that a country – and its military - has to respect when conducting a war. What is important to note, according to Lucas, is that principles now part of the *jus in bello* - also called humanitarian law - "arose first as questions regarding proper *professional* conduct."[189]

Therefore, despite the peculiar features of warfare, ethics plays a role. Indeed, a crucial one, considering what is at stake during combat.

What we want to investigate is whether or not soldier's enhancement affects the *jus ad bello* and, especially, *the jus in bello*. Are the enhanced soldiers more likely to breach international law?

The last part of the chapter will recall the issue on inequality. We already presented this issue in the second chapter, where we concluded that human enhancement is neither right nor wrong *per se*. In this chapter we are going to analyze the subcategory of soldiers' enhancement and its possible effects on equality.

4.2 Harm and Coercion

The field of soldier's enhancement and its ethical underpinnings can be considered cutting edge, given its reliance on the latest scientific discoveries and their technological or biomedical applications. However, already in 1997, DeRenzo and Szafranski were investigating the *Human-Performance Enhancements in the Armed Forces*.[190] Their analysis, despite being almost twenty years old, is still both enlightening and applicable to present times.

The authors identify four categories of ethical issues regarding soldier's enhancement: harm and coercion, moral boundaries, coherence and normative system.

In part, these categories overlap with the analytical division proposed in this dissertation. The category of harm and coercion refers to the concerns that enhancement could "create the potential for unacceptable risks of harm"[191] (for the soldier) and that a widespread use of enhancers could generate indirect coercion in so

[189] *Ibidem,* 21.
[190] E. G. DeRenzo and R. Szafranski, *Fooling Mother Nature*: *An Ethical Analysis of and Recommendations for Oversight of Human-Performance Enhancements in the Armed Forces*, Airpower Journal, Volume 9, No. 2 (1997).
[191] *Ibidem,* 27.

far it forces others "to undertake risks (= taking enhancers, *ed*.) they otherwise would not, merely to assure their competitive capabilities."[192] As we can see, these arguments are the same ones we analyzed in the last section of the previous chapter.

The moral boundaries issue refers to those critics according to which biomedical enhancement is wrong as it involves an internal - meaning, into the body - intervention. For these critics the distinction between internal and external (and between natural and unnatural) bears also a moral significance. This boundary not only defines what is internal or extern, natural or unnatural but, for some authors, also what is morally acceptable and what is not.

We dealt with this kind of critic in the first chapter, where we questioned the logical foundation of this statement.

The coherence issue asks "whether or not an action is consistent with our idea or understanding of the essence of an endeavor or phenomenon."[193] In the field of the military, these issues translate into this sort of questions: "can a performance-enhanced soldier be a good soldier? Can we enhance the performance of combatants and still adhere to war rules that are just?"[194]

These are, indeed, the questions that we are going to analyze in the following section, to determine whether or not enhanced soldiers are more likely to breach international law, and how great is this risk.

The last category of issues considered by the two authors is that of justice and inequality. For DeRenzo and Szafranski the focus is on the enhancement's effects on procedures for recruitment, promotion and advancement. Our focus, however, will be more on the civilians-military relation and equality.

As stated above, we are now entering the ethical underpinnings of a very specific category, that is, the one of soldier's enhancement.

This subcategory, however, is more peculiar than, for example, the one of enhancement in sports or academia.

Indeed, we have a strong presumption *in favor* of soldiers' enhancement, whereas there is a general tendency against enhancement in the other abovementioned fields.

[192] *Ibidem*.
[193] *Ibidem,* 28.
[194] *Ibidem*.

Why is this so? The answer can be easily found in the different nature and goal of these sectors. The military has a vital role, in a literal sense. A better performance by the military personnel increases the chances of victory of the war, and thus the chances of survival of soldiers and civilians, as well as their quality of life. A better performance by an athlete, on the other side increases "only" his chances of winning the race.

Therefore, there are two, interrelated, features that set the military job apart from all the others. The first one, of course, depends on their *aim*. What is at stake is not "just" a sport match, but the life and death of real persons.

We have an intuition that this matter is so important that can make us more tolerant regarding certain risks. Simply put, when benefits are greater, it also means that they can outweigh greater risks. Soldiers fight for their country, provide protection and security to their fellow citizens.

Prima facie, then, the *raison d'état* seems important enough to counterbalance some of the risks of soldier's enhancement, even if this is not always enough to justify it, as we have seen in the previous chapter.

Soldiers would be the subjects of enhancement for something more than their personal interest, even in a case where personal interest – surviving – would probably justify greater risks alone.

In the end, the enhancement risks are posed mainly on the soldiers themselves, and the potential benefits – their survivals and the winning of a conflict – are not only benefits for them, but also for us. In a very selfish way, we might feel that we have "only to gain" from soldiers' enhancement and very little too loose (this might not be the case, but we will analyze this possibility in the section on inequality).

We can clearly see that this is not a moral argument in favor of soldier's enhancement, just a selfish balance of risks and benefits – yet, I believe that it plays a role in the highest tolerance than enhancement faces in the military compared to other fields.

It is also because, as stated above, we perceive war and the military as something quite distant from our day-to-day life, as situations in which different moral principles rule – which is in part true, as we have seen.

This is also because, as reported by DeRenzo and Szafranski, the military's one is a contract that "directly or indirectly involves death – either yours or our country's

enemies."[195] The distinction with the majority of every other job is striking. "This distinction," notice the authors "raises the stakes for the kinds of risks one might be willing to take – indeed, must be willing to take and to order in a combat setting. Being willing and being coerced, however, are two different things."[196]

It is true, therefore, that we evaluate risks and benefits differently when the topic of enhancement is applied to the military – be it because of *raison d'état* or because of more hidden, selfish ones. But we should never forget what we highlighted in the previous chapter: the vulnerability of the military to harm and coercion.

This is why, according to who writes, soldiers' enhancement is wrong when the risks outweigh the benefits *from the point of view of the soldier* himself, and not for society en large. This is the minimum moral requirement for the enhancement of the armed forces. Since we are not talking about experiments, the rule of informed consent, even if still strong, is not a *sine qua non*.

What we have to consider is the interplay of the informed consent and voluntariness of the soldier, as well as the risks posed for his health and/or life.

For further analyzing the ethics of soldier's enhancement, therefore, we have to assume that these enhancements do not impose an undue risk – in terms of short and long term health effects, for example – to the military personnel, that they know what the enhancement is, how it works and what is involves, and they agree for something more than the mere peers' or superiors' pressure.

We can consider these requirements as the first moral test for enhancers in the armed forces. If these are lacking, it makes no sense to proceed further in the ethical analysis.

This is why, as stated above, we will assume that from the point of view of the soldier, the risks outweigh the benefits.

We can now turn to the analysis of what DeRenzo and Szafranski called "coherence" and that for us is, more specifically, the effects of soldiers' enhancement on *jus in bello*.

4.3 Jus Ad Bello and Jus In Bello

We have stated many times already that the moral principles applicable in a situation of war might be, in certain regards, different form the ones present during peacetime,

[195] *Ibidem,* 29.
[196] *Ibidem.*

but that their difference does not mean that they can be respected less– actually quite the opposite is true.
International laws regulating warfare can be divided into two categories, as we have seen earlier: *jus ad bello* and *jus in bello.*

Most of the people have a strong intuition that war is wrong. Indeed, international law generally bans war, considering it justifiable only when it is a means of last resort and when its goal is to prevent an even greater evil.
The Charter of the United Nations, signed in 1945, banned all together not only *war* but the more general use of force, at article 2(4): "All Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations."[197]
Also the preamble of the Charter states that "armed force shall not be used" but an exception is introduced right after: "save in the common interest"[198].
What are, then, those cases in which conducting war can be considered just? William Casebeer listed the traditional tenets of *jus ad bello* as follows:

- Just cause: The purpose must be the preservation and protection of value, such as defending the innocent, punishing evil, or reclaiming wrongly taken property.
- Right authority: The agent authorizing the use of force must be the representative of a sovereign body.
- Right intention: The intent must accord with the just cause; the war must not be fought for territorial aggrandizement or out of bloodlust.
- Proportionality of ends: The net good achieved by the war must outweigh the net harm cause by waging it.
- Last resort: No other means are available to achieve the ends sought.[199]

These tenets still exist, but today the international law regulating the use of force – which encompasses also the war – is codified in the Charter of the UN. This is true

[197] Art. 2, paragraph 4, United Nations, Charter of the United Nations (1945).
[198] Preamble, *Ibidem.*
[199] William D. Casebeer, *Ethics and the Biologized Battlefield: Moral Issues in 21st century conflict, in Moral Issues in 21st Century Conflict*, Center for Technology and National Security Policy, National Defense University Press, Washington D.C. (2010), 297.

not only for the general ban, as we have seen above, but also for the exceptions to that ban.

The Charter of the UN recognizes only two exceptions. The first is when the use of force qualifies as self-defense (individual or collective), as regulated by Article 51. The second one is when the Security Council, having determined "the existence of any threat to the peace, breach of the peace, or act of aggression"[200], "take such action by air, sea, or land forces as may be necessary to maintain or restore international peace and security."[201]

A third exception, more controversial, started to emerge in the last years - the one of the humanitarian intervention. According to the doctrine of the so-called "responsibility to protect", when a State fails to protect its own people – either because it is unwilling or unable to do so - and the population is suffering serious harm, other States have the right (indeed, the responsibility) to intervene and protect that population.

Do enhanced soldiers, in any way, threaten the respect of the principles entailed in the *jus ad bello*?

Personally, I doubt it. Soldiers are not in charge of declaring war – they are not the *right authority*. The decision to go to war, and thus also the morality of this decision, falls on the representatives of a sovereign body, as we have seen.

The conclusion that soldiers' enhancement does not affect the compliance with the rules of the *jus ad bello* was not difficult to foresee. When we move to the analysis of *jus in bello*, however, the conclusion is less clear.

The *jus in bello*, or humanitarian law, "regulates the conduct of parties engaged in an armed conflict."[202] There are two tenets of *jus in bello*:

- *Proportionality of means*: Acts causing gratuitous or unnecessary harm are to be avoided; the good achieved by a particular means would outweigh the harm done by employing it.
- *Noncombatant* protection ("*discrimination*"): Direct harm to noncombatants should be avoided; efforts should be taken to protect noncombatants.[203]

[200] Art. 39, *Charter of the United Nations.*
[201] Art. 42, *Ibidem.*
[202] International Committee of the Red Cross, *International Humanitarian Law: Answers to Your Questions*, ICRC, Geneve (2014), 8.

If these are the core tenets of *jus in bello*, in the last century many treaties of international law have been codified, enlarging as well as specifying more the actual content of humanitarian law.

Patrick Lin identifies which of the humanitarian law treaties could be relevant for the enhancement of the armed forces: the Hague Conventions (1899 and 1907), the Geneva Conventions of 1949 and the additional Protocols I, II and III), the Biological and Toxin Weapons Convention (1972) and the Chemical Weapons Convention (1993) [204].

The author, in his article for *The Atlantic*, expresses his concerns regarding the compliance of enhanced combatants to international law. He analyzes specific parts of the treaties above mentioned to establish whether enhancement would be compliant with them or not.

The core of Lin's argumentation is that enhanced warriors can be considered weapons themselves. Indeed, the author starts his analysis discussing the Geneva Conventions, more specifically Article 36 of the Addition Protocol of 1977, which states the following:

> "In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law application to the High Contracting Party."[205]

Simply put, Article 36 requires the signatory states to make sure new weapons or method of warfare abide to the *jus in bello*. Could enhancement of the armed forces be considered a weapon, and thus be regulated under article 36? Lin, despite recognizing that "enhancement does not directly harm others", believes the answer is yes, as "in a broader sense, the warfighter is not only a weapon but perhaps a

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[203] William D Casebeer, *Ethics and the Biologized Battlefield: Moral Issues in 21st Century Conflict*, 298.

[204] Patrick Lin, *Could Human Enhancement Turn Soldiers Into Weapons That Violate International Law? Yes,* The Atlantic, accessed the 15ht of May 2016, http://www.theatlantic.com/technology/archive/2013/01/could-human-enhancement-turn-soldiers-into-weapons-that-violate-international-law-yes/266732/

[205] Article 36 of the Protocol Additional to the Geneva Conventions, 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) (1977).

military's best and oldest weapon."[206] Therefore, for the author the soldier is a weapon, and a soldier subjected to a *new* type of enhancement qualifies as a *new* weapon.

In my opinion, this broader concept of weapon is not the one intended by Article 36. However, as we will see later, it is irrelevant to establish whether soldiers are weapons or not. Indeed, regardless of the label we decide to assign to them, they have to comply with international law. The reason why we are going to critically analyze the way Lin supports his argument is to avoid others to take it as a given, and use his thesis – as he does – to promote an extreme caution towards enhancement.

Lin expresses two other problematic reasons why we should consider combatants as weapons.

Firstly, he states that robots are clearly weapon, whereas humans - according to the mainstream opinion - are not. However, there is a continuum between humans and robots. At one end of the spectrum we have humans, at the other one robots, and in between cyborgs – that are partly humans and partly robots. Lin writes: "if we want to say that robots are weapons but humans are not, then we would be challenged to identify the point on that spectrum at which the human becomes a robot or a weapon".[207] He then applies the same reasoning not only to technology and robotics, but also to genetic and pharmacological enhancement.

It is true that in the future we might face the difficult task of drawing a line between robots and humans, or between humans and an extremely enhanced version of humans. Perhaps we should start dealing with this and similar issues now, so to be prepared when further technological advancement occurs. Simply put, we have – or will have – to face this question, not to avoid it, as proposed by Lin, according to whom "to avoid the difficult question of drawing the line at which the enhanced human becomes a weapon, a more intuitive position would be that human animal is a weapon all along, at every point of the spectrum."[208]

The author suggests pretending there is no difference between the two ends of the spectrum, as the exact division line is difficult to be drawn. This seems far from a reasonable solution to me.

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[206] Patrick Lin, *Could Human Enhancement Turn Soldiers Into Weapons That Violate International Law? Yes*.
[207] *Ibidem*.
[208] *Ibidem*.

Note that Lin is not claiming that the continuum, between humans and robots, does not exist. He is not claiming that humans and robots are the same thing. He is claiming that since the gradual change from humans, to various degrees of cyborgs, to robots, does not indicate clear cut division lines, we can attribute a certain characteristic of robots – being a weapon – also to humans. This seems to me a far from convincing way to support the argument that humans (soldiers, more specifically) are weapon.

Imagine for a second to buy Lin's argumentation. We decide not to draw a line between robots and humans regarding the weapon-characteristic. Lin assumes that the only possible outcome is that robots and humans are both weapons. However, why could not it be that they are both *not* weapons? It is true that it seems counter intuitive to say that robots in the battlefield are not weapons, but think for a second about the reason why we do so. We imagine that robots used by the military are weapons *because they are not humans*.

Moreover, Lin starts with the example of robots, but applies the same reasoning to other types of enhancement, as the biomedical one. As we have said, it is easy and intuitive to consider robots as weapons. Lin attributes the weapon characteristic of robots to humans, in that continuum. But in the spectrum between extremely enhanced humans/soldiers and non-enhanced humans/soldiers, could we do the same? Is far less intuitive to consider an enhanced soldier a weapon. We could say that some of the medical intervention or substances used to enhance soldiers can also be deployed as weapons. We saw that LSD and other psychedelic substances were sometimes used not only for enhancing the performance of soldiers, but against the enemies, as truth serums or to impair their performances. For all these reasons, this argument exposed by Lin does not seem conclusive to support his thesis.

Consider now the second argument that according to Lin supports his thesis. According to the author, the fact that soldiers are organisms should not automatically disqualify them as weapon, because "if a military were to field a weaponized rhino in an urban battlefield that contains innocent civilians, we would be reasonably worried that the war-rhino does not comply with Article 36"[209]. We would most certainly will, but I d not see how this example can support the argument that soldiers are

[209] *Ibidem.*

weapons: saying that an organism such as an animal could be a weapon does not imply that humans could as well. What Lin overlooked is a fundamental question: *why* would a weaponized rhino be a matter of concern? Lin says that humans and animals are both organisms. Which is true, but obviously it is not the fact that a weaponized rhino is an organism that worries us, but the damages it could make. More specifically, it is the *weaponized* part of the weaponized rhino that is a matter of concern. A weaponized human can be a matter of concern as well, but again, for the weaponized part.
In the end, Article 36 does not establish its own requirements for a new weapon or method of warfare – it simply refers to other international regulations.

Moreover, the whole point of trying to demonstrate that soldiers are a weapon is to state that enhancement falls under Article 36. There is a way to do so that does not involve categorizing humans themselves as weapons. Indeed, Article 36 does not mention only weapon, but also "new means or method of warfare". According to who writes, Lin's aim was to establish that enhancement in the military has to comply with article 36. In order to do so, it would have been easier – and more logical – to consider enhancement a new method or means of war. Enhancing the armed forces with new biomedical intervention can be seen as a new method of conducting warfare.
However, also this easier and less problematic argumentation would have been unnecessary. In fact, as stated earlier, Article 36 simply refers to the other norms of the Geneve Convention and to the *jus in bello*.
I believe that the reason why Lin wants to consider enhanced soldier a weapon, is not to apply to them Article 36 *per se*, but all the other rules of international humanitarian law.
However, states and the military have *anyway* to comply with the *jus in bello* when deploying enhanced armed force. Simply put, considering enhanced soldiers a weapon - or not - does not change their obligation to comply with international law.
We have to see if enhanced soldiers are bound – or more likely to – commit war crimes, or violate the *jus in bello* in some other way.

We have seen that the two core tenets of *jus in bello* are the principle of discrimination between combatants and civilians, and the principle of proportionality.

Lin, following the line of reasoning that soldiers are weapons, reports the fact that new weapons have to abide to the principle of distinction – that is, they have to be capable of distinguishing between civilians and combatants, so to avoid harming the former. It is for their inability of abiding to the principle of distinction that, for example, biological weapons or anti-personnel landmines are illegal.

Even if they are not weapons *strictu sensu*, enhanced soldiers are obviously bound to comply with international law, and thus to the principle of distinction. One could argue that the principle of distinction applies only to weapon. This is irrelevant, because the principle of distinction derives from the principle of discrimination. Indeed, soldiers – enhanced or not – have to comply with the principle of discrimination.

Basic humanitarian law also entails:[210]

1 - Persons *hors de combat* and those who do not take a direct part in hostilities are entitled to respect for their lives and their moral and physical integrity. They shall in all circumstances be protected and treated humanely without any adverse distinction.

2 - It is forbidden to kill or injure an enemy who surrenders or who is *hors de combat*.

3 - The wounded and sick shall be collected and cared for by the party to the conflict which has them in its power.

Protection also covers medical personnel, establishments, transports and equipment. The emblem of the red cross or the red crescent is the sign of such protection and must be respected.

4 - Captured combatants and civilians under the authority of an adverse party are entitled to respect for their lives, dignity, personal rights and convictions. They shall be protected against all acts of violence and reprisals. They shall have the right to correspond with their families and to receive relief.

5 - Everyone shall be entitled to benefit from fundamental judicial guarantees. No one shall be held responsible for an act he has not committed. No one shall be

[210] International Committee of the Red Cross, *Basic rules of international humanitarian law in armed conflicts*, (1988).

subjected to physical or mental torture, corporal punishment or cruel or degrading treatment.

6 - Parties to a conflict and members of their armed forces do not have an unlimited choice of methods and means of warfare. It is prohibited to employ weapons or methods of warfare of a nature to cause unnecessary losses or excessive suffering.

7 - Parties to a conflict shall at all times distinguish between the civilian population and combatants in order to spare civilian population and property. Neither the civilian population as such nor civilian persons shall be the object of attack. Attacks shall be directed solely against military objectives.

In the second chapter, when we analyzed the ethics of human enhancement in general, we were simply trying to reply to the critics of those who would ban it entirely. We just had to demonstrate that enhancement is not *inherently wrong*. With enhancement in the armed forces, however, this is not enough. We already know that it is not inherently wrong – indeed, we said that we have a strong presumption in favor of it, due to the key role played by the military in guaranteeing our security and protecting their state.

The *raison d'état*, however, does not trump every kind of concerns of morality. We saw this when talking about the principle of informed consent in the last chapter. Now we have to balance the benefits of enhancing the armed forces with the risk of them breaching the rules of *jus in bello*, starting with the principle of discrimination, expressed by the seventh of the points abovementioned.

Are enhanced soldiers more likely to violate it? Lin himself states that it is "implausible". At the same time, however, the author points out that it is not theoretically impossible. He write that "an hypothetical *berseker* drug would likely be illegal if it causes the warfighter to be inhumanely vicious, aggressive, and indiscriminate in his attacks, potentially killing children."[211]

As we have seen, there are some drugs that can make the soldier so aggressive that he could become a threat for civilians, or wounded and prisoners of war (other categories protected by humanitarian law) and we can imagine some biomedical interventions with the same effect. It is true that we should not allow the use of whatever enhancement, but from the other side we cannot even ban them all together

[211] Patrick Lin, *Could Human Enhancement Turn Soldiers Into Weapons That Violate International Law? Yes.*

simply because some of them might be dangerous - we have to distinguish between the safe and the dangerous ones.

Enhancers are a broad category. Each substance and each intervention has different effects, and different persons react differently.

A recent study of The Ohio State University found out that acetaminophen (also know as paracetamol) diminishes empathy for others' pain:

> "In two double-blind placebo-controlled experiments, participants rated perceived pain, personal distress, and empathic concern in response to reading physical or social pain scenarios, witnessing ostracism in the lab, or visualizing another study participant receiving painful noise blasts. As hypothesized, acetaminophen reduced empathy in response to others' pain. Acetaminophen also reduced the unpleasantness of noise blasts delivered to the participant, which mediated acetaminophen's effects on empathy. Together, these findings suggest that the physical painkiller acetaminophen reduces empathy for pain and provide a new perspective on the neurochemical bases of empathy."[212]

If we find new side effects - such as this new - for drugs that have been used for decades and are among the most common worldwide, how can we consider safe, without doubt, new substances and enhancers? The study of the brain and its functioning is a relatively recent field, and there are many fundamental questions that we still have to address.

The effect of LSD on soldiers, for example, has been tested not longer after its creation. Experiments were conducted in order to test LSD efficacy as a performance enhancer, as a truth serum, or as a possible weapon to be distributed among the enemies to weaken them.

Neuroimaging did not exist at that time, so obviously it was not possible to study the effects of LSD on the brain using this technique. However, it was surprising for who writes to discover that the first study on the effects of LSD on brain activity was conducted only in 2016.

In April 2016, in fact, a group of researchers published on the National Academy of Social Sciences (PNAS)[213] the results of the first neuroimaging study of this substance. The experiment compared the brain activities of two persons, one of

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[212] *From Painkiller to Empathy Killer: Acetaminophen (Paracetamol) Reduces Empathy for Pain*, Oxford University Press (2016).

[213] Robin L. Carhart-Harris et al., *Neural correlates of the LSD experience revealed by multimodal neuroimaging*, Proceedings of the National Science Academy of the United States of America, Vol 113, No 17 (2016).

which had taken LSD. It showed that under the effect of this substance many more areas of the brain are active, which probably explains the hallucinatory experiences of the subjects. As we can see, at the moment is difficult to assess the actual risks of an enhancer. Thanks to the unfolding evolution of neuroscience we can understand more about the brain. In the near future we will have more insights on how certain substances or enhancers have a certain effect, as with the LSD experiment. At the same time, the improved knowledge of brain functioning is leading to the creation of new substances and interventions.

We can imagine a future in which the risks of each enhancement are clear, and the reaction of a specific individual can be predicted with an acceptable accuracy. In this scenario, the problem would be drawing a line between acceptable and unacceptable risks. A drug that enhances aggressiveness, at what point would be considered a risk for the respect of the principle of discrimination? Should it be banned all together? What if we could test the individual response of every soldier of, for example, those who whish to join an elite team (as it is more reasonable to assume rather than every member of the armed forces, because of time and costs issues), and state that only those who react to the enhancer in a certain way – not becoming a risk for protected categories, for example, or not experiencing a decrease in their performance – can be admitted? We saw that controlling betablockers could be useful in removing painful memories for those who suffer of PTSD. Also this intervention is not free of risks. Indeed, knowing that you will not have any memories of certain actions could make you feel less responsible, or guilty for it. Also this kind of reaction could be tested.
But at this point, one could argue that it would be discriminatory not to allow someone with high potentials to join the elite group just because of its reactions to a substance – nothing related to his actual capacities in combat.
In my opinion, it would be a physical requirement not different from the perfect sight required for military pilots.
If enhancers were safe both for soldiers and for those who should not be harmed during conflict, I do not see an ethical problem in requiring soldiers of certain groups to take them. However, it could still be the case that the choice is left to the individual, especially for less concerning substances, such as improved go pills or no go pills. The pilot or soldier could choose, depending on his tiredness and lucidity, whether or not to consume them. A system measuring his actual physical situation

could support him in making his decision, as our reaction times and cognitive abilities tend to be more affected by fatigue than what we realize.

What would be the ethical problems of such scenario? What the losses? We are analyzing a scenario with almost perfect information and full consent for all the persons involved, with the simple aim of improving soldiers' performances and chances of survival. For who writes, this ideal situation does not present any ethical issues or losses (we are leaving inequality aside, as we are going to explore it in a different section).

However, there is still another issue that needs to be addressed. It recalls the discussion about spontaneity and authenticity presented in the second chapter. We are referring to a characteristic, a value, which is fundamental in the military – honor.

Is an honorable action less honorable if the person who performs it took an honor-enhancer? This is what DeRenzo and Szafranski rightly ask:

> "What of the notion of honor? Can honor, so integral to our understanding of what it means to be part of the armed forces, be just as honorable if it is fortified pharmacologically? If sense of commitment, honor, and loyalty could be fortified through biology, is its quality or importance lessened or devalued in some way?"[214]

In the second chapter we analyzed the general critique of inauthenticity against enhancement, and more specifically the one against the inauthenticity of virtues. The issue of honor in the military is not an exception from what we concluded at the end of our analysis.

As we said in the second chapter, we tend to forget how much of our present moral capacities depend on the education we received at a small age, and from other environmental circumstance.

If honor – as any other virtue – does not depend entirely (and not even for the majority) on our own free will, what is the difference with enhancement? One could say that in the case of enhancement honor would be *even less* authentic, introducing another not spontaneous element into the formation of honor. However, as we have already noted, the decision itself of becoming more honorable is to be praised, and,

[214] E. G. DeRenzo and R. Szafranski, *Fooling Mother Nature*: *An Ethical Analysis of and Recommendations for Oversight of Human-Performance Enhancements in the Armed Forces*, 1997.

most importantly, is *authentic,* unlike the education received in the past or many experiences lived.

What is the real reason why, most of the people would intuitively state that honor "count less" when is enhanced through an external means?

It could be that this is the case because an enhancer is artificial, and thus "inauthentic", but as we have shown in the second chapter artificial means can lead to authentic feelings, emotions and actions, whereas "natural" situations can cause inauthentic feeling.

Another reason could be the fact that taking an enhancer introduces an element of disparity with those who did not take it. However, we can simply reply that having received a certain moral education is an element of disparity all the same. One of which, actually, we are less in control, and thus should be consider less authentic.

The same critiques and replies are valid not only for honor, but also for other virtues greatly valued in the military, such as courage.

Moreover, we also have to consider that virtues are not only valuable per se, but also because of the positive outcomes and actions they usually produce. Applied in the military context, a positive outcome could include saving one or more lives. In such a situation, would someone really snort and comment: "I could have done that as well, with that pill"? I doubt it.

In the opinion of who writes, the concerns over the authenticity of honor or courage are intuitive, but as soon as we analyze the issue, we find out that our intuition is biased by incorrect assumptions – such as the one that artificial means always lead to inauthentic feelings and actions.

We imagined a scenario with no scientific uncertainties, to uncover the ethical issues that are not depending on them.

This scenario, however, is not a reality at the moment, and it probably will not be in the near future, despite the recent progresses in neuroscience.

How to tackle these uncertainties? What kind of policy should we advise in dealing with new, possibly dangerous enhancers?

First of all, we exclude two "extreme" solutions, either a complete ban or a complete tolerance:

1- To ban entirely the use of enhancers in the military is not an option, both because of the possible benefits (with positive repercussions on the citizens'

security), and because the armed forces have been using substances for various reasons – killing pain, boosting performances, relieving stress, fatigue, thirst and hunger – since not hundreds of years, but thousands. Banning them now would be unpractical, and such a ban would anyway be overridden *de facto*.

2- To allow indiscriminately every enhancer, on the other hand, is too risky. We know that some enhancers do boost aggressiveness, and others could apparently make us less compassionate. Our goal is not only to win the war, but also to conduct a *just* war.

We could say that, regarding enhancement as regarding many other issues, *in medio stat virtus*. In the opinion of who writes, more control and regulations are paramount in this field.

First of all, regarding the research and development of new substances and intervention, it is important to test and control thoroughly every substance or new intervention before applying it. The experiments have to follow the principles of research ethics. In case of tests conducted on humans, the rule of informed consent cannot be violated.

Once the enhancer is developed, how to determine which ones can be used and which not? As we saw, there are international laws and conventions regulating which weapons are permissible and which are not. For example, the Chemical Weapons Convention (1997) banned the use of chemical weapons during conflicts, and the Biological Weapons Conventions (1972) ban the biological ones. Landmines, incendiary and blinding laser weapons are banned by the Convention on Certain Conventional Weapons (1980).

A similar international Convention could be take place, in order to establish whether or not the military applications of and enhancer are permissible. The opinions of scientific and ethical committees would have to be taken into account.

There are obvious problems with this idea, however. The first one regards the actual binding force of such a treaty. This is one of the most common critiques toward international law as a whole. Without an Hobbesian "Super Leviathan" – that is, without a an institution superior to the state capable of enforcing the law - it is impossible to guarantee full compliance. However, some mechanism of enforcement can be applied also in the international arena. Sanctions are the most common one. Therefore, to guarantee a higher level of compliance, the international treaty should

also incorporate an enforcing system, such as, indeed, sanctions from other states. Moreover, each state would have to file a yearly report on the status of its compliance regarding enhancement in the military.

However, it is difficult to imagine a state that, after having developed a new powerful enhancer, decides to ask for other states' approval before employing it. As we noted, the competitive advantage given by cutting edge technology is crucial for the military.

Each state, then, would have to self-evaluate the new enhancer, deciding whether or not it is admissible.

Obviously, the existing *jus in bello* still has to be respected when applying the new enhancer. This means that if the state, when using the new enhancer, violates it, the international community might intervene and sanction it.

Moreover, after the establishment of the International Criminal Court (the Rome statute was adopted in 1998, but the Court entered into force in 2002), individuals can be prosecuted for genocides, crimes against humanity and war crimes. Enhanced soldiers would be not qualify as an exception, regardless of whether the enhancer was the indirect cause of that illegal action or not.

Therefor, the problem of the *new* enhancers developed is minor. The major problem entails the regulation of enhancers in general. Once we established that a certain substance should be banned, how do we get states to sign a regulatory treaty in the first place, and later, how do we ensure that they will not violate it?

These questions obviously assume a realist position – according to which states' only motive of action is to increase their power relative to other states. A hard realist position would imply not signing a treaty that could in a second moment prevent the state from deploying efficient means to win a war – or not respecting the treaty signed. Indeed, international treaties do exist, and states usually comply with them. The reason why this occurs is the same reason why a treaty regulating enhancers could be reached and respected.

In recent years, game theory has started to be used not only in the international relations literature, but also in the international law one[215]. Since the situation to which we are applying game theory is *war* and anyway we are analyzing this issue from a realist perspective, it seems reasonable to apply an example of a non-

[215] For an introduction to game theory see A. Rapoport, Game Theory, (Palgrave Macmillan UK, 1989).

cooperative game. The most well known example of a non-cooperative game is that of the Prisoner's Dilemma, in which each player has as a dominant strategy "defection" instead of "cooperation". This leads to the only Nash equilibrium of the game, namely, that of mutual defection. What is important to note is the fact that mutual defection is less advantage for both players than mutual cooperation – despite this, a player has an incentive to defect, as defecting is the best strategy regardless of what the other one would do.

In the case of states interacting with each other, however, we refer specifically to the repeated Prisoner's Dilemma. This distinction is crucial, as the outcome of one single game or repeated games changes substantially. In the first case, each player has a dominant strategy to defect, which means that the outcomes reached will not be the optimal one. When the interaction is repeated, however, we know that

In the field of international law this applies as described by Jens David Ohlin:

> "The new realists proceed to argue that compliance in a Prisoner's Dilemma is based on reciprocity that is hard to come by. A state will prefer to violate the treaty or customary rule while their competitor adheres to it, though this state of affairs is hard to achieve as all competitors share the exact same preference. Thus, in order to avoid the opposite result (mutual defection), states cooperate in the form of international agreements to produce the next-best preference: mutual adherence to the norm."[216]

Can we say that the states have a preference in other states not using dangerous enhancers? It seems reasonable, as it would be a guaranty for them then when facing in battle the army of that state, the combatants will not be under the effects of the banned enhancer.

Why would the state then keep respecting the treaty? First of all because of the sanctions that would follow a breach of that treaty. Sanctions are not considered in the Prisoner's Dilemma example, not even in the repeated one, but they do exist in international law, and give to states a very concrete reason why to comply with a treaty. In the Prisoner's Dilemma, even in a moment of mutual cooperation, one of the players could switch to defection. In the international arena, this would have a number of consequences, such as the abovementioned sanctions, but also a worst reputation and the risk of retaliation by the state against which the risky enhancers have been used.

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[216] J. D. Ohlin, *Nash Equilibrium and International Law*, 2011, Cornell Law Faculty Publications. Paper 572. http://scholarship.law.cornell.edu/facpub/572

Of course, even this approach faces difficulties. First of all regarding non-state actors, which, not being players in the international arena, do not have any strong incentive in respecting international treaties. Fortunately, as remembered above, the International Criminal Court has the authority to judge individuals for crimes of war. The authority and powers of this Court could partially operate as deterrence.

Secondly, it might be difficult to establish whether soldiers, during a specific conflict, where under the effect of a banned enhancer or not.

We reported in Chapter III that many times the unusual –maniac, extremely aggressive, etc. - behaviors of soldiers under the effect of drugs were noted directly by their enemies or by civilians. As part of the treaty regulating enhancers in the military, a system that allows civilians and soldiers alike to report and denounce suspect behaviors from other armed forces could be included. Depending on the severity of the reports, the international community could reply differently, for example with investigations on that country.

Despite the difficulties and the problems highlighted, in the opinion of who writes, an international treaty, coupled with a system of sanctions, remains the best option to regulate the use of enhancers. Finally, we also have to remember that this regulation would regard only those enhancers that are considered too dangerous, leaving the states free to use or not use the allowed enhancers.

4.4 . The Difference between Technology and Enhancement

In the first chapter, we discover how difficult it is to delineate the type of enhancement that is now a matter of concern for philosophers, politicians, and of course, scientists. After having analyzed the difficult distinction between therapy and enhancement, we briefly presented another distinction, the one between technology and enhancement. "What is so different about incorporating tools as part of our bodies," asked Lin and Allhof "as opposed to merely using them externally?"[217]

It might be that they do not change and affect our *nature.* They do not change our body - they do not interfere with it. This is the difference between "a neural implant that gives access to Google and the rest of the online world" and " using a laptop computer or Pocket pc to access the same". Is there an ethical difference? One could answer yes, if it believes that our anatomy, our body, its functions and abilities are

[217] P. Lin and F. Allhoff, *Untagling the debate: The Ethics of Human Enhancement,* 253.

what really define us, and that only internal means affect them. This, however, is easy to confute. First of all, to believe that our anatomy is what defines us would be reductive of the whole human nature. Regarding abilities, it is obvious that external tools can increase our abilities as much as internal ones (or almost the same)

It is true that, for example, a neural implant would give us the possibility of connecting online constantly. However, we already have a nearly-to-constant access to the web. Neural implants would be a step further, allowing an access, not only constant, but also ultra-rapid and more "guaranteed" (= if I loose my phone I loose also the connection, whereas I cannot loose my neural implants). This and other enhancement/technologies would certainly generate a number of ethical issues, but in my opinion these will be focused on the social, economical and legal consequences of this technology, not with the mere fact that these implants are going to be in our bodies.

When we take a closer look at the distinction between enhancement and technology, the barrier between the two concepts seems to fall down.

When we apply it to the military, however, I think this distinction plays a role. This is because of the temporary nature of wars and conflicts. The way we deal with weapons and veterans after a war is obviously not the same. We can turn off a robot, but can we remove the robotics parts of a cyborg and make it come back to its original situation? Would this be the most ethical thing to do? Should we ask the veteran what he prefers? Should he be allowed to use his abilities in a civilian field once the war ends?

This is the real difference between technology and enhancement. Technology does enhance us, but we still depend on a device to have certain abilities. If that device is related only to a specific situation or job – as war – the person is not entitled to it also when that situation ceases to exist. When the technology is within us, we might be entitled to maintain it also afterwards, unless there is a specific contract that states otherwise.

Simply put, humans have, clearly, more control over enhancing technology that on other (enhanced) humans.

Imagine veterans who come back home with various kinds of enhancement incorporated in their bodies, and the right to maintain them. These enhancements could be of all types – technological implants, robotics replacement of human parts, intervention on the brain to enhance our cognitive capacities, or genetics. Moreover,

we imagined a scenario in which the members of elite group also react perfectly – or close to perfectly – to enhancing substances.

Should we ban the armed forces to maintain their enhancements once the war has ended? If we do not, how would the equilibrium change between the veterans and the civilians? Would there be inequality?

These questions are going to be analyzed in the following section, which deals with issues of inequality. Our discussion on technology and enhancement has indeed brought us close to the discussion of distributive justice, noting the problem of the maintenance of the enhancers once the conflict has ended.

4.5 Civilians/Military Inequality

After having analyzed issues of fairness and equality in the second chapter, we concluded that enhancement is not morally wrong per se. Enhancement does not lead automatically to inequality. Is its distribution that could be unfair, or unequal – as the distribution of every good/service. If we could find a just distribution of enhancement, the issue of inequality would not stand. This is obviously an incredibly difficult task, as the whole point of distributive justice, as a field, is precisely to find a distribution of goods and services that we can consider fair and just. If we had a just distribution for goods – or resources - in general, probably that would apply also to enhancement. We do not have such distribution, and even if we had it, it could still be practically impossible to establish it all of a sudden, given the current, deep, socio-economic differences both between and within countries.

As we stated many times, however, the aim of the second chapter was simply demonstrating that enhancement is not inherently morally wrong, and does not lead automatically to an unfair distribution.

In this chapter, however, we are analyzing a specific type of enhancement, the one of the military. Therefore, we have to imagine, and analyze from an ethical standpoint, the possible distributions that could unfold from the application of enhancement in the military.

There are three possible scenarios:

1- The military and the civilians get access to the same enhancers.
2- Only the military actively conducting war can access enhancers.
3- Only the military actively conducting war can access the enhancers, but once back to the civil life, they loose their privilege.

In the first scenario, we would not have inequality between the military and the civilians. The distribution could be either fair or unfair, but what we are trying to analyze here is the ethics of soldiers' enhancement. In the first scenario we would be back into the general issue of the equality of human enhancement. Thus, we are not going to analyze it at the moment.

The second scenario entails a clear inequality between different sectors of society, namely, the military and the civilians. Is this situation realistic? We already stated that the risks/benefits balance for enhancers' use is different in the military field from the civilian one. It is not impossible, then, that a country decides to ban the enhancers for civilians, but allows them for the military. What would happen when the veterans come back home? Could the armed forces maintain their enhancement?

If we think about it, in scenario 2 there is a general ban on enhancers, and the exception of the military is due only on the exceptional character of war, where the possible benefits are higher, therefore decreasing the ratio risk/benefits. Once the war ceases, however, the additional benefits of enhancing the military ceases as well. Therefore, there is an argument for saying that the military access to enhancement should cease when they come back home, or when the war ends, as suggested by scenario 3.

Scenario 3, however, faces many problems – that we are going to analyze now – and in the end seems neither fair nor practical.

First of all, some enhancements are permanent (such as genetic enhancement), or so invasive (such as a neuroimplant) that removing them could be impossible, or extremely expensive, or too risky for the health of the soldier.

Secondly, the war might be ended, but having enhanced armed forces, ready to go the minute that they are needed (or simply stationing in military bases abroad), would increase the level of protection of the country even during peacetime.

And what about those enhancers that hypothetically cure PTSD – and thus would be taken by veterans, at home – but might have other enhancing effects?

In the end, what is the risk of having an enhanced military in the same country of non-enhanced civilians, as suggested instead by scenario 2?

We can list a few reasons that indicate such a deep inequality would be an element of tension within the society.

First of all, with an extremely powerful military, a military that indeed has superior capacities to the average people, the risk of a coup d'état becomes realistic also in those countries that are usually democratic and follow the rule of law. This is not only because of the physical superiority of the military, but also for the psychological sense of superiority that could come with it. In the end, the best ones are indeed supposed to rule, they could say.

A similar situation could happen even without a coup d'état. Having a competitive advantage, the former members of the armed forces could exploit their enhanced abilities to occupy the most socially, politically and economically important roles in society. Moreover, if the enhancements were genetics, the children of the veterans could inherit them. This could possibly turn into a vicious, self reinforcing circle, that in two or three generations time could created a socio-economic division much deeper than the actual one[218].

Finally, scenario 2 inherently entails inequality. Depending on the distributive justice theory adopted, however, inequality can be just or unjust. From the perspective of a pure egalitarian, for example, it is in itself bad that some people are better off than others – in this case, that some have access to a resource and others do not. For a pure egalitarian, inequality in itself is enough to consider as unfair this distribution. The most common critique to this position is the Leveling Down Objection. Consider this provocative example that highlights the nature of the Leveling Down Objection. Imagine a situation in which 10 people are blind and 10 can see. Indeed, if all that matters is equality, blinding those 10 people would create a fair, a better, distribution – everybody is blind, with no inequality. This is of course absurd.

Other egalitarians – the pluralist ones - recognize the presence of other values beside equality. Inequality is still considered bad, but a kind of bad that can be outweighed by other values. The world is in *one way* worse, if there is inequality, but it could be *overall* worse or better. In this sense, equality is recognized as a value, but also utility. We can "trade" a bit of equality in order to increase utility.

[218] Of course, if the children of the veterans were enhanced as their parents, but not part of the military, the division line between enhanced and non-enhanced would be exclusively a matter of genetics, and not of being part of the military, in a matter of two generations. On the one hand, this could entail a slow spread of enhanced genes among the others; on the other, on the contrary, enhanced persons might want to secure their privilege and breed only with other enhanced, widening the gap with the non-enhanced more with every generation.

Moreover, we can also think that equality is important not only for its intrinsic value, but also because it instrumentally promotes other things we value, such as economic growth, political stability etc.

The line of reasoning of the pluralist egalitarians could apply to scenario 2 in order to justify the existing inequality.

Indeed, the reason why the military would have access to enhancement is precisely to increase the security of the country and the protection of the citizens. It could be that that the increase in utility generated by this higher protection outweighs the inequality of the enhancers' distribution.

We said that possibly some equality can be traded for higher utility, and this is a powerful argument in favor of scenario 2. However, in my opinion, not convincing.

First of all because, as we have stated above, inequality would also lead to higher social tension and possibly political instability. Ironically, we could reach a situation in which citizens have higher protection from foreign enemies, but less protection within their own country because of disorders, riots etc.

It is not clear in this case if the overall utility would be greater or not. Probably not.

Moreover, from a pluralist point of view, scenario 2 faces a major problem. Indeed, scenario 2 is not a perfect example of "trading equality for higher utility". The idea of trading implies that, in a way, we cannot have that higher utility without giving up to a bit of equality – exactly a trade off. In the situation that we have presented, however, what would lead to higher utility would simply be giving the enhancers to the military. In order to do so, it is not required, at the same time, to not give access to the enhancers also to the civilians. There is not a real trade off. We could have both higher utility and higher equality moving to *scenario 1*.

There is another reason – less philosophical and more practical - for which we should consider scenario 1 as a valuable option.

Imagine that when the military personnel comes back home from the war, keeps assuming enhancers. However, the presence of enhanced members could spread the use of enhancers among civilians, first illegally and then, eventually, legally. This is a real possibility also because once an enhancer has been developed, even if just for the military, it is not easy to maintain that technology away from black markets for too long. Regulating enhancement - establishing the safe doses of enhancing, providing medical intervention in the hospitals – would actually promote a healthier and safer use of it.

Moreover, it would not be the first time that the use of a substance or enhancement spread among civilians after first having been tried by the armed forces, as noted also by Kamieński[219].

I am well aware of the fact that in order to advocate for the distribution of enhancement to everybody is not enough to promote scenario 1 as the best possible option among the scenarios proposed. As stated in chapter II, the position exposed in this dissertation is not pro-enhancement *strictu sensu*, but rather anti-anti-enhancement. The critiques usually targeting enhancement were confuted – but still something more (something stronger) is needed in order to advocate for enhancement.
What we highlighted is the fact that a society in which only the military has access to enhancement might be not only unequal, but also unjust and overall *not* better (if not worse).
Entering into scenario 1, however, means entering in the general field of distributive justice. The aim of this dissertation is not to find a distribution of enhancers that be just, but to analyze from an ethical standpoint the ethics of soldiers' enhancement. Regarding its impact on inequality, our suggestion is to not increment the existing inequalities allowing only a sector of society – the military – to have access to enhancement.

So far we analyzed the inequality within nations. What about the inequality between *nations*? It is reasonable to imagine that the richest countries will be the first ones – as indeed already are – to develop and employ enhancers. Here we can briefly recall the argument about technological innovation that we introduced in chapter II. In that chapter, we stated that it is possible that at the beginning only the best off would have access to enhancement (as usually occurs with technological innovations), and in a second moment they would have a privileged access to the latest development of enhancers. But the fact that new versions would be available soon (because of the speed at which progress moves) means that the prices of the previous ones would decrease in a short period of time. In this way, the middle and lower strata of the society would have access to enhancers fast enough to catch up with the higher

[219] Ł. Kamieński, *Shooting Up: A Short History of Drugs and War*, 56.

strata, or at least fast enough to avoid the widening of the existing gap. The same line of reasoning could be applied for inequality between nations. It is probable that at the beginning only the richest countries would use enhancers, but it is also probable that these would probably spread worldwide in a matter of a few years. The international treaty regulating enhancers could include a plan to assist poorest countries into acquiring - or producing their own - enhancers.

4.6 Conclusion

In this final chapter we discussed the ethical underpinnings of soldiers' enhancement on just war and equality.

Just war theory is composed of *jus ad bello* – the right to go to war – and *jus in bello* – the laws regulating warfare. Enhancement does not affect the former, but could affect the latter. Some enhancers could trigger more aggressiveness and violence – or lower compassion. This could in turn make it more likely for the soldier to infringe international humanitarian law. These risks could be outweighed by the obvious benefits of deploying an enhanced military, in terms of security and protection of the citizens.

What are, therefore, the ethical recommendations to analyze risks and benefits and to deal with enhancement in this field?

First of all, developing them has to abide to research ethics. When human subjects are involved, the rule of informed consent is paramount. Secondly, they have to be safe, both in the short and long run, for the soldiers themselves, and if a specific elite group requires taking enhancers, this possibility should be left as much as possible to the free choice of the soldier, or be clearly stated as a "requirement" of a special unit before the soldier joins it, so that it could opt out.

To respect the *jus in bello*, there is the need of classifying enhancers as weapons in order to regulate their use in the military applications. Soldiers – enhanced or not – have to comply with humanitarian law. International regulations should ban the substances or interventions that are considered more dangerous. We showed that – despite the skepticism – international treaties and international law are indeed usually respected by states. This can be explained by a mutual advantage situation, as showed by the Prisoner's Dilemma repeated game.

Regulations and a fair distribution seems also the most reasonable way to tackle issues of fairness and equality. If we allow veterans to maintain their enhancement

once the conflict has ended, but we ban civilians to obtain them, the resulting distribution could not be equal or fair, and dangerous tensions within society could develop. We highlighted the fact that, even if it is indeed true that some equality could be traded for higher utility, in this case it is not required. We could have the higher utility guaranteed by better soldiers, without being obliged to introduce an element of tension and inequality within society. Of course, we stated that this is not enough to strongly advocate in favor of enhancement – it could be considered part of our general anti-anti-enhancement position.

Regulation, without banning all together every enhancement, could also avoid the formation of a black market for selling enhancers to those who cannot legally buy them.

We concluded the chapter briefly analyzing the issue of inequality among different countries. We recalled the analogy between enhancement and technological innovations done in Chapter II, where we highlighted the fact that enhancers would probably spread rapidly across society (after being a privilege of the better off for a short period). Hopefully, a similar catch up process would occur also among different countries. After a period of time in which only the richest countries develop and deploy enhancers, it will probably spread worldwide.

CONCLUSION

This dissertation proposed an ethical analysis of soldiers' enhancement. First of all, we defined soldiers' enhancement as a subcategory of human enhancement. In the first chapter, we tried to delineate the latter concept, and we adopted as working definition the one provided by Parens, according to whom we can consider human enhancement those "biomedical interventions that are used to improve human form or functioning beyond what is necessary to restore or sustain health".

We noted, however, that there are no reasons to restrain this definition only to biomedical interventions, and decided to broaden the concept to include also electronic and robotic means, not only biomedical ones, for the ends of this dissertation.

The distinction between enhancement and therapy, implied by this definition, is too blurred and subjective. In order to operationalize it, we will adopt Juengst and Moseley's "disease-based-account" which considers an intervention as therapy when is meant to have an effect on an illness or a disease (be it cure it or prevent it)), whereas enhancement is not related to a malady. We have highlighted the fact that what is considered a disease might change with time, and that developers of enhancers could lobby to label as "diseases" or "dysfunctions" every minor problem encountered by the individual. However, at a theoretical level, the disease-based-account remains the best way to define and operationalize human enhancement today.

The second chapter defended an anti-anti-enhancement stance. This means that we did not advocate positively for human enhancement – we simply replied to the critiques of the "anti-enhancement" authors, demonstrating that human enhancement is not wrong *per se.* We highlighted the fact that humans have changed already their biology at different stages of the evolution of the species, as with literacy and the agriculture revolution – there should be no room for "biomedical exceptionalism".

Indeed, human biology is neither a fine, stable and perfect product that should not be altered, nor, on the contrary, a fragile equilibrium that we should preserve exactly as it is to avoid catastrophic consequences. Of course, caution is needed – but without this sort of unmotivated deference to nature, which is closer to a religious ideology than scientific evolution and progress ethos.

We replied also to the critiques of self-manipulations, cheating, and inauthenticity. Cheating is a complex issue, but we concluded that since it depends on relative parameters – such as the "rules of the game" and the behavior of the other "players" – it cannot be used to undermine the whole field of human enhancement. Indeed, cheating is usually a critique to doping in sport and the off-label use of cognitive enhancers in the academia. We noted how our perceptions changed when considering the same behavior – taking enhancers – not even in a different field, but in a different context (from students, to researchers). The critique of inauthenticity was confuted with a double argument: first of all we broke the alleged absolute correlations between natural-authentic and artificial-inauthentic; secondly, we noted that even assuming that enhancement does provoke inauthenticity, the overall balance of the enhancement effect can be positive, with gains outweighing the losses.
Finally, we debated the critiques of distributive justice, according to which, human enhancement should be banned not because it is wrong in itself, but because it would increase sharply the inequality within our society. Many authors believe that human enhancement could worsen the existing inequalities and add a new social division, namely, the one between enhanced and non-enhanced individuals. However, we highlighted the necessity of distinguishing between human enchantment and its distribution. This critique would be solid only if there were not any possible fair distribution. However, we can imagine, for example, a national health service, or maybe in this case national enhancement service, regulating and funding access to enhancers in an equal and fair way.

In the third chapter, the history and the current applications of soldiers' enhancement are going to be presented. As highlighted before, the combatants have always used intoxicants. The reasons are mainly three: to suppress fear, enhance their abilities, or as a way of dealing with post traumatic stress disorder. The ancient Greeks used opium, as later the Indian and Chinese troops. Hashish was common in the Middle East already from the Middle Ages, whereas coca leaves were extremely widespread in South America. It was only in the twentieth century that artificial substances such as LSD were created. Some of these substances, together with new neuroscientific interventions, have been tested for their "truth-serum" or "truth machine" potentials, even if the results so far indicate that they are not reliable enough to be, for example, accepted as evidence in court.

Moreover, a new set of "safer" pills, that present similar features to amphetamines but far less side effects, is becoming increasingly popular both among the military and civilians.
The third chapter included also the ethical analysis of the vulnerable position of soldiers, who on the one hand risk to be the subjects of human experiments without having given their informed consent, and on the other hand could be coerced – directly, from their superiors, or indirectly, from their peers – to take enhancers even when they do not intend to.

In the fourth chapter we discussed the ethical underpinnings of soldiers' enhancement on just war and equality.
Regarding just war, we highlighted the importance of an international treaty regulating the use of enhancers, in particular banning those that are considered dangerous for either the wellbeing of the soldier of for the civilians' situated in conflict-zones.
Regulations and a fair distribution seems also the most reasonable way to tackle issues of fairness and equality. If we allow veterans to maintain their enhancement once the conflict has ended, but we ban civilians to obtain them, the resulting distribution could not be equal or fair, and dangerous tensions within society could develop. We highlighted the fact that, even if it is indeed true that some equality could be traded for higher utility, in this case it is not required. We could have the higher utility guaranteed by better soldiers, without being obliged to introduce an element of tension and inequality within society. Of course, we stated that this is not enough to strongly advocate in favor of enhancement – it could be considered part of our general anti-anti-enhancement position, as another reason for which we recommend not to completely ban the development and sale of enhancers.
Regulation, without banning all together every enhancement, could also avoid the formation of a black market for selling enhancers to those who cannot legally buy them.

In conclusion, this dissertation proposed an anti-anti enhancement view, demonstrating that human enhancement is not inherently wrong. We advocated for a careful assessment of risks and benefits regarding each substance or intervention, in

order to establish a regulation on the one hand able to protect the citizens from dangerous substances, on the other not restraining their freedom of choice.

The importance of regulation has been stressed also at the international level. The establishment of an international treaty, with also the contribution of scientific and ethical committees, would have a double purpose.

First of all, enhancers considered dangerous for the health of the soldiers should be banned by international law. In order to protect the soldiers, considered a vulnerable population, the treaty should also partially establish the substances that the superiors couldn't order the soldiers to take. Moreover, the information regarding which substances are considered a requirement for either training or combat should be available to every individual before it joins a military force.

The second purpose of an international treaty would be to avoid the risks that certain enhancers could entail for the respect of *jus in bello*, especially for the civilians' immunity and for the use of proportional means during conflicts.

Moreover, such a treaty could also help limiting the inequality – regarding access to enhancers between countries.

Regarding inequality within countries, we already noted in this conclusion that giving access to enhancers only to military personnel (and banning them for civilians) would be not only unequal, but also unjust. Moreover, this inequality is unnecessary for the purpose of guaranteeing an enhanced military protection to the country. This final remark is in agreement with the general anti-anti-enhancement view defended in this dissertation.

We noted that there is a presumption in favor of soldiers' enhancement (given the vital importance of the military), but we also highlighted the ethical concerns it arises. We proposed the establishment of an international treaty, which could on the one hand promote the military applications of human enhancement development, and on the other hand regulate it in a way able to respond to the ethical concerns we reported.

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MILITARY APPLICATIONS OF HUMAN ENHANCEMENT: AN ETHICAL ANALYSIS

Abstract

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ABSTRACT

In the past months, when someone asked me what I was researching on, I struggled to find an easy and readily identifiable label to describe the topic of my work.

This is because the issue that I analyzed – and that I am going to introduce in a moment – is complex, specific, and, most notably, almost completely unknown. It is also because of its almost-unknown feature that we need more debate and public discussion on this topic, especially given the fact that this issue will most probably affect our lives deeply in the next decades.

This dissertation proposes an ethical analysis of soldiers' enhancement. At this point, one would probably ask what soldiers' enhancement is. The answer is easy and difficult at the same time. Simply put, the enhancement of soldiers is the application of substances and interventions of human enhancement to combatants – or, more broadly, military personnel. The reason why I said that this answer was difficult is that even within its ethical debate we lack a common, agreed-upon, definition of human enhancement.

One of the main problems faced when trying to define human enhancement is that humans have always tried to improve themselves. One could say that the history of human evolution itself is the history of the enhancement of our species.

From an ethical standpoint there is nothing that seems particularly troubling with the phrase "human enhancement". What there is an ethical debate about, however, is a different type of human enhancement. In the last years, in fact, the innovations in science and technology have allowed us to affect humans' biology and abilities in a way that was unconceivable a few decades ago. Substances able to improve our memory consolidation, our ability to focus and to control our sleep cycle exist already, and are becoming more and more widespread as off-label "cognitive enhancers". Recent fields such as neuroscience and robotics are working on new technologies that enhance these abilities even more. An example is the project called *Electrical Prescriptions* (ElectRx), which "aims to help the human body heal itself through neuromodulation of organ functions using ultraminiaturized devices, approximately the size of individual nerve fibers, which could be delivered through minimally invasive injection." Speeding up the healing process through the injection into the body of an external micro device seems part of the plot of a scientific novel, but ElectRx is actually a program of the US Defense Advanced Research Projects

Agency (DARPA), the agency of the US Department of Defense responsible for the development of emerging technologies and, of course, their military application.
The reason why the military is interested in these scientific fields is easy to be explained. Science and innovation have always played a crucial role for issues of national defense. Developing and possessing a new technology unknown to the enemy gives a competitive advantage that could make the difference between winning and loosing a battle or even the war.
On the one hand, thus, this dissertation deals with the ethical debate surrounding a very recent issue, given how cutting edge these technologies are.
On the other hand, however, soldiers' enhancement is not a new phenomenon, and it precedes by thousands of years the birth of human enhancement as we intend it today.

1. Defining Human Enhancement

In Chapter I, the problems faced when trying to define the concept of human enhancement are presented, before adopting Erik Parens' definition. According to the author, we can consider as human enhancement those "biomedical interventions that are used to improve human form or functioning beyond what is necessary to restore or sustain health". In this dissertation the concept of human enhancement is broaden to include also electronic and robotic means, not only biomedical ones.
In order to operationalize the distinction between enhancement and therapy - implied by Parens' definition - Juengst and Moseley's "disease-based-account" is adopted. According to this account, an intervention qualifies as an intervention when it is meant to have an effect on an illness or a disease (either cure it or prevent it), and as enhancement in the other cases.
This account is not perfect - what is considered a disease, for example, might change with time, and that developers of enhancers could lobby to label as "diseases" or "dysfunctions" every minor problem encountered by the individual. However, at a theoretical level, the disease-based-account remains for now the best way to define and operationalize human enhancement today.

2. *Ethical Issues on Human Enhancement*

The second chapter aims at demonstrating that human enhancement is not *inherently wrong*. In fact, if the general category of human enhancement were inherently wrong, with no exceptions, then also the subcategory of soldiers' enhancement would be always wrong, and there would be no point in further analyzing it.

The position adopted in this chapter – and in the rest of the dissertation – is a "anti-anti-enhancement", not a "pro-enhancement" one.

The critiques against enhancement analyzed in Chapter II can be divided in three groups: the ones related to nature and the natural, the ones related to self-manipulation and authenticity, and the ones of distributive justice.

- Human Nature and the Natural

According to this widespread critique, human enhancement should not be permitted, because it is not our role – as human species – to change human nature, and especially human biology. However, we have to note that humans have already altered their biology through past evolutionary steps and innovations, such as literacy and the agriculture revolution.

In addition, our nature, our biology, is neither a final, stable and perfect product that we ought not touch, neither the result of an equilibrium so fragile that any intervention could disrupt a precarious internal equilibrium with catastrophic effects.

Moreover, evolution shapes the species for "reproductive fitness, *not what human beings rightly value*." So even if our organism were a flawless object, stable and complete, it would be so for the aim of the *species' survival*. There is no reason to assume that this would coincide with what we care about, especially from a moral standpoint.

Of course, caution is needed – but without this sort of unmotivated deference to nature, which is closer to a religious ideology than scientific evolution and progress ethos.

- Self Manipulation and Inauthenticity

Regarding self-manipulation, the focus has been on the critique of *cheating* – a complex issue that in this abstract can be only briefly summarized.

It has to be highlighted the fact that qualifying an act as cheating depends on relative parameters – such as the "rules of the game" and the behavior of the other "players". For this reason, cheating is more a critique to a specific use of enhancers in specific

fields (as doping in sports or the off-label use of cognitive enhancers in the academia) than a real critic against enhancement as a whole.

The critique of inauthenticity applies in two different domains: feelings and values. Enhancers, however, does not imply inauthenticity; actually, they can render our actions more authentic. This becomes evident when we break the assumed absolute correlation between "natural" and "authentic". Moreover, it is true that authenticity is desirable value, but its lacking can be easily counterbalanced by various positive outcomes, both in a hedonistic way – feeling better – and in an utilitarian way – when our enhancers-boosted actions also generate increased utility for others (and for us as well).

- Distributive Justice

Issues of fairness and inequality are probably the most common concerns regarding human enhancement. Every author expresses his distributive justice worries in a specific way, but many share the bottom line of this critique, which can be summarized as follows. If there were enhancers capable of making us – or our children - smarter, stronger, and healthier, they would be extremely expensive, being a cutting edge technology able to bring about incredible benefits to those who utilize it. This would mean that only the wealthiest ones, the better off, could have access to them. For the medium and lowest strata of the society, competing with the advantages given to the upper socio-economical classes is not easy even today. If the benefits of the enhancers were to be added to those of wealth, the competition for jobs and key roles in society would be even harder – if not impossible – for the worst off. Some authors note that the enhanced could also "band together and exploit the unenhanced."

Therefore, social mobility would be more difficult than today. A situation of complete social immobility could be reached, the critique goes on, if the enhancements were genetically encoded, and thus it was possible to transmit them to future generations. In this case, the enhanced could even evolve into a different species, most likely in possess of the majority – if not the totality - of wealth and power. Our reply to this critique includes four different points.

Firstly, comparing enhancement to technological innovations can prove insightful. It is possible that at the beginning only the best off would have access to enhancement (as usually occurs with technological innovations), and in a second moment they would have a privileged access to the latest development of enhancers. But the fact

that new versions would be available soon means that the prices of the previous ones would decrease in a short period of time. In this way, the middle and lower strata of the society would have access to enhancers fast enough to catch up with the higher strata, or at least fast enough to avoid the widening of the existing gap.

Secondly, depending on how enhancement will be considered and regulated, it might be that health insurances and national health services will cover their costs, partly or entirely. This would diminish or even eliminate the risk of an unequal and wealth-driven access to enhancers.

Thirdly, it is important to highlight the fact that enhancers do not target exclusively abilities that can be considered positional goods – "goods that confer an advantage only if other have less of them" (such as height) - but actually many capacities that "provide benefits in absolute (rather than purely relative) terms (such as intelligence), and that often presents *network effects*, as noted by Buchanan: "the benefit to an individual of being enhanced will depend upon, or at least be greatly augmented by others having the enhancement as well."

Finally, we have to differentiate between enhancement *itself* and its *distribution*.

Saying that we should not develop and practice human enhancement because its distribution would be unfair is different from saying that human enhancement is wrong. If enhancement were morally wrong, there would not be a distribution fair enough to make it morally acceptable. We would not even care about its distribution - we would stop at the step before. But we cannot reverse the argument – we cannot say that since a distribution of that good could be morally wrong, than that good is also wrong. Therefore, concerns over inequality cannot be used to demonstrate the inherent moral wrongness of enhancement.

3. *Soldiers' Enhancement Applications: History and Present Practices*

The third chapter presents the history and the current applications of soldiers' enhancement. Combatants have always restored to intoxicants before and after the battle, mainly for three different reasons: to suppress fear, to enhance their abilities, or as a way of dealing with posttraumatic stress disorder.

Among the many substances utilize, we can here briefly recall a few.

Opium was used by ancient Greeks, and later by the Indian and Chinese troops; hashish was common in the Middle East already from the Middle Ages, whereas coca leaves were extremely widespread in South America.

It was only in the twentieth century that artificial substances such as LSD were created. Some of these substances, together with new neuroscientific interventions, have been tested for their "truth-serum" or "truth machine" potentials, even if the results so far indicate that they are not reliable enough to be, for example, accepted as evidence in court.

DARPA currently has three main areas of interest in the field of human enhancement, all presenting interesting potential applications: sleep management, metabolism control and memory.

The control over sleep and fatigue has historically been, and still is, one of the main areas targeted by soldiers' enhancement. The effects of sleep deprivation are one of the major problems of soldiers and pilots. Indeed, the effects of sleep deprivation are comparable to that of intoxication by alcohol.

Throughout history soldiers have experimented many substances to combat fatigue and stimulate energies – above all, cocaine and amphetamines.

Now, a new generation of synthetic agents, divided in "go-pills" - that help prevent falling asleep - and "no-go pills" -- that, on the contrary, help falling asleep.

In the early 2000s, DARPA – the Defense Advanced Research Projects Agency – launched the Preventing Sleep Deprivation (PSD) program, responsible of the research on "prevention of degradation of cognitive performance due to sleep deprivation." We can understand easily why this is a key goal for the military. Consider, for example, the phenomenon of fatigue-induced errors, as sometimes is the case with "friendly fire", but also the fact that "combat systems become more and more sophisticated and reliable, the major limiting factor for operational dominance in a conflict is the warfighter."

There are other new substances, however, that cause similar effects to amphetamines, but without their side effects – for this reason they are frequently called "*eurogenics*" from the Greek *eu* (good) and *egeirein* (arousal). The most famous one is Modafinil, created for the first time in the late 1970s to treat narcolepsy and currently produced under the name of Provigil.

The advantages of Modafinil are numerous. It increases alertness, it has a mood-boosting effect, it enhances memory and mental acuity and it sharpens attention and concentration. Given the addiction problem of the veterans in the past, it is important to not that this substance does not seem to be addictive, which lowers the risk of its abuse. There are few side effects - especially if we compare them with the ones

associated with amphetamines – as irritability, dizziness, headaches, nausea, heartburn and loss of appetite. Another advantage of Modafinil is the fact that it does not alter the circadian cycle, thus allowing the person who took it to remain lucid, but without preventing him from falling asleep when he wants to, without giving insomnia – a common side effect of stimulants. Another valuable aspect of Modafinil is the fact that, usually, after periods of forty-sixty hours awaken, fourteen hours of sleep are required to be fully rested, whereas with Modafinil the normal eight hours period is sufficient.

However, Modafinil is still a "controlled substance", with therapeutic use to treat narcolepsy, but it does not target healthy people. Despite this fact, its popularity as cognitive enhancer increased greatly in the last ten years, with profits from its selling increasing from five million dollars in 2005 to one billion in 2009, and an expected ten billions in 2018. This increase is due to the extremely widespread use of Modafinil among civilians. Many professionals - as well as students - rely on these pills to enhance their concentration, and work or study harder and longer.

However, even if Modafinil really seems to be a safer drug, the effects of its long-term use, as well as the effects of a prolonged period of little (or close to none) hours of sleep, are not yet well understood.

Regarding the second area of military interest in human enhancement, we can cite a DARPA's project called Metabolic Dominance aims at creating a neuraceutical, "a pill with nutritional value that would vastly improve soldiers' endurance." Controlling the soldiers' metabolism would be as important as controlling their sleep, but progresses in this area seem more difficult to achieve, and thus more distant in time.

The third crucial field targeted by DARPA is the enhancement of military personnel's memory. The combat instructions are usually long and complex, and the confusion and stress of the battle do not help soldiers and pilots to keep all the details in mind, even if, of course, it would be crucial. A long-term project entails the possibility of directly connecting the human brain with a computer memory, in order to store information safely, and then have direct and instant access to them.

Another project consists of a chip – currently under development - dubbed "brain prosthesis", that is intended to restore damaged brain activities. If it can help people with memory impairment, it could also be used to enhance memory in healthy people.

The third chapter includes also an ethical consideration - that here can be only summarized – regarding the rights and wellbeing of the soldiers.

Given the highly hierarchical system to which they belong, and the fact that they are obliged to follow their superiors' orders, soldiers can be considered as part of a vulnerable population – meaning that they are more at risk of being coerced into taking enhancers or exploited as subjects in human experimentation.

Regarding the latter circumstance, human experiments conducted on the military have historically been masked as part of their "training", or have been conducted without a full disclosure of what the experiment entailed, often with the justification that greater details would have not been useful for soldiers, who lacked the education to understand them.

The Nuremberg Code established in 1947 that "the voluntary consent of the human subjects is absolutely essential." The informed consent is described by Beachamp and Childress as "an individual's autonomous authorization of a medical intervention or of participation in research."

Experiments – even on human subjects – are an essential part of developing new substances and interventions. They must, however, be run adhering to the principles of research ethics - first and foremost that of the voluntary consent - with no tolerable exceptions.

Moreover, the enhancers should of course not be dangerous for the health of the combatants. Generally speaking, their benefits should counterbalance the risks. The benefits of the soldiers' enhancement are pretty straightforward – a more effective military, thus a better defense of the country and possibly saving the lives of many people, including the ones of the soldiers themselves. The risks would depend on the nature and the effect of these substances.

For example, beta-blockers could be used to relieve stress and avoid PTSD in soldiers after having committing violence and even killing during conflicts. In this way, they could be used as "anti-conscience" pill. As the name suggests, a possible risk of its usage would entail less "morality-driven" soldiers, resulting in unnecessary killing and violence - the same outcome is a risk when considering substances that could increase the aggressiveness of soldiers, or decrease their fear. Natural evolution selected and improved certain natural human instincts and feelings over thousand of years, as the one of fear and thus the strive for survival. Altering them

artificially could actually be counter-reproductive not only from a moral standpoint, but also for the efficacy of the military operation. This does not entail, of course, the sort of "deference to nature" – ruled out in Chapter I. The wellbeing of the soldier is an ethical limit to the development and employment of enhancers. Caution is needed, but caution should not become a paralyzing factor for research and development.

4. The Effects of Soldiers' Enhancement of Just War and Inequality

The fourth and last chapter analyzes the ethical underpinnings of soldiers' enhancement on just war and equality.

Just war theory is composed of *jus ad bello* – the right to go to war – and *jus in bello* – the laws regulating warfare. Enhancement does not affect the former, as the military does not have the right authority to declare war, but could affect the latter. As presented in Chapter III, some enhancers could trigger more aggressiveness and violence – or lower compassion. This could in turn make it more likely for the soldier to infringe one of the two core tenants of international humanitarian law:

- *Proportionality of means*: Acts causing gratuitous or unnecessary harm are to be avoided; the good achieved by a particular means would outweigh the harm done by employing it;
- *Noncombatant protection* ("*discrimination*"): Direct harm to noncombatants should be avoided; efforts should be taken to protect noncombatants.

An idea to ensure the respect of humanitarian law is that of establishing an international treaty, banning the substances or interventions that are considered more dangerous. Despite realists' skepticism, international treaties and international law are indeed usually respected by states. This can be explained by a mutual advantage situation, as showed by the Prisoner's Dilemma repeated game, precisely adopting a realist point of view.

Regulations and a fair distribution seems also the most reasonable way to tackle issues of fairness and equality. Regarding the issue of enhancers' distribution, and the relationship between civilians and the military, three possible scenarios can be analyzed:

1- The military and the civilians get access to the same enhancers.
2- Only the military actively conducting war can access enhancers.

3- Only the military actively conducting war can access the enhancers, but once back to the civil life, they loose their privilege.

Scenario 3 is not convincing, however, as some enhancements are permanent (such as genetic enhancement), or so invasive (such as a neuroimplant) that removing them could be impossible, or extremely expensive, or too risky for the health of the soldier. Moreover, even after the end of a conflict, having enhanced armed forces - ready to go the minute that they are needed (or simply stationing in military bases abroad) - would increase the level of protection of the country even during peacetime.

Turning to scenario 2, we can see that also this distribution faces many problems. First of all, it would entail a great and deep inequality within society. Depending on the distributive justice theory adopted, however, inequality can be just or unjust. For a pure egalitarian, for example, inequality in itself is enough to consider scenario 2 as unjust.

Pluralist egalitarians, however, recognize the presence of other values beside equality. Inequality is still considered bad, but a kind of bad that can be outweighed by other values. In a way, we can "trade" a bit of equality in order to increase utility.

Scenario 2, however, would be considered unjust also from this point of view. First of all, great inequality in society would increase social tensions and the possibility of riots and, given the fact that the military would have exclusive access to the enhancers, of a military coup d'état. The higher protection guaranteed by enhanced combatants could be paradoxically useless (if not counterproductive) in case of a military coup, of a civil war, or simply of tensions potentially explosive.

Moreover, it is not really required to trade equality for higher utility in this case. Indeed, we could have the higher utility guaranteed by better soldiers, without being obliged to introduce an element of tension and inequality within society, moving to *scenario 1*.

There is another reason – less philosophical and more practical - for which we should consider scenario 1 as a valuable option.

Imagine that when the military personnel comes back home from the war, keeps assuming enhancers. However, the presence of enhanced members could spread the use of enhancers among civilians, first illegally and then, eventually, legally. This is a real possibility also because once an enhancer has been developed, even if just for

the military, it is not easy to maintain that technology away from black markets for too long. Regulating enhancement - establishing the safe doses of enhancing, providing medical intervention in the hospitals – would actually promote a healthier and safer use of it.

Entering into scenario 1, however, means entering in the general field of distributive justice. The aim of this dissertation is not to find a distribution of enhancers that is just, but to analyze from an ethical standpoint the ethics of soldiers' enhancement. Regarding its impact on inequality, our suggestion is simply not to increment the existing inequalities allowing only a sector of society – the military – to have access to enhancement.

Chapter IV also analyses the issue of inequality between countries. It is reasonable to imagine that the richest countries will be the first ones – as indeed already are – to develop and employ enhancers. Here we can briefly recall the argument about technological innovation that we introduced in Chapter II, where we stated that it is possible that at the beginning only the best off would have access to enhancement (as usually occurs with technological innovations), and in a second moment they would have a privileged access to the latest development of enhancers. But the fact that new versions would be available soon (because of the speed at which progress moves) means that the prices of the previous ones would decrease in a short period of time. In this way, the middle and lower strata of the society would have access to enhancers fast enough to catch up with the higher strata, or at least fast enough to avoid the widening of the existing gap. The same line of reasoning could be applied for inequality between nations. It is probable that at the beginning only the richest countries would use enhancers, but it is also probable that these would probably spread worldwide in a matter of a few years. The international treaty regulating enhancers could include a plan to assist poorest countries into acquiring - or producing their own - enhancers.

In conclusion, this dissertation proposed an anti-anti enhancement view, demonstrating that human enhancement is not inherently wrong. We advocated for a careful assessment of risks and benefits regarding each substance or intervention, in order to establish a regulation able to protect the citizens from dangerous substances, without restraining their freedom of choice. Regulating, and not banning,

enhancement is also one way for avoiding the inequality between civilians and the military, as well as the formation of a black market.

The importance of regulation has been stressed also at the international level. An international treaty, with also the contribution of scientific and ethical committees, should regulate those substances that are considered dangerous for the health of the soldiers, as well as one that could entail a risk for the respect of *jus in bello*, especially for the civilians' immunity and for the use of proportional means during conflicts.