

ENHANCING SOLDIERS



A EUROPEAN ETHICAL APPROACH



ENRICHED PROCEEDINGS OF THE SYMPOSIUM

HELD ON OCTOBER 16, 2019 IN PARIS



Euro-ISME, the International Society for Military Ethics in Europe, aims to promote the study, training and practice of military ethics.

It provides a politically neutral forum for the analysis, development and sharing of best practice in the area of professional military ethics, across and beyond the European defence community.

It encourages professionals in all parts of the military and academic spheres to engage in robust and constructive dialogue with each other. It invites politicians to listen to the fruits of our debates and to participate in them. We do this because it is essential for the health of our societies and for the wider world that our armed forces behave to the highest ethical standards, so that they can clearly differentiate themselves from ad hoc militias, mercenaries and terrorists. It is also essential in order to ensure that those who are the innocent victims of war can look to our armed forces as protectors, not persecutors, and as the representatives of societies which value justice and peace above mindless aggression.

www.euroisme.eu

Enhancing soldiers

A EUROPEAN ETHICAL APPROACH

Enriched proceedings of the international symposium

held on October 16, 2019 in Paris

Edited under the auspices of

the Saint-Cyr Military Academy Research Centre (CREC Saint-Cyr)

&

the International Society for Military Ethics in Europe (Euro-ISME)

Edited by

G rard de Boisboissel

Magdalena Revue

CONTENTS

Introduction

Enhancing soldiers : a European ethical approach

Général Christian Thiébault 5

Definition and characterization of soldier performance enhancement

Gérard de Boisboissel 7

Is there a moral obligation for human enhancement?

A contribution to the discourse from a medical ethical perspective

Dirk Fischer 16

Some forward-looking scenarios for increasing combatant performance

Gérard de Boisboissel & Cyriaque Naut 28

Striking the balance between military necessity and the enhancement of military personnel

Marie-des-Neiges Ruffo de Calabre 36

Enhancement depends on the type of soldier

Colonel Marc Espitalier & Colonel Quentin Bourgeois 44

The Concept of Enhanced Soldier: Beyond Boundaries

Vincent Guérin 48

Human Enhancement : A European Ethical Perspective

Ioana Maria Puscas 64

Interception: a possible answer for the enhanced soldier? : a view of the French Military Health Service

Médecin en chef Marion Trousselard 73

From the example of the BSSS (Battlefield Super Soldier Suit), towards a responsibility ethics for military enhancement

Lieutenant-colonel Christine Boshuijzen-van Burken 83

Consent: an obstacle to the requirements of group cohesion and military efficiency ?	
<i>Jean-François Caron</i>	97
Politics facing the societal uses of the enhancement and their impacts for the Military	
<i>Dominique Reynié</i>	107
Initial reflections on an ethical framework for enhancing soldiers' performance	
<i>Jeanne Andrade</i>	114
Consent and the Pharmacological Performance Enhancement of Soldiers	
<i>Heloise Goodley</i>	123
Ethical Reflections on the Role of Military Health Care Providers in Enhancement	
<i>Daniel Messelken</i>	128
How to deal with the enhanced soldier in our army today ?	
<i>Colonel Gilles Haberey</i>	135
Can we talk about sacrificial ethics for enhanced soldiers (especially in the case of possible side effects)?	
<i>Gautier Filardo</i>	139
What are the ethical limits to the fighter enhancement ?	
<i>Colonel Olivier Pinard Legry & Gérard de Boisboissel</i>	150
Closing Remarks : Can there be a European ethical consensus on enhancing soldier performance ?	
<i>Air Commodore (Ret) John Thomas</i>	159

Under the direction of
Gérard de Boisboissel (CREC Saint-Cyr) & Magdalena Revue (Euro-ISME)

Thanks to Éric Fourcin, from the Saint-Cyr Military Academy Reprography Department, for the formatting of this book.

Thanks to Dr. Ted van Baarda for his proofreading

INTRODUCTION

*Général Christian Thiébault,
former chief of staff of the UN mission in Mali (MINUSMA),
Management Institute for International Security (THEMIIS).*

ENHANCING SOLDIERS: A EUROPEAN ETHICAL APPROACH

Enhancing soldiers has been on the agenda of the Saint-Cyr Military Academy Research Centre (CREC Saint-Cyr) since 2015. The CREC Research Centre provide a multidisciplinary overview on this complex issue in relation to human nature. Today, thanks to Euro-ISME contribution, we will approach this issue under the perspective of human sciences. It will be useful to extend to an additional European perspective the interesting symposium of last January in Paris on this subject.

We turn to an ethical approach of Enhancing soldiers, which is a topic of current debate with many scientific articles online. We are really on the eve of a structural evolution or rather at the starting point of a social revolution more or less under control. Therefore, it is urgent to clarify this issue at stake, not only at the individual level but also at the political and social level. Enhancing is an old dream of humankind, Are we at the dawn of Nietzsche's Übermensch? Nevertheless, we have to stay very prudent: the quest of Prometheus ended up in everlasting misery, in the same way Doctor Frankenstein's research led to a nightmare.

However, as General François Labuze said during the previous CREC Seminar about Ethic and Robotisation: *"Even if the best mingle the worst, it is never useful and appropriate to reject technological evolutions"*. Effectively, technological innovations could save life. So if we refuse scientific advances, we risk being caught up by reality. France was during a long time against the killer-drones but finally accepted their use. The question is to clarify: what are the principles to be respected, the limits not to be crossed, in order to avoid major risks for human civilisation.

The current ideology of transhumanism developed mainly in the US and supported by a strong lobby is an additional difficulty. Therefore, in my point of view, it is essential to make a clear difference between the improvement of human capacities and the enhancement, in the sense of a transformation which would touch to the essence of human nature. On this point, we are

really at the core of the issue. Already in 1920s Aldous Huxley prophesized in *The Brave new world*: “*The real revolution will take place not in the external world but in the soul and in the body of human beings*”.

We must keep in mind that according to Descartes, we have a dualism of spirit and body with a very fragile balance. With the enhancing soldier, we have to preserve this balance. Breaking this harmonious cohabitation between the spirit and the body could led to an unacceptable drama. First of all for the soldier, for sure, but further for the entire society.

In 1990, during the war of Kuwait, my legionnaires and I used Modafinil, an experimental drug to increase awareness, but some years after we had a debate about the Gulf syndrome. Furthermore, in Afghanistan and in Mali, I have seen the consequences of vision goggle on the snipers and the missile gunners more vulnerable to the Post Traumatic Stress Disorder PTSD. Even the drone’s pilot living in the US are sensible to the PTSD. It seems that vision goggles open a weakness window in the spirit through which the spectre of death could access directly the human soul. More often, soldiers never fully recover from this invisible damage.

Consequently, I think that the enhancement must take into account with a real prudence the whole of the human person through a comprehensive approach: at the same time the spirit and the body to guarantee the right balance. It is the reason why we absolutely need a solid ethical, juridical, medical, social thinking before moving on this direction.

This is the explicit goal of our symposium, to improve our understanding of the problem.

Starting with the definitions and after an overview of the opportunities opened by science, your work will deal with the social and medical issues in a European perspective. I wish you a fruitful reflexion because our civilisation is really at stake. We must be careful not lead to more inhumanity in war for our soldiers.

Keeping in mind the warning from Rabelais, a XVth century French writer: “*Science without conscience is only ruin for the soul*”.

DEFINITION AND CHARACTERIZATION OF SOLDIER PERFORMANCE ENHANCEMENT

Gérard de Boisboissel,
Research Engineer, CREC Saint-Cyr.

DEFINITION

IN its book published with the Revue Défense Nationale at the end of 2017, still accessible online under the link <http://www.defnat.com/e-RDN/cahiers-de-la-RDN.php>, the CREC Saint-Cyr gives us a definition of the enhancement of the combatant under the terms:

“Enhancing a soldier is the action of rendering him/her more efficient during military operations by strengthening or optimizing intellectual skills (mental, psychological, cognitive to assist in decision making help or perception) and/or physical abilities (to last), or by letting the soldier acquire new ones (like seeing at night);

- *Using technological equipment worn by the soldier to enhance performance;*
- *Using non-therapeutic substances or using static dynamic implants (nanomaterials, prostheses) or applying suitable gene therapeutic treatment;*
- *For short or long-term use that can even be irreversible provided its effects are controlled.*

By efficiency we mean operational efficiency. In other words, an individual’s capacity to achieve results in fulfilling a mission.

This definition is intentionally broad in scope and unrestrictive to encompass enhanced performance derived from different techniques.”¹

Nevertheless, it raises ethical questions. First of all, all forms of enhancement do not respond to an initial need for care and are therefore non-therapeutic. Moreover, they can propel the individual beyond his or her own limits, allowing him or her to go beyond what seems to be normality: acquiring nyctalopia, for example, allows the acquisition of a capacity that man does not possess. Finally, and most often, certain enhancement techniques directly affect the human body, with effects:

- with or without adverse effects,
- temporary in time or not,
- reversible or not (especially if the human body is transformed).

¹ Gérard de Boisboissel et Jean-Michel Le Masson, in “*Le soldat augmenté: les besoins et perspectives de l’augmentation des capacités du combattant*” p. 21, 2017, Les cahiers de la Revue Défense Nationale.

THE PURPOSE OF THE ENHANCEMENTS

The purpose of the enhancements, as we, the CREC Saint-Cyr, have circumscribed them, is first and foremost one of military effectiveness. They focus on the fighter's abilities and performance. In the end, they must make it possible for the latter to:

1. A better efficiency in his combatant function as indicated above.
2. To remain alert, to resist sleep, to resist fatigue and stress, i.e. to last physically and mentally.
3. To return to normal after a period of aggression or intense activity of the body.
4. To give oneself courage.
5. A decision aid, or a better acuity in decision making, to avoid errors of choice in complex environments or situations.
6. Even better associating the soldier with his weapon system, such as with brain control, or by using neurofeedback techniques² allowing the control of his brain activity.

Who are the enhancements for? They are intended:

- a) first and foremost for each combatant to remain operational, to reduce danger, to improve and then to maintain over time his reflexes and automatisms as a combatant in order to survive;
- b) for the basic combat unit that is the group, so that it carries out its mission and does not endanger others (avoid deterioration of collective know-how, maintain the pace of the manoeuvre, remain attentive to the requirement for internal liaison);
- c) for the leader, to enable him or her to discern in complexity (i.e. to deploy genuine situational intelligence); to decide in uncertainty (i.e. to have a real strength of character enabling him or her to accept calculated risks); and also to act in adversity (to federate energies, encourage collective action and decide in conscience), these three axes forming the three major pedagogical axes of the training of cadets of Saint-Cyr Military Academy.

² Method that allows an individual to learn to modify his brain activity in order to improve his health and performance (source: AAPB (Association for Applied Psychophysiology and Biofeedback), BCIA (Biofeedback Certification International Alliance) & ISNR (International Society for Neurofeedback and Research), 2008). Based on the notion of feedback to the brain: the brain learns and develops thanks to the feedback it receives from the external environment and the actions taken by the body (source: Ooreka Santé: <https://memoire.ooreka.fr/astuce/voir/635931/neurofeedback>).

THE CONSTRAINTS OF THE ENHANCEMENT

A basic premise is that an enhancement should never override the requirements of the military:

- The success of the mission;
- Reduce the risk to his own soldiers;
- Respect for international law;
- Respect for his subordinates and his opponent.

This implies for the leader to be able to take responsibility for his decisions. His strength of character must not be altered as a result, but maintained over time and, in the face of difficulties, his will to win must remain intact.

But there are invariants that prevent the use of enhancement techniques:

- if it affects the responsibility of the fighter (the case of certain drugs) by inhibiting him or by making him lose his judgement capacities;
- if it alters respect for the opponent and dehumanizes the fight by inhibiting the empathy of the combatants: we can take the example of the Viking Bersek or Berseker warriors who, according to some authors³, used hallucinogenic alkaloids *Muscimole*, such as those contained in panther amanite *Amanita panthera*, mixed with alcohol; or more recently the fighters of ISIS or Boko Haram, drugged with Captagon or Tramadol before each raid or attack.

This implies that any enhancement must be preceded by medical authorisation with knowledge of the effects, direct and even undesirable, and therefore authorisation from the Army Health Service. It is also important to note that if there is an enhancement, training on the enhancement is required for both the leader and the person receiving it.

THE COLLOQUIUM OF OCTOBER 16, 2019 IN PARIS

At the international colloquium on October 16, 2019 co-organised in Paris by the CREC Saint-Cyr and the International Society for Military Ethics in Europe (Euro-ISME), the organisers' wish was not to focus on man-carried equipment. Indeed, it appears that such equipment is controlled by the combatant, and that he can at any time either remove or deactivate it.

³ Lionel Lesaffre, Étienne Jouzier, Jean-Pierre Labouyrie, Alain Badoc: “*hallucinogenic mushrooms through philately*”, Bull. Soc. Pharm. Bordeaux, 2009, page 153.

A good example is the exoskeleton. The ethical stakes here appear to be minor, apart from the constraints of information sharing (confidential data of the individual, the right to know) or a possible alteration of the commitment to risk.

The focus was therefore mainly on the ethical issues that integrated technological systems will pose to combatant with effects on him, especially invasive ones, namely :

1. Anthropotechnology⁴ allowing a direct effect on the human body such as pharmacology, implants, even surgery.
2. Hybridization which, starting from an artificial crossing between Man and technologies, combines the potentialities of the human body and those of the machine, multiplying the efficiency of the Man-Machine System. In particular via a direct interface from the one to the other.

On the question of epigenetics and genetic manipulation, which could only be conceivable on a man who is already a member of the military forces, given the state of science today this possibility is currently out of sight. It was therefore proposed at the symposium not to focus precisely on this question, even though some countries are already working on this approach. We can quote here the Director of DARPA (Defense Advanced Research Projects Agency), Mr Walker, who states that this agency “*would like to be able to protect soldiers from disease and chemical or biological warfare agents by modifying those soldiers genetically to make them able to resist*”. Therefore, it will probably be necessary to consider another colloquium on the subject at a later date.

THE EVOLUTION OF TECHNOLOGIES TODAY

If the desire for enhancement on the battlefield in order to survive or to have an advantage over one's opponent dates back to the first organized fighting organizations, nowadays the contribution of new technological

⁴ Several definitions given:

- Modification aimed at improving individual human performance, by an intervention on the human body, without medical purpose: general practitioner Lionel Bourdon, special issue DSI n°45, “*Le soldat augmenté*”, p. 63, December 2015.
- According to Vincent Guérin, a set of technologies that make it possible to escape human standards and go beyond them.
- A multiform service for the biological transformation of humans for the purposes of performance, the quest for identity, freedom and standardisation: Jérôme Goffette, “*Naissance de l'anthropotechnie: De la médecine au modelage de l'humain*”, 2006.
- Indefinite technical transgression of human limits by a technology applied to Man: Gilbert Hottois, “*De l'anthropologie à l'anthropotechnique?*”, *Tumultes* 2005/2 (No. 25), pages 44.

perspectives having an effect on man such as NBICs (Nanotechnology, Biotechnology, Information technology and Cognitive science), implants, pharmacology, brain stimulation (plasticity, enhancement memory capacities), management of physiological data of any individual (sleep, stress etc.) open new ways whose effects must absolutely be anticipated, especially on the ethical and legal levels. These technological advances, which open up vast fields, will be developed in greater detail by Dr Ioana Puscas and Dr Guérin later in this document.

Moreover, technology allows systems to be more reactive and more precise than human beings do. The risk for man is therefore that he may become the weak link in tomorrow's weapons systems. To avoid this, researchers are considering better integrating the combatant into the decision-making chain of these systems with the advantages provided by technology: one can thus consider the possibility of active or passive invasive implants, linking the soldier with his digital environment (network) or his weapon system, as well as the automatic analysis and transcription of the combatant's brain signals via a neural interface in order to translate them into understandable commands for a system. This is the famous Cyborg on which the American services are working and which has just published in October 2019 a study entitled "*Cyborg Soldier 2050: Human/Machine Fusion and the Implications for the Future of the DOD*". In it they explicitly state:

"The direct neural enhancements of the human brain ... is predicted to facilitate read/write capability between humans and machines and between humans through brain-to-brain interactions. These interactions would allow warfighters direct communication with unmanned and autonomous systems, as well as with other humans, to optimize command and control systems and operations. The potential for direct data exchange between human neural networks and microelectronic systems could revolutionize tactical warfighter communications, speed the transfer of knowledge throughout the chain of command, and ultimately dispel the "fog" of war. Direct neural enhancement of the human brain through neuro-silica interfaces could improve target acquisition and engagement and accelerate defensive and offensive systems."

Artificial Intelligence on embedded systems will allow adaptation to the sometimes difficult to predict battlefield situation, and will offer systems, in which the combatant is the central element, a faster decision support in the treatment of tactical data, relying on computing and data consultation capabilities far superior to those of humans.

ISSUES RAISED BY THE ENHANCEMENT OF HUMAN COMBATANTS

We will note here other issues that arise in increasing the performance of the combatant.

First of all we find the question of consent, individual or collective, or the question of lack of consent in critical cases. This point will be addressed later by Professor Jean-François Caron and Miss Jeanne Andrade.

Will the traditional cohesion of military units, which is based on a strong *esprit de corps* resulting from training and living together, be challenged by the possibility of creating a differentiation of treatment based on technology alone to the detriment of human potential?

It will also be necessary to reflect on how the enemy may view a fighter in our Forces if he is enhanced by artificial means. Will he maintain his respect for our soldiers, or will he see this as an excessive dehumanisation of mankind in favour of technological submission? How will he treat him once he is a prisoner?

And will the enhanced soldier remain an operational soldier in his head, technological efficiency less, retaining his strength of character to win, when technology fails him?

While most of these questions were only very partially addressed at this colloquium, they are undeniably areas for reflection that will have to be addressed again in the future in order to be able to respond to the issues raised by these opportunities.

THE ENHANCEMENT, A FUNCTION OF THE MILITARY CONTEXT

The very principle of increasing performance must be extremely carefully controlled to avoid any drift. Nevertheless, the scope of application of this enhancement, as we can intuitively sense, depends heavily on the military context.

The type of warfare is probably the first factor likely to influence the enhancement: total warfare, conventional warfare, hybrid warfare or war against terrorism, each of these types of conflict calling for a different assessment of the type and degree of enhancement. However, a nation's ability to survive will depend on the extent to which it addresses the question of the possible enhancement of its soldiers. If the ethic is not variable according to the type of war, it remains that the application of means of enhancement will probably be influenced by the intensity and criticality of the threat that the enemy carries to our Nation.

Then, depending on the phases of the operational mission and their intensity, the idea of resorting to enhancement may vary according to the phase of combat. Thus, after the *How* succinctly listed in the above paragraphs, it is the *When* of the enhancement, which can be broken down into seven different temporal phases that we will find on the ordinates of the table below:

1. The adaptation of the soldier’s body for specific tasks, according to his speciality and environment;
2. The training;
3. Operational readiness, that is to say passing through a specialised training centre before rotation abroad;
4. Mission preparation, the short phase before departure on mission, including the drafting of orders by the commander;
5. The conduct of the operational mission;
6. The contact or use of fire (where the intensity is maximum);
7. The context of survival if the risk of death is imminent or certain.

Four needs or axes of enhancement are presented here for illustration (in columns in the table): they appear to us to be essential for a combatant deployed in theatre and in combat. They are needs that are increasing for the following purposes:

- | | |
|--------------------------|------------------------------------|
| a) decision support, | c) sustainability over time, |
| b) resistance to stress, | d) and combat performance support. |

We will try to list the possible increasing needs of the combatant in the light of these different temporal phases:

Temporal phases	Decision support	Stress resistance	Enduring lasting	Combat performances
Adaptation / Specialisation	NO	Implants, anthropotechnics	Implants, anthropotechnics	Anthropotechnics sight hearing
Training	Electro stimulation	NO	NO	NO
Operational readiness	Electro stimulation (learning brain plasticity)	Avoid PTSD	NO	Mastering once reaction (facing hostile situations)
Mission preparation	OK for the leader (concentration help)	Avoid PTSD	NO	NO
Operational mission management	OK for the leader (synthesis in retrospect)	According to leader’s decision	According to leader’s decision	According to leader’s decision
Contact, under fire	OK for the leader	OK	According to leader’s decision	According to leader’s decision
Survival	OK	OK	OK	OK

The enhancement depends on the context:

- *NO: no enhancement;*
- *According to the decision of the chief: enhancement possible according to the decision of the chief with always a prior medical agreement;*
- *OK: enhancement possible on an individual level with always prior medical agreement;*
- *OK for the leader: only applies to the chief.*

1. Adaptation / Specialisation of the fighter to his or her speciality: In the first line of the table, we will focus here on the enlisted soldier who must adapt to the environment and the speciality to which he is assigned: sniper, mountain soldier. It is only in this phase that it might be possible to consider an invasive enhancement of the reversible implant type, or irreversible surgical anthropotechnical type on the eyes or hearing, with strong links to the medical world.
2. For training purposes, we do not consider it necessary to consider enhancing the combatant: on the contrary, this is the phase where the soldier must learn to know his personal, physical, physiological and cognitive limits. And it is by surpassing himself without artifice that he will know how to go beyond the limits and integrate into the group. However, in this phase we should mention the possibility of training the brain with neurofeedback methods such as cerebral electro-stimulation, as well as non-invasive techniques for improving memory, accelerated language learning, etc.
3. In operational preparation, it does not appear that an unavoidable enhancement is needed for the fighter. As far as the soldier is concerned, it is possible here to go beyond the limits of the individual by pushing them back gradually but without invasive actions. This is the case of preparing the combatant for the horror of certain situations he is likely to encounter on a mission, in order to avoid PTSD, which can be done gradually by showing him terrible images. The same to help him control his reactions to hostile attacks.
4. In mission preparation, the enhancement is possible for the military leader who is often physically tested and has to prepare his orders in sometimes very complex contexts, having to reflect and think about the course of action and non-compliant cases, etc. (rehearsal, orders, etc.) while always being aware of the stakes and risks. Concentration aid is one form of possible enhancement.

5. In the conduct of a mission, in contact and in a survival situation where one must last to the maximum of one's ability, the role of the leader takes on a decisive value. He must assess the risk and decide on the potential benefits of the enhancement in danger, depending on the situation.
6. The same applies to contact under fire. In this phase, stress is to be managed at the level of the individual.
7. For cases of survival, the discernment would clearly lean in favour of enhancement if it is the only means of survival.

CONCLUSIONS

To conclude this introduction to the problem, the field of opportunities is vast and raises questions about the Man at the heart of the enhancement, because if the latter is a means for military action, it is by no means a simple material that should be adapted according to military needs.

At the end of 2017, Major General Bernard Barrera, then deputy head of *programme plans* at the Army General Staff, questioned and opened the discussion by declaring that: “*in an outrageously utilitarian manner, why refuse to consolidate man and the soldier if they are the weak links of tomorrow ?*” while listing six frameworks needs to accompany a potential implementation.

At a time when, for the technologically leading countries in the arms race, the question of the opportunity to enhance soldiers on operations is becoming a line of research for defence departments, it seemed to us to be essential to anticipate these questions and to address a common European ethical reflection to accompany this new trend.

This is therefore the purpose of this first international colloquium on the subject, which was attended by European specialists in military ethics, and whose initial thoughts are presented in this book. Let us hope that this is only a first step, and that future reflections on this issue will follow this initiative led by the CREC Saint-Cyr with the support of Euro-ISME.

IS THERE A MORAL OBLIGATION FOR HUMAN ENHANCEMENT? A CONTRIBUTION TO THE DISCOURSE FROM A MEDICAL ETHICAL PERSPECTIVE

*Dr. med. Dr. theol. Dirk Fischer,
Medical Service Academy of the Bundeswehr.*

INTRODUCTION

ONE of the most far-reaching achievements of modern natural and technical sciences is the ability to alter human beings by human enhancement techniques. Compared to former times, which already had the optimization of individual human traits in mind, the invention and application of human enhancement techniques have reached a new dimension leaving human beings as we know them today behind.

As medicine focuses on the human being and its physiological and pathophysiological states in prevention, diagnosis, therapy, and rehabilitation, medical self-understanding is particularly challenged by this development. The expansion of the area of responsibility of medicine has serious consequences for physicians, patients and their relationship. The technological alteration of human beings goes far beyond maintaining and restoring health. By means of applying invasive techniques, mankind seems to be willing to reach a new level of existence.

Particularly in the military, both, the improvement of existing and the invention of new traits and skills of the soldiers by human enhancement techniques is of a special interest. Concerning military necessities, the optimization and enhancement of the soldier seems to be desirable to improve modern warfare. This shall not hide the fact that in view of medical necessities neither optimization nor enhancement are at the core of a physician's employment.

The question whether there is a moral obligation for a human enhancement of the soldier will lead to different answers, depending on whether more weight is given to military or medical aspects. An ethical decision support might be found in the concept of medical indication. The latter indicates a line of demarcation, which separates the traditional concepts of medicine from the concept of human enhancement, which still needs to be formulated.

The aim of this chapter is to offer a contribution to the debate about human enhancement from a medical ethical point of view. Based on a proposal to define human enhancement with regards to invasive techniques and their effect on human self-understanding, the relevance of human enhancement

for a military context is outlined. The term transhuman warfare is introduced to characterize the changing effects human enhancement might have on future deployments. From a medical perspective the concept of medical indication seems to be of crucial importance here, particularly as military necessities have a massive conflicting potential with regards to medical necessities. Both, military and medical necessities have to be weighted up against each other, taking into account the specific role of medical personnel in general and of physicians in particular when it comes to applying human enhancement techniques.

TERMINOLOGICAL ASPECTS OF HUMAN ENHANCEMENT

The discussion about human enhancement shows a need for greater terminological precision. There are several approaches to be found defining human enhancement by pointing out different aspects. It is quite obvious that some of these definitions are formulated rather in the light of the aim, which human enhancement should help to reach, than of the phenomenon itself and of the question what consequences it might have to human beings.¹ Concerning the medical ethical discourse on human enhancement, there is a fundamental need to give a useful definition.

Apart from the fact that human enhancement is realized in different fields like performance, appearance and capabilities; it follows the aim to implement new human traits.² Unfortunately, the field of methods and techniques, which are currently subsumed under the term human enhancement, is extremely wide. It leads from ordinary every day practices like drinking coffee to neurosurgical interventions like setting up a brain-machine interface. This inflationary usage of the term is quite problematic as it eliminates terminologically decisive differences between methods and techniques and the resulting ethical challenges. Indeed, not all of them should be called human enhancement.³

¹ Cf. Woyke, Andrea: “*Human Enhancement und seine Bewertung – eine kleine Skizze*”, in: Coenen, Christopher / Gammel, Stefan / Heil, Reinhard et al.: “*Die Debatte über ‚Human Enhancement‘: Historische, philosophische und ethische Aspekte der technologischen Verbesserung des Menschen, Bielefeld*”: Transkript 2020, 21-38 (here: 22).

² Cf. Allhoff, Fritz / Lin, Patrick / Moor, James et al.: “*Ethics of Human Enhancement. 25 Questions & Answers*”, in: *Studies in Ethics, Law, and Technology* 4(2010), 1-39.

³ Cf. Bostrom, Nick / Savulescu, Julian: “*Human Enhancement*”, Oxford: Oxford University Press 2009, 3.

It seems appropriate to use the term under two aspects: Though man uses all sorts of techniques to improve his personal skills, the ones applied by human enhancement owe a special technological character. The term human enhancement shall refer only to those methods and techniques, which can be called invasive. As such, invasive techniques have an anthropological impact. They raise the question what it means to be human, as they alter the self-understanding of human beings. After having applied an invasive human enhancement technique being human means something different than before⁴. Based on both, the technological and the anthropological aspect, invasive techniques can be defined in a first step :

The term invasive technique refers to technical methods and tools, which modify the set of traits characterizing members of the species homo sapiens. As such, invasive techniques have an impact on what it means to be human and lead to a fundamental shift in human self-understanding.

The necessity to differentiate between optimization and enhancement seems to be of crucial importance. In contrast to human optimization, human enhancement leads to a fundamental shift in human self-understanding based on the application of invasive techniques. Human enhancing techniques owe an invasive character in the way stated above, while human optimizing techniques do not.

Based on the concept of invasive techniques, human optimization can be defined in the following way:

The term human optimization refers to a medically non-indicated application of non-invasive technical methods and tools to improve the naturally given status of a human being. A method or tool of human optimization does not lead to a fundamental shift of human self-understanding.

This is different in the case of human enhancement:

The term human enhancement refers to a medically non-indicated application of invasive technical methods and tools to move beyond the naturally given limits of human beings, who thereby enter a new stage of existence. A method or tool of human enhancement leads to a fundamental shift of human self-understanding.

⁴ Cf. Böhme, Gernot: *“Invasive Technisierung. Technikphilosophie und Technikkritik, Kusterdingen”*: Die Graue Edition 2008, 12.

In this context it seems appropriate to explain the reference to naturally given limits. This is less about quantitative than qualitative human traits, which members of the species homo sapiens originally do not possess. In other words: The term of human enhancement does not describe the improvement of traits human beings already have, but the implementation of traits with a new quality. The latter can be described as superhuman, in other words: the implemented traits constitute what transhumanists call the posthuman.⁵

In view of the given definitions many methods and techniques, which are today characterized as human enhancement are falsely subsumed under this term. Indeed, it seems much better to speak of optimization rather than of enhancement in most of these cases.

Besides this, three different areas, which might be affected by either human optimization or human enhancement, have to be pointed out: appearance, performance, capability. The term of appearance refers to the outer look with regards to e.g. height, shape or form of the body, while the term of performance expresses the well-doing of specific actions taking into account aspects like potential, capacity or competitiveness. The term of capability indicates the presence of specific skills with regards to e.g. sensory or motoric skills. To differentiate these terms does not mean that they can be separated from each other. Indeed, appearance, performance and capability are very closely linked to each other; nevertheless, they represent different aspects of human reality. The following table shows different forms of human optimization and human enhancement. Depending on the specific character of the optimizing or enhancing mean, several can be subsumed under more than one keywords (cf. table 1). Contact lenses or hearing aids might lead to an optimized performance of vision and hearing as well as provide capabilities opening up new domains of hearing and seeing. The same is true for invasive human enhancement techniques like retina or cochlea implants.

⁵ Cf. Sorgner, Stefan: “*Transhumanismus. Die gefährlichste Idee der Welt?*”, Freiburg i. Br.: Herder 2016, 17-18.

	Optimization	Enhancement
Appearance	Human Appearance Optimization <ul style="list-style-type: none"> • haircut • makeup • etc. 	Human Appearance Enhancement <ul style="list-style-type: none"> • surgical modifications • etc.
Performance	Human Performance Optimization <ul style="list-style-type: none"> • drug based intervention • blood doping • exoskeleton, exosuit, exoframe • smart clothes • smart contact lenses • smart hearing aids • etc. 	Human Performance Enhancement <ul style="list-style-type: none"> • neuro pacemaker • cardio pacemaker, defibrillator • drug pump • cochlear implant • retina implant • etc.
Capability	Human Capability Optimization <ul style="list-style-type: none"> • smart contact lenses • smart hearing aids • heads up display • etc. 	Human Capability Enhancement <ul style="list-style-type: none"> • cochlear implant • retina implant • muscle implant • brain-machine-interface • nanobots • etc.

Table 1: Classification of Human Optimization and Human Enhancement

From a phenomenological point of view, it is important to differentiate between appearance, performance and capability. Particularly in the military discourse about human enhancement, a reductionism is spreading, leading to a synonymous usage of the terms of *human enhancement and human performance enhancement*.

By this, the aspect of performance is unduly overemphasized as other aspects are ignored. Besides human performance enhancement, particularly human capability enhancement will be of future importance. As human enhancement might affect all of them, the relation of appearance, performance and capability needs to be part of further research.

HUMAN ENHANCEMENT IN A MILITARY CONTEXT: TRANSHUMAN WARFARE

To overcome the limits of homo sapiens is a declared aim of trans and posthumanism. Concerning transhuman ideas, the posthuman still belongs to the species homo sapiens. Posthumanism goes further and declares that there is a new species to come, which cannot be called homo sapiens anymore.⁶ In whatever way the term posthuman might be defined, it shows impressively the consequences of the application of invasive techniques.

The fundamental ideas of leaving the limits of homo sapiens behind by the invention and application of human enhancement techniques is nothing new. They were prominently represented by authors like John Burdon Sanderson Haldane (1892–1964), John Desmond Bernal (1901–1975) or Julian Sorel Huxley (1887–1975) in the 1920s.⁷ Until today, their publications are very thought provoking when it comes to think about the future existence of man.

It was Huxley, who first proposed the term *transhumanism*: “*The human species can, if it wishes, transcend itself – not just sporadically, an individual here in one way, an individual there in another way, but in its entirety, as humanity. We need a name for this new belief. Perhaps transhumanism will serve: man remaining man, but transcending himself, by realizing new possibilities of and for his human future.*”⁸ Although Huxley does not speak of enhancing the human being, his words can be read as reference to what is called human enhancement today. At the same time his thoughts show the above stated demand to differentiate between enhancement and optimization.

In a military context, these ideas might develop a huge number of possible implications. Indeed, human enhancement is widely discussed. Concerning the law of armed conflict as well as military ethics and particularly military medical ethics human enhancement leads to several serious problems.⁹

⁶ Cf. Sorgner, Stefan: “*Transhumanismus. Die gefährlichste Idee der Welt?*”, Freiburg i. Br.: Herder 2016, 18.

⁷ Cf. Haldane, Joseph Burdon Sanderson: “*Daedalus or the Science and the Future*”, London: Kegan Paul 1924”; Bernal, John Desmond: “*The World, the Flesh and the Devil*”, London: Kegan Paul 1929; Huxley, Julian Sorel: “*What dare I think? The Challenge of Modern Science to Human Action and Belief*”, London: Chatto and Windus 1931.

⁸ Huxley, Julian Sorel: “*Transhumanism*”, in: Huxley, Julian Sorel: “*New Bottles for New Wine*”, London Chatto and Windus 1957, 13-17 (here: 17).

⁹ Cf. Messelken, Daniel / Winkler, David (Ed.): “*Ethics of Medical Innovation, Experimentation, and Enhancement in Military and Humanitarian Context*”, New York: Springer 2020 (Military and Humanitarian Health Ethics).

As soon as somebody who has been declared as posthuman gets involved in military actions, most of our concepts of law and ethics will need to be revised. To characterize conflicts of this kind, the term *transhuman warfare* might be appropriate. It can be defined the following way:

The term *transhuman warfare* relates to military conflicts involving soldiers who, for reasons of military necessity, have been altered by the application of human enhancement techniques and therefore owe traits which originally do not belong to members of the species homo sapiens.

Even if it is not possible to line out all the details of this new kind of warfare today, its main trait might be that by realizing a posthuman fighter our concepts of combatant, non-combatant etc. seem to be obsolete. Transhuman warfare at the moment might be overall part of science fictional scenarios like those described by David Simpson.¹⁰ Nevertheless, this topic will preoccupy mankind tremendously in the future and therefore already today should be part of strategic foresight and in depth ethical reflection.

The latter is especially true when it comes to think about morality as a fundamental peculiarity of humans. Both, in civil as in military life, the creation of a posthuman being will strongly effect man's self-realization as an autonomous moral subject. To clarify what a posthuman autonomous moral subject might be like, is a very thought provoking challenge. Trying this, it is of crucial importance to realize that terms like autonomy, morality or subject only make sense in relation to the understanding of human beings as human beings. This epistemological insight cannot be transferred uncritically to posthumans, who are a result of invasive technical changes.

¹⁰ Cf. Simpson, David: “*Sub-Human*”, Worlaw: David Simpson 2012 (The Post-Human Series 1).

Excursus: Invasive techniques for therapeutic reason

The case of the German sociologist Helmut Dubiel (1946–2015), a former professor at the University of Giessen in Germany, might serve as an example for applying invasive techniques in the above defined way for medical reasons. At the age of forty-six Dubiel was diagnosed with Parkinson's disease. When conventional therapy based on drug intervention was no longer sufficient to reduce Parkinson's symptoms, he was offered deep brain stimulation alternatively.

Deep brain stimulation is based on the idea to stimulate specific regions of the brain, which are connected with an infraclavicular pacemaker. After having set up the device usually the amount of drugs can be reduced significantly while symptoms get better.

This was also true in Dubiel's case, nevertheless, deep brain stimulation also led to the effect that he lost his ability to speak and think properly. This side effect vanished directly when the device was switched off. Doing this on the other hand aggravated the Parkinson's symptoms again.

Once having discovered this, Dubiel saw himself in the possession of a peculiar power. Using a remote control, he was able to influence via neurostimulation his personal state and to choose between the ability to think and speak clearly or the reduction of Parkinson's symptoms. This capability caused his family and friends to confront him regularly with the question, whether he is switched on or off. It is more than understandable that Dubiel called himself a "reluctant cyborg."¹¹

In 2006, Dubiel published a significant report on both, his life with Parkinson's disease and deep brain stimulation.¹² His explanations are of a particular value with regards to the invention and application of invasive techniques. Although in his case the decision for deep brain stimulation was based on a medical indication, Dubiel is aware of the fact, that a brain machine interface might be used for non-medical reasons, too.

¹¹ Cf. Kutter, Susanne: "Ich kam mir vor wie ein Versuchskaninchen ...". Interview mit Helmut Dubiel, in: Wirtschaftswoche vom 11. März 2015.

¹² Cf. Dubiel, Helmut: "Tief im Hirn", München: Kunstmann 2006; Dubiel, Helmut: "Deep in the Brain. Living with Parkinson's Disease", New York: Europa Edition 2009.

MEDICAL INDICATION: A DECISION CRITERION

The possibility to use the application of invasive techniques for non-medical reasons raises severe questions in medical ethics. In a military context these questions underline the tension resulting when medical is weighted versus military necessity.

Military medical personnel and physicians in particular find themselves at the center of this conflict as their core concepts of self-understanding are shaken. Even already true for human optimization, far more in the case of human enhancement, terms like health, illness, physician, patient or physician-patient-relationship are profoundly questioned. It seems necessary to discuss, if these terms can be defined in the same way as they were, once physicians become protagonists in the development of human enhancement.

Some crucial objections have to be faced here. One might comment, that there is hardly a difference to be made between the application of human enhancement techniques and others like e.g. vaccination medicine or heart pacemaker surgery. All of them can be classified as invasive techniques in the above-defined way.

With regards to the application of a heart pacemaker, it has to be pointed out that the intervention is based on medical reasons with the aim to manage a specific disease. The above mentioned case of Helmut Dubiel is another example for this. Concerning vaccination, the aspect of preventing serious infections is crucial. Prevention always has been part of men's fight against diseases and therefore has to be named a medically indicated intervention by physicians. On the other hand the application of human enhancement techniques does not include any medical reasons. They are not part of any strategies of prevention, therapy or rehabilitation, and therefore medically non-indicated. Compared to the traditional understanding of medicine and its resulting self-image of physicians, the application of human enhancement techniques includes a different logical approach. Questions of health and disease play a subordinate role in this context.

Another objection might point out that a significant change already had taken place when physicians got involved in wellness and beauty medicine, which are economically profitable but not necessarily medically indicated. In fact, this area also represents a difficult field in medical ethics. Also here the question whether the application of invasive techniques takes place for medical or non-medical reasons is crucial. E.g., breast enlargement can actually be done for medical and non-medical or even

medically unjustifiable reasons. The fact that these interventions promise an enormous economic profit, does not justify a commitment pushing every reasonable criterion aside.

In military context, physicians have to fulfill a double role. Being a soldier, they have to take into account military necessities; being a physician, their task is to promote and restore human health. Based on this, any resulting double-loyalty-conflicts show clearly the need for ethical guidance. To restrict medical treatment strictly to what is medically indicated, is a way to protect both, the physician's profession and its underlying ethical concepts, particularly if medical necessities have to be evaluated against military necessities. The term medical indication provides orientation here. It might be defined in the following way:

Based on the principles of autonomy, beneficence, non-maleficence and justice, the term medical indication relates to actions of prevention, diagnostic, therapy and rehabilitation with the aim to fight diseases, to prevent illnesses, to restore health or to accompany the chronically ill.

Even if human optimization is close to prevention, diagnostic, therapy and rehabilitation, human enhancement as defined above is not. Therefore, the physician's role within this development will need to be defined. Whether human enhancement has to be part of a physician's practice is questionable. As an alternative, the new profession of an enhancer could be introduced, leaving untouched the classical role of a physician as someone who takes care of the sick and wounded. Of course, anyone who is involved in enhancing human beings must have a fundamental knowledge e.g. of anatomy, physiology, neurology or pharmacology, as well as technical skills, but there is no need for the enhancer to be a physician.

IS THE ENHANCEMENT OF THE SOLDIER A MORAL OBLIGATION?

The question, whether there is a moral obligation to enhance soldiers, has to be considered from various perspectives. Any contribution to the discourse from a medical ethical viewpoint needs to take into account the special role of both, physicians and patients and their extraordinary relationship. The aim, to help humanity to a breakthrough, even in times of war, led to the far-reaching protection of this group by the humanitarian law and its underlying ethos.¹³

¹³ Cf. Fischer, Dirk: "The Threat to Humanitas in Asymmetric Conflict", in: Medical Corps International Forum 1 (2015), 42-45.

In the light of human enhancement, these core concepts of medical self-understanding are pointed out in a peculiar way. To define a moral obligation to enhance soldiers endangers these concepts. The same has to be considered for any principles of biomedical ethics (autonomy, beneficence, non-maleficence, justice).

Though a human enhancement of the soldier might be desirable from a tactical point of view, it hardly can become a military physician's moral obligation. Not everything that is tactically desirable, e.g. the increase of military clout by means of human capacity enhancement or human performance enhancement, can be justified from a military ethical perspective. This is all the more the case if military medical ethical issues are at stake.

Any medical intervention has to be based on medical justified reasons. Though the application of invasive techniques can be medically indicated (e.g. the treatment of neurological or cardiovascular disease), they are not, if reasons of a different kind are at stake (e.g. the increase of military clout by creating a sort of super-soldier). The moral obligation to enhance soldiers can neither be justified, if military clout is interpreted as relevant to protect one's own integrity and health in the sense of a preventive medicine. The latter cares about human health, understanding humans as an end in themselves. In contrast to this, human enhancement in a military context subordinates humans to military reasons. Even if this might be justifiable from a military ethical point of view, it is not from a military medical ethical perspective. Therefore, the human enhancement of soldiers cannot be part of a physician's moral obligation without giving up fundamental professional concepts.

CONCLUSION

The question, whether there is a moral obligation to human enhancement, was considered from a medical ethical point of view. Based on terminological reflections the terms invasive techniques, human optimization and human enhancement were defined. Concerning the question if medical professionals are morally obliged to apply either means of optimization or of enhancement, the relevance of a medical indication was pointed out. Either human optimization or human enhancement should not be reduced to performance alone. In fact, other aspects like appearance and capabilities have to be considered, too. This is particularly true, as in the future human capability enhancement will lead to an excessive extension of skills, which humans as technically unaltered members of the species *homo sapiens* originally did not possess.

Particularly human enhancement goes along with a number of medical ethical questions. The application of invasive techniques to enhance human appearance, performance or capabilities has severe consequences on the traditional medical concepts. Terms like physician, patient or physician-patient-relationship have to face a fundamental shift of meaning, if medical professionals expand their area of responsibility to the modification of humans by human enhancement techniques. The crucial aim of medical professionals to maintain and restore human health has to be brought to the focus of attention by the current debate. This is all the more the case, as military medical professionals are particularly tied to the requirements of international humanitarian law and its underlying ethos.

Though human enhancement offers a wide range of positive options, especially from a military tactical point of view, its application has to meet requirements of military medical ethics. With regards to future conflicts the term transhuman warfare was introduced. The future scenario of transhuman warfare already today gives an idea of the severe medical ethical challenges to come. Human enhancement is one of them.

SOME FORWARD-LOOKING SCENARIOS FOR INCREASING COMBATANT PERFORMANCE

Gérard de Boisboissel,
Research Engineer, CREC Saint-Cyr,
Cyriaque Naut, student at the École normale supérieure de Rennes.

IN order to give concrete expression to the various concepts that have just been expressed further upstream, here are some prospective scenarios presented at the colloquium on 16 October 2019 at the Ecole Militaire, Paris.

There are many hypotheses for an enhancement of human beings, but a sample of a dozen or so cases already allows us to sufficiently open the debate on ethical issues. Whether during the preparation phase or during the soldier's mission, it is a question here of taking up the various hypotheses of applications set out earlier in the paragraph *Enhancement is a function of the military context*, page 12.

Enhancement and anthropotechnics¹ will be considered synonymous, the latter being understood as “*the application of techniques to improve human performance without medical purposes*” by a technology applied to humans. Thus, the classification adopted is primarily that of ends, although it also takes into account the *means* of its implementation:

- mechanical: without interaction with the human body, but only with its environment.
- pharmacological: interacting with the human body via active substances.
- physiological: interacting with the human body, but without the presence of pharmacological substances.

For information, these scenarios and definitions have in no way been validated by the French Armed Forces Health Service, and must therefore be taken with hindsight. They do, however, show a *possible field of possibilities* with a possible time horizon of the next ten years, albeit with a futuristic but realistic dimension opening up the debate on ethical issues.

¹ With a view to simplification, the concept of reversibility of anthropotechnics is based in this article solely on the examination of the durability of its positive effects, and not on the durability of all its consequences (in particular negative ones, which would allow subdivisions *with probable sequelae*, *without sequelae*, etc.). To this end, pharmacology therefore has only a temporary effect.

ADAPTATION OF THE HUMAN BODY FOR SPECIFIC TASKS (ACCORDING TO ITS SPECIALITY)

Irreversible physiological increase : Eye operation to improve visual acuity

Increased visual acuity for observers and snipers enables them to be able to detect and potentially neutralize a distant threat more accurately, while reducing the risk of error.

Special Forces soldiers parachuted at night to take up positions as discreetly as possible on a pass are tasked with burying themselves and observing the road to report any movement or suspicious vehicle heading towards a valley. Dedicated optical tools are a proven risk of being spotted when the sun's rays illuminate the held slope.

The members of the commando are selected from among those who have previously undergone, under military medical supervision, an irreversible operation on the cornea to increase their visual acuity by 20%.

It should be noted that this operation already seems to be performed in some foreign armies on volunteers, this surgical operation allowing a significant improvement in natural vision.



Copyright ©Marine Nationale/Défense

Reversible mechanical enhancement: geolocalisation implants

In order to make the acquisition of the data necessary for Blue Force Tracking³ more efficient, a combat unit is asked to have a subcutaneous implant allowing the geolocation of its members during its mission. This implant will also allow the localization of the combatants in case of capture.

The operation is carried out in the greatest secrecy and in an undetectable way in order to avoid the risk that the enemy is informed and can take invasive exploration measures on the bodies of any prisoners he may have captured.

³ Blue Force Tracking refers to a capability to provide combatants with location information on friendly (blue) military forces.

Reversible mechanical enhancement: cyber-protected chip to access secure buildings

In order to secure access to sensitive military sites, the implantation of a contactless subcutaneous chipset that acts as a proximity key can be coupled with biometric identification technologies (fingerprints, iris recognition) to guarantee authorisation to enter an area.⁴

This is to allow military personnel access to high-security sites without a key, badge, or restrictive protocol, allowing them to open certain doors, start their computer, etc.

To this end, the identity of the equipped military personnel, their access rights, the associated validity periods and the identification media are synchronized with the sites' information system and controlled from a management position by highly qualified and authorized personnel.

The operation of this chipset can be immediately deactivated in case of emergency from the management station, for example in case of suspicion of radicalisation of an individual.

TRAINING

Irreversible physiological increase:⁵ brain training

The aim of initial training for individuals in the forces is to enable them to acquire a number of techniques essential to the military world: analysis of terrain mapping, learning certain languages or command terms, increasing concentration, managing external stimuli, etc. The aim is to provide them with the necessary skills to be able to use them in the military world. Through the practice of meliorative neurosciences such as memory and concentration optimisation exercises, using BCI (Brain Control Interface) with neurofeedback, the aim is to play on the plasticity of the soldier's brain during training (plasticity which defines the adaptability of an individual) and to offer him a visual, sound or haptic feedback of his brain activity during training sessions or role-playing, for a better efficiency and speed of learning.

⁴ By November 2018, 4000 Swedish employees of private companies had agreed, on a voluntary basis, to be equipped with such chips to facilitate their access to their companies.

⁵ The means of enhancement here is temporary and its effect can be long-lasting thanks to the plasticity of the brain without necessarily being irreversible in the long term.

MISSION PREPARATION (PRECAUTIONARY PRINCIPLE)

Reversible physiological increase: night vision with water mask

A marine commando has to dismantle a major hub of an illegal gold panning and drug trafficking network in South America. A diving and night-time approach would allow the gold panners to be taken by surprise and would considerably reduce the loss of soldiers' lives. However, the requirement to wear a water mask prevents the wearing of night vision goggles.



Copyright © Patrick LOPEZ / armée de Terre / Défense

However, a recent scientific discovery provides a significant improvement in night-adapted vision by means of injectable drops with temporary effects, which would allow commando members to acquire this ability without the inconvenience of carrying an extra load.

The procedure is simple: individuals administer the drops themselves.

However, the person must have an approval for self-administration by the medical staff given during a previous medical check-up, followed by a medical check-up on return from mission.



Copyright © Morgan DURAND / armée de Terre / Défense

Pharmacological enhancement: stress reduction implants

Stress is one of the main factors in the disabling negative emotional load for the combatant, causing loss of control, unpredictability, lack of anticipation and analysis of danger, all of which can go as far as astonishment putting at risk the survival of the soldier and the combat group to which he belongs.

Cortisol is a steroid stress hormone that helps the human body respond better to danger. In a hazardous situation, high stress is caused and the body is then boosted by adrenaline that will sharpen the senses and provide energy to face danger. At the same time, cortisol is produced in large quantities to recover energy more quickly by transforming the individual's fat reserves into sugars.

A new biotechnological implant, a cyber-protected microcapsule, previously transplanted subcutaneously and equipped with sensors, allows the analysis of the heartbeat and the measurement in real time of the cortisol level.

Intended for soldiers with a proven effect of stress in critical situations (under the supervision of a military doctor), the physiological data of these individuals are recorded during numerous situations and training exercises in order to determine their maximum heart rate during effort and their critical cortisol concentration rate.

Based on these elements, a personalized formula is established which makes the cortisol implant automatically releases cortisol to reduce stress when the maximum heart rate (HR Max) of each individual is reached.

It is with such a device that a company is sent on a risky mission in foreign territory under the constant and direct threat of enemy attacks on outposts. The implant, which can be activated, is inserted under the skin between the thumb and forefinger of the weak hand.



Copyright : Amal Graafstra, www.amal.net

CONDUCT OF THE MISSION

Pharmacological increase: hunger or thirst suppressant capsule

While hunger is a physiological indicator, it remains a disabling constraint because it requires carrying a food load on missions that exceed half a day, especially in rough terrain.

Therefore, the provision of a capsule that provides light vitaminized nutritional supplements and helps to lighten the fighter remains a Holy Grail for many missions. This is not a replacement for the traditional rations, which are necessary to ensure that rest periods in a secure environment are enjoyable, but rather a complement, in order to reduce the load carried by the teams deployed for periods longer than 12 hours.

Pharmacological increase: pain-relieving clothing

A so-called *intelligent* garment incorporates a device in its fabric that allows a substance with analgesic virtues, i.e. suppressing sensitivity to pain, to be released by skin contact, automatically triggering itself in the body in the event of injury.

Reversible physiological increase: stimuli if sleep or for attention

During field operations, the sequence of missions in difficult environments (temperature, duration, steepness, stress, danger, etc.) make soldiers subject to moments of intense fatigue. This is all the more critical since some surveillance missions, requiring excessive attention and concentration to detect danger and react quickly in the event of an alert, are both repetitive and long, such as night sector surveillance. Tired and unstimulated organisms often fall asleep...

A flexible under-helmet, which is positioned on the head and under the combat helmet, allows the capture of the soldier's brain waves via passive electrodes. Controlled by a discreet electronic box integrated into the helmet, this sub-helmet detects on the individual on a surveillance mission any period of cerebral inactivity corresponding to a sleep phase, and sends stimuli in the form of light vibrations whose purpose is to awaken the individual's attention. This equipment has a direct physiological effect.

The use of this sub-headset requires a personalised analysis of each individual's electroencephalogram beforehand to avoid any unsuitable stimulation.

Pharmacological increase: awakening psychostimulant substance

A unit of Mountain infantry has been on a deep raid for several days and is approaching its objective. It is able to overtake the adversary and to go around his device via a steep rocky massif requiring a perilous climb but allowing to win the battle definitively. But the men are exhausted. The effect of surprise is essential for the success of the operation and time is running out because the enemy has called for reinforcements.

A new psychostimulant substance allows the fighters to stay awake for 72 hours, increasing intellectual activity for a better cognitive analysis of the situation and increasing vigilance. However, after these three days, there is a period of several days of incapacitation requiring total rest with possible subsequent risks of adverse effects. There is a high risk that the soldier will no longer be operational just afterwards.

The head of the unit decides, after informing his superiors, to take the substance himself and orders his soldiers to do the same.

ON CONTACT (MAXIMUM INTENSITY)

Pharmacological increase: fighting beyond exhaustion

A commando, spotted, finds itself totally surrounded by rebels during a deep raid near a border in a conflict zone. The rebels advance towards the position to eliminate the members of the commando.

While air support is possible, conditions do not allow for exfiltration before 48 hours, nor for immediate ground reinforcement: it will be necessary to hold out in conditions of extreme danger. The glorious but tragic memories of the battles of Camerone and Bazeilles in Sedan come back to everyone's mind.

The commando leader then ordered some of the soldiers in his group to take the capsule described in the previous scenario, forbidding others from taking it in the event that the military action lasted longer than the capsule's 72-hour effect.



Copyright © Jérôme SALLES
armée de Terre / Défense

SURVIVAL OF THE FIGHTERS

Pharmacological increase: surviving a major risk as a group

You are a submariner, embarked on board a prestigious nuclear attack submarine, and you are located at Nemo Point, the furthest point of the ocean from any land mass.⁶ An explosion sounds on board which results in serious engine damage. While the Nato Submarine Rescue System (or NSRS) can be on site in less than 72 hours, the particularly difficult weather conditions require the 60 crew members to be in complete autonomy for at least 5 days.

The only solution is to wait with the memory of the submarine K-141 Kursk. However, oxygen reserves are limited, and your commander orders the taking of a pill that slows down the metabolism in order to reduce oxygen consumption and maximize the chances of survival for all. This is when three submariners refuse, having heard of a serious accident during an experiment in previous clinical trials.



Copyright ©Marine Nationale/Défense

Public opinion survey

Mr. Gérard de Boisboissel and Professor Axel Augé of the CREC Saint-Cyr, with the support of Second Lieutenants Serretta and Viaud of the École spéciale militaire de Saint-Cyr, conducted a survey of the chain of command and officer cadets of Saint-Cyr Military Academy on their acceptance of techniques to increase soldier performance. The results of this survey was published in 2020 in the French academic review “*Tétralogiques*” (published in French) under the title: “*The relative acceptability of the technical increase in the physico-cognitive performance of the combatant: a survey of officer cadets and their leaders at Saint-Cyr Military Academy*”.⁷

⁶ This point is located in the South Pacific Ocean at 48° 52' S, 123° 23' W1. The nearest land surface is 2,688 km away.

⁷ Axel Augé, Gérard de Boisboissel, “*L’acceptabilité relative de l’augmentation technique des performances physico-cognitives du combattant. Enquête auprès des élèves-officiers et de leurs cadres aux Écoles de Saint-Cyr Coëtquidan*”, in *Tétralogiques*, N°25, La déconstruction du langage. URL : <http://tetralogiques.fr/spip.php?article157>

STRIKING THE BALANCE BETWEEN MILITARY NECESSITY AND THE ENHANCEMENT OF MILITARY PERSONNEL

*Marie-des-Neiges Ruffo de Calabre,
Researcher CREC St Cyr Coëtquidan,
Post-Doc Researcher ETH+ Lille.*

MANY companies, from pharmaceuticals to mechatronics, are full of innovations that a clever marketing department will soon present as *necessary* opportunities for the military world. In order to distinguish between the reality of needs on the ground and a potentially commercial discourse that is only intended to stir up desire and raise excessive hopes in the capabilities of technology, let us ask ourselves where military necessity stands in relation to the opportunities offered by the enhanced soldier.

If one argue the military necessity, to try to justify the adoption of a soldier's enhancement, is ethical reflection still present? Could we ethically deny enhancements to soldiers fighting terrorists, for example? The argument that it would seem unethical to limit the arsenal available to legitimate combatants is frequently used by advocates of increases, but also by advocates of other recent technologies¹ with military objectives. There is sometimes a strong belief that restricting the means of combat would be accompanied by a decline in effectiveness on the ground. This view would confront the defence of democratic values such as human rights, which motivate our rejection of terrorist ideologies, with respect for military ethics. This opposition would seem to assert that it would not be possible to be fully democratic and ethical at the same time. Of course, it would be naïve to assert that these ideals have never been flouted, but how could we assert that behaviour is ethical if it does not respect human rights, or that, conversely, we could respect the spirit of human rights while failing to meet ethical requirements? Distinguishing democratic values from respect for ethics in general, thinking that such a distinction would amount to dissociation, can only be a logical error.

From this point of view, it would thus be possible for a philosopher to envisage that enhancing soldier presented as necessary from a military point of view could nevertheless be refused on ethical grounds. Furthermore, a few linguistic clarifications could shed a different light on the sometimes overly rapid understanding of the concept of military necessity. Would it be conceivable that military necessity and the opportunities for enhancement could conflict?

¹ Think of proposals to create some Letals Autonomous Weapons Systems (LAWS), or the one to trigger the nuclear on the basis of a decision by an IA, and so on.

WHAT IS MILITARY NECESSITY?

Contrary to what common parlance might suggest, military necessity is first and foremost an ethical concept. It can be defined in different ways, in meanings that remain accessible to everyone, civilians included. For example, the association *Médecins Sans Frontières* mentions on its website in its Practical Dictionary of Humanitarian Law that “*military necessity is proportionality in the use of armed force to achieve military objectives*”². Making such definitions available to the general public helps to avoid the pitfall of a misunderstanding of the concepts of military ethics, the vocabulary of which could be confused with that of everyday language. Indeed, the French Larousse dictionary, which targets the general public even more than the one proposed by *Médecin Sans Frontières*, defines necessities in the plural as “*the superior character of a community, of an institution that imposes itself on all*”³ and in the singular as “*the character of what is necessary, of what cannot be dispensed with (...) Character of what is inevitable, inescapable (...) Imperative need, necessary thing*”⁴ or again in the infinitive as “*the necessitate: to make necessary, indispensable*.”⁵

The semantic difference between the daily use of the term *necessity* and its particular use in military ethics easily explains why the concept of military necessity can be confused with the *necessity* of everyone to have to do something, to be obliged to do it, for example. On the other hand, and the definition of *Médecins Sans Frontières* briefly summarized it, the ethical concept referred to in military matters and referred to as *military necessity* is more concerned with the requirement of proportionality of response, which would be expressed in terms more familiar to the military, such as the *level of intensity of commitment*, which must be tailored to the military objective being pursued.

As an ethical concept, military necessity is not codified as such in International Humanitarian Law (IHL), even if it nevertheless *infuses* all IHL, as Professor Michaël Schmitt⁶ believes, notably through two notions:

² “*Doctor Without Borders*”, art. Nécessité militaire, Dictionnaire pratique du droit humanitaire, website: <https://dictionnaire-droit-humanitaire.org/content/article/2/necessite-militaire/> last consulted 28 February 2020.

³ <https://www.larousse.fr/dictionnaires/francais/n%C3%A9cessit%C3%A9s/54011>

⁴ *Ibid.*

⁵ *Ibid.*

⁶ M. N. SCHMITT, “*Military Necessity and Humanity in International Humanitarian Law: Preserving the Delicate Balance*”, in *Virginia Journal of International Law*, vol. 50, 2010, p. 835 <http://www.vjil.org/assets/pdfs/vol50/issue4/VJIL-50.4-Schmitt-Essay.pdf>

proportionality and discrimination. The requirement of proportionality will thus be legally translated into Article 51 of the Additional Protocol to the Geneva Conventions, paragraph 5b:⁷

“5. The following types of attacks, among others, shall be considered to be indiscriminate: (...)

(b) attacks which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.”⁸

As an extension of paragraph 4 of the same article, which refers to the requirement of discrimination, in other words, the distinction between combatants and civilians who must be protected from combat, it reads as follows:

“4. Indiscriminate attacks are prohibited. The expression indiscriminate attacks means:

(a) attacks which are not directed against a specific military objective;

(b) Attacks which employ methods or means of combat which cannot be directed at a specific military objective; or attacks which are not directed at a specific military objective.

(c) attacks which employ methods or means of combat the effects of which cannot be limited as provided in this Protocol; and which are therefore, in each such case, suitable to strike military objectives and civilians or civilian objects without distinction.”⁹

These articles of law reflect the desire to give a legal translation to the ethical concept of *military necessity* by emphasizing the need to act towards a military objective in a proportionate manner. Proportionality must be assessed in terms of the damage that could be caused to civilians. This is a pragmatic tolerance since such harm would logically not be acceptable to the extent that IHL protects civilians, in theory. Nevertheless, the proportionality required by the concept of military necessity allows for the countering of unnecessary violence and destruction whose military advantage would not be proportionate to the harm caused to civilians, or which would be indiscriminate, which would apply indiscriminately to civilians and military personnel, or which would spread terror among the population.

This comprehensive overview sets out the framework of what constitutes military necessity and thereby draws the limits of what would be acceptable in

⁷ ICRC, Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts, Protocol I, Article 51, 8 June 1977.

⁸ Ibid.

⁹ Source: Article 51 of the Additional Protocol to the Geneva Conventions, op. cit.

terms of enhancements. Military necessity cannot be an argument superior to the constraints given by the Law, by the laws and customs that regulate armed conflict. In other words, the argument of military necessity does not allow one to free oneself from the framework of the law, but rather constitutes a bulwark for ethics. Evoking military necessity does not mean that everything is acceptable because it is a military matter.

COULD MILITARY NECESSITY BE AN ETHICAL CRITERION FOR DENYING ENHANCING SOLDIERS?

Rather, *ethics* by itself is characterized by a *mesh* of various ethics. It is a vast field, comprising currents as different as the ethics of virtues, deontological or utilitarian.¹⁰ Thus, the concepts of proportionality and discrimination, like that of military necessity, are derived from the ethical tradition known as the Just War. This tradition is divided into *Jus ad Bellum*, *Jus in Bello*, and *Jus post Bellum*. Military necessity thus comes from the Just War tradition, particularly *Jus in Bello*. Therefore, the principle of military necessity should only be applied in wartime.

If military necessity is presented in the face of the enhancement, we must therefore note that the concept of military necessity only works during war. Strictly applied, this principle implies that no decision to enhance combatants should be taken outside the time of war. Neither before war nor after, any enhancement would only be acceptable during the time of fighting. The example of taking an energy drink before going on a mission would seem acceptable from this point of view.

We have developed an understanding of military necessity, but what is a raise? We refer to the article by Gérard de Boisboissel¹¹ for an exhaustive answer to the question. It should be pointed out that there are two kinds: chemical or mechanical. Whether we consider chemical or mechanical enhancements, one of the ethical criteria that derives from military necessity and its limited application to the duration of hostilities will be that these enhancements imply reversibility.

Reversibility implies that a device can be removed, that a chemical molecule has a temporary effect, a minimum of side effects, and preferably a minimum of long-lasting side effects. In the absence of this criterion of

¹⁰ For a discussion of the ethical issues relating to enhancement, see Écoles de Saint-Cyr Coëtquidan, “*Le soldat augmenté - Regards croisés sur l’augmentation des performances du soldat*”, Fondation pour l’innovation politique, 18 December 2019.

¹¹ See Gérard de Boisboissel’s contribution in this book.

reversibility, the enhancement acquired in a military context would remain after the war. Therefore, the enhancement would no longer be compatible with the military necessity requirement of *Jus in Bello*. For if it were irreversible, an enhancement, acquired perhaps legitimately in a military context, would become illegitimately usable in a civilian context.

Nevertheless, this restriction leaves open the possibility of enhancements not directly related to the use of force. In theory, any enhancement to which a civilian could have access in the civilian world for civilian activities would therefore in theory be acceptable for military necessity. Improved eyesight would be an example. There are now operations to repair defective eyesight, to avoid wearing glasses. There are therefore enhancements available in the civilian world, which could in theory become available to the military world as well, without prejudice to respect for the principle of military necessity, nor to the requirement of reversibility which this implies. Thus, in terms of respect for military necessity, this leaves open the possibility of some enhancements, although some might call them more of a *correction* as in our example of sight correction, rather than an increase in the superhuman sense of the term.

Whether mechanical or chemical, the choice of which capabilities one wishes to enhance is not ethically neutral. They must also be analysed through the prism of military necessity. Thus, enhancements designed to increase aggression are particularly dependent on *Jus in Bello*. Any capability related to the use of potentially lethal force and therefore properly useful in the military context must be limited to the duration of the mission, otherwise there is a risk that a military innovation will ultimately be available in the civilian context, for example, to doping boxing or MMA¹² athletes.

Moreover, increased aggression may have side effects that threaten respect for ethics, including military necessity. For example, some northern mythologies depict particularly fierce fighters, such as the Berserkers, sometimes compared to bears and said to be animated by a sacred fury, generated by the absorption of plants.¹³ Under influence, the fighter could sometimes attack members of his own camp. An enhancement, to be acceptable, should not have the effect of threatening respect for ethical principles such as friend/enemy discrimination, nor that between civilians and the military.

¹² Mixed Martial Art.

¹³ “A flower at the origin of the warrior fury of the Vikings”, Slate, October 1, 2019. <http://www.slate.fr/story/182292/fleur-origine-rage-folle-guerriers-vikings-jusquame-noire>

CAN ENHANCEMENTS BE DEFENDED UNDER THE PRETEXT OF MILITARY NECESSITY?

We have set out in detail what military necessity consists of. But if this understanding is distorted, for example by using the more common dictionary definition, it would be possible to establish five counter-arguments to our proposal for a framework for enhancements, which must be addressed. If military necessity were confused with a justification of all means to use violence, in an understanding of necessity as a *duty to act*, it would mean that in war anything would be permitted.

Thus, the first counter-argument that would defend the enhancements would be based on the argument that the end would justify the means. This reference to the quotation attributed to Machiavelli is not compatible with the original definition of military necessity, neither with IHL nor even with human rights. Indeed, this principle would undermine all the ethical roadblocks erected against barbarism. If *the end justifies the means*, anything is possible, anything would be allowed, including exceeding the Law, which must remain unacceptable.

Advertising would propose the second counter-argument: The discovery of a molecule or the creation of a device by a company will incite it to create a need in the potential customer to make him a consumer. A legitimate safety need will be identified by the company proposing a *solution*, that of using enhancements. These marketing arguments do not fit deeply with military ethics. It would be wrong to confuse military necessity with the need for an ordinary consumer. For if the soldier's need for security were to be fully satisfied, only peace would be able to satisfy it, or its complete replacement by machines, using robots for example.¹⁴ However, there are solutions to meet real needs. These solutions are partly linked to greater planning of logistics and support functions. They may be more costly in many ways, but there are solutions compatible with military ethics to ensure, for example, the supply of water in places where it is necessary to hydrate frequently.

The third counter-argument would be based on an exclusively medical understanding of life. However, humans are more than a machine to which only a few additives would be needed to make it work better. The adage *there is no free lunch* also applies in biology. Side effects can occur, the risk of PTSD¹⁵ increases as violence which has faced also rose.

¹⁴ This is not without other difficulties, see the case of LAWS in particular.

¹⁵ Post-traumatic syndrome disorder.

As in the mythological example of the berserkers, increasing aggression and violence increases the risk of unethical behaviour since empathy is like *anesthetized*.

Suppressing survival-related feelings such as thirst is akin to turning off the alarm that signals that a critical level has been reached in the body. These bio-signals exist to protect the organs, so suppressing them does not mean that the body is no longer in danger, but that the *bio-alarm* that signals it has been short-circuited. Working the body on overdrive can result in impairment and a longer recovery period. Therefore, the long-term time factor must also be taken into account when considering an increase. With regard to mechanical enhancements, the danger is more about security than ethic since a captured soldier, dead or alive, may be stripped of these devices. Some security devices, such as RFID tags to identify the owner of a weapon, for example, can be double-edged solutions from this point of view.¹⁶

A fourth argument in favour of enhancements would be based on the moral inequality between combatants. If one side does not respect the constraints of *Jus in Bello*, there is a strong temptation for the other side to do the same. Why should we restrict ourselves if the others are sending berserkers? In short, if the rules are flouted, should they still be followed? The first part of the answer would require a reminder that a breach of the law does not render the law null and void.

Second, a contextualization is necessary. The argument at issue here does not belong to military ethics. In a different formulation it is a call for an *eye for an eye, a tooth for a tooth*. While its inclusion in the Code of Hammurabi was originally a first attempt to reduce violence, the ethical requirements have expanded, and revenge, even if proportionate, is not acceptable. In other words, the lack of respect for ethics by one side cannot constitute a validation for the other to violate the law and/or ethics.

The last counter-argument is a widespread fear: Could we win tomorrow's wars without the enhancements? Even if *comparison is not reason*, we can relate to a historical counter-example, that of the use of pervitin. Even though German troops used it during the Second World War, it did not guarantee their victory. In other words, the implicit equation "*man + enhancement = victory*" would be a dangerous simplification. If, therefore, the enhancement is not a guarantee for victory, it remains essential to reflect on the elements that could be decisive, such as strategy and tactics, which should never rely solely on technical innovations and even less on sacrificing respect for ethics and the law.

¹⁶ https://www.liberation.fr/planete/2014/09/16/peut-on-controler-l-utilisation-des-armes-que-l-on-envoie_1101444

CONCLUSION

Ethics is not a hindrance to military effectiveness. The temptation to use rapid enhancements is an easy response to complex problems. Thus, disinhibition will not be the same as courage. It is possible to disinhibit an individual easily, but forming a courageous character takes time. In the first case, side effects are to be feared, in the other the main constraint is the time needed to obtain the desired effect. Why would one now want to lean towards the first solution? The project of enhancing soldiers can be found in transhumanist fictions. What is the implicit dream? That with a bit of technology we could transform *ordinary* soldiers into the equivalent of special forces personnel. One of the best-known heroes in American comics represents the hope of this transformation, *Captain America*. Initially too small for the Army, a spectacular product makes him a superman.

This fiction must be compared to a field anecdote. Without it, this implicit desire to transform an entire army into elite soldiers would overlook one of the most profound characteristics of Special Forces members. Admiral MacRaven, a former member of the Navy Seals,¹⁷ relates this anecdote: when he wanted to join the Navy Seals, he ran into an apparently frail civilian in a hallway. MacRaven felt he was better prepared than this candidate. As it turned out, this seemingly “*frail civilian*” was in fact Tommy Norris, “*that reserved and humble quiet man was one of the toughest soldiers in the history of the Seals,*”¹⁸ who was widely decorated for his bravery. MacRaven’s first judgment was similar to the one the instructors first made of Norris in 1969; he was considered too small, too thin, not strong enough, and almost failed. However, in war, it would be wrong to confuse physical strength with mental strength. Without the latter, no enhancement of any kind would result in victory.

Thus, perhaps military necessity does indeed imply an enhancement, but one given in accordance with ethics, in a harmonious coupling between physical and moral training. Without physical effort, character cannot be formed. The ethically desirable enhancement remains education for future combat, requiring a critical mind in the use of new technologies, especially AI. Here, finally, was the military necessity that should be sought: not that of an enhanced soldier, supposedly *perfect* but violent, but one who in all circumstances will give the best of himself.

¹⁷ Navy commando, Sea, Air, Land special forces.

¹⁸ William H. McRaven, “*Make Your Bed: Little Things That Can Change Your Life...And Maybe the World*”, Grand Central Publishing (4th april 2017).

ENHANCEMENT DEPENDS ON THE TYPE OF SOLDIER

*Colonel Marc Espitalier,
Head of Scorpion (weapon system) Environment Section,
EMAT PLANS office.*

IN summary of the questions that were directly asked during the round table of this colloquium on the fact that enhancement depends on the function of the soldier, it seems essential to me to insist on a few points. Without this being definitive, six criteria could be considered when we talk about the enhanced soldier: certification, control and mastery, reversibility, acceptability, effectiveness, legitimacy.

THE QUESTION OF CERTIFICATION, CONTROL AND COMMAND ... THE IMPERATIVE OF TRUST

If we think of the enhanced soldier as a weapon system then his *authorization to use* will be through certification. During the colloquium on 30 January 2019 on artificial intelligence for defence, organised by the CREC Saint-Cyr in Paris, we underlined the difficulty of certifying advanced algorithms when they will only apply to fairly limited fields. No leader wants to use a weapon system that he is not sure to control and this is the reason why LAWS are excluded from the field of possibilities by the French three services. What does not seem feasible with silicon chips will certainly be even less feasible with a human brain of much higher complexity. Will the superb sophistication of the human machine allow the certification of any enhancement? How else can tests be carried out? How can we be sure of the effect of a particular substance under high stress conditions that are not reproducible (for the moment) in a laboratory? What error rate will we accept on these enhanced men? Is it acceptable that humans can be hacked like machines?

All these questions that we do not know how to answer allow us to measure the step to be taken between laboratory experiment and real deployment.

THE QUESTION OF ACCEPTABILITY

When we talk about the evolution of robots, the question arises of the political decision to develop or not to develop these weapons. The question of the enhanced soldier has a completely different aspect: will the soldier accept this enhancement? To dismiss this question would be to deny the human nature of combatants.

From the trench *sip of red wine* to the more or less legal muscle-building products, the soldier has always had the individual temptation to overcome his fears, to go beyond his own limits. But each time, this enhancement is the result of personal acceptance. Apart from a few extreme cases, the soldier must have confidence in the product, the graft that is offered to him. Even if the product is certified, mistrust remains the order of the day as soon as one touches the physical integrity of the individual. This individual assessment must be brought back to the society in which the soldier lives. Even if he is aware that he is doing an extraordinary job, the soldier is a man of his time: he therefore tolerates what society tolerates and rejects what is not acceptable to the society of the moment. The notion of acceptability is all the more relative as it depends on the culture and the era: We can easily imagine that today's prohibitions will not be the same as those of tomorrow.¹

The question of acceptability is intuitively linked to that of reversibility. Every soldier is imbued with his or her mission and is willing to take risks. Even if the status of hero can make him dream, this same soldier always aspires to return to a normal life within the society he defends. The French soldier is indeed a citizen soldier; he does not aspire to the status of a dehumanized superhero. The ability to no longer be enhanced (reversibility) thus appears to be an imperative condition for the acceptability of enhancements.

THE QUESTION OF LEGITIMACY

It is always a soldier planting the flag in the heart of the enemy camp that symbolizes victory. This is why it seems difficult to achieve victory without putting soldiers on the ground and in direct contact with enemy resistance. One can widely imagine winning a battle using *non-human* means ... it is unlikely to win a victory, i.e. to put an end to the conflict without physically involving a man. In the same vein: is it possible to win a real victory with *superhumans*? Will the tactical gain achieved by this means appear legitimate and be exploitable? The enhancement of soldiers therefore raises the question of the proportionality of the use of force coupled with the use of a means that could be judged as *unethical*.

Let me conclude with two strictly personal reflections that I bring to the debate.

These questions of certification and legitimacy of acceptability will be a matter of context. The legitimacy cursor will change according to our position, according to our operational superiority or, to the contrary, according to our observed shortcomings, according to the peril we will have

¹ This is a two-way street.

to face. The answers we provide today are linked to our moral references of the moment and it is certainly pointless to make too precise bets on the future.

From a personal point of view, I do not believe that we can be defended by *post-humans*. Without going as far as *Avengers*, the lessons of history lead me to affirm that a society cannot be defended by men and women who do not resemble to that society.

*

*Colonel Quentin BOURGEOIS, Head of the Scorpion Doctrinal Coherence Office,
Doctrine and Command Teaching Center, CDEC*

I am perfectly in line with what Colonel Marc Espitalier said and will propose to complete the first criteria that he defined. However, as a soldier, I think it is important to remind you of two things in the preamble:

The first is that, from a command point of view, the question of the enhancement raises questions about the principles governing the profound functioning of our democratic societies, underpinned by respect for the dignity of each individual.

The Army Blue Book defines 6 principles of command, two of which are likely to question the option of artificially enhancing the soldier: humanity and trust. One could add exemplarity, implying that a leader must be able to do what he asks his men to do, referring the question to the entire chain of command, up to the highest levels. It is likely that the solutions for enhancements would then be seen in a very different light.

The second is that the success of operations depends less on the *superpowers* of individual combatants than on the ability to work as a team. In battle, it is this ability that determines superiority over the enemy. It is expressed on the one hand in the cohesion of units and on the other hand in the effectiveness of the combined effects of weapons or units.

Before thinking of increasing physiological capacities, it is therefore necessary to ensure that these two conditions are well met. To that end, it must be possible to allocate resources, but above all a great deal of time, so that people know each other, master individual skills and are able to cross-fertilise them in order to generate the expected synergies.

The military response to the problem of the enhanced soldier is only part of the answer: starting from the principle that these techniques will inevitably

be developed in our future societies, if only for the benefit of medicine, the important question is that of the risks involved in any major technological development. In this respect, the precautionary principle enshrined in the Act will apply. Thus, to the criteria proposed by Colonel Marc Espitalier, three others deserve to be mentioned: control, reversibility and effectiveness.

1. Mastery: the enhanced soldier will have to remain master of the enhancements from which he will benefit, in the same way as he must remain master of the force he triggers. He will therefore have to be trained for this and be equipped or used to taking substances upstream, which increases the risk of exposure. The question that comes after this is the question of *who is in control?* which was mentioned earlier.
2. Reversibility: if the taking of substances that one imagines to be punctual is possible, implant techniques are more problematic. What to do with the enhancements of the soldier back home? Can we accept that military capabilities are still active when they are out of service? In other words, who will hold the key to the armoury? Can it be activated and deactivated remotely? Is this humanly acceptable because it still belongs when a leader decides whether or not it can be enhanced in the flesh?
3. Finally, Efficiency: in the arms race, some technologies only help to increase the level of violence without allowing for any advantage to be taken. This was the case with gas during the 1st WW and the Iran-Iraq War. One could also evoke 5 years of deadly battles between the Confederates and the Union whose armies were almost symmetrically equipped with the latest equipment and materials produced by industrialists (with an exponential increase in firepower). There is a significant risk that future battles will pit superhumans against superhumans, with the end result being increasingly deadly confrontations. Consequently, it will be necessary to ensure that the soldiers enhancement is a real operational added value increasing the chances of a better victory.

The SOLOW paradox¹, on the other hand, reminds us that technological progress does not always lead to productivity gains. Vulnerability usually makes the individual react, spurred on and able to find unexpected resources. Fear, for example, sharpens the senses and helps us to grasp the reality of things. It protects against recklessness and, when mastered, generates courage. It could prove counterproductive to try to remove frailties that are part of man's deep nature, when many other non-intrusive solutions are possible.

¹ The SOLOW paradox refers to the slowdown in productivity growth in the world in the 1970/80s despite rapid IT development over the same period.

THE CONCEPT OF ENHANCED SOLDIER: BEYOND BOUNDARIES

*Vincent Guérin,
Doctor in contemporary history*

*“Be all that you can be... and a lot more”
Dr. Joseph Bielitzki (DARPA)*

INTRODUCTION

WHEN you ask a group of people what an enhanced soldier means, both adults and children answer drugs, Terminator or a superhero. The drug relates to a soldier who is no longer completely himself, Terminator to an anthropomorphized machine, the superhero refers to the imaginary of comics and in particular Captain America. These three imaginaries produce an idea of power in the triple sense of producing an effect, of becoming what we are not through an exogenous agent and a supernatural being. What is an enhanced soldier? The question seems a priori irrelevant, as everyone has a representation on it, is on this polysemic vision that we wish to anchor the development that will follow. The aim of this text is to question the concept of the enhanced soldier, to give it intelligibility, to delimit its perimeter. In what context was it born? What questions is it associated with? What were the ingredients of its crystallization, its first incarnations? To do so, we will explore a crucial temporality at the junction of the 20th and 21st centuries, in the United States. We are interested in a singular institution: the DARPA (Defense Advanced Research Project Agency), one of the creating force of the enhanced soldier, and more particularly one of its departments, the Defense sciences office (DSO).

THE CONCEPT OF THE ENHANCED SOLDIER

In browsing through the literature on the enhanced soldier, what stands out is the diversity of definitions adopted, the difficulties that authors seem to have in grasping its contours and defining its limits. In a 110-page study signed by a team of American researchers led by Patrick Lin, the definition is sixteen pages long.¹

Does it reflect embarrassment in the face of a concept that lacks coherence and is difficult to define? According to a definition that summarizes these studies, the enhanced soldier would be a healthy person who uses an artificial process, a chemical substance or a technical device to quantitatively and qualitatively push back his physical or psycho-cognitive capacities that are currently allowed by military selection, discipline, intensive training through repetition (drill), progressive immersion in the “*bubble of violence*”² in order to have a comparative advantage over the enemy. And this, beyond the human exception with exceptional physical and psycho-cognitive qualities.

Anchored in the historical use of psychoactive substances (opium, hashish, coca/cocaine) and then amphetamines,³ the horizon of anthropotechnics diversified in the early 2000s with neuroengineering, which includes neurostimulation and brain-machine interfaces (BMI). The first incarnation of anthropotechnics aims to optimize the human being. In this, it differs from therapy, which seeks to reduce a pathological state, bringing the subject back to the norm: health. There is a fine line between anthropotechnics and therapeutics. For example, promoting the psycho-cognitive resilience of the soldier, modulating a potentially traumatic memory by taking a beta-blocker such as propranolol combined with psychotherapy based on rewriting memories before its final memorization, is this an improvement or a repair? To know whether a substance, a technical device, can be qualified as anthropotechnical, in the absolute, it would be necessary to know its purpose, but also to understand its mode of action, its effects.

¹ Lin Patrick, Melman J. Maxwell and Abney Keith: “*Enhanced warfighters: risk, ethics, and policy*”, The Greenwall Foundation, 2013.

² Goya Michel : “*Sous le feu. La mort comme hypothèse de travail*”, Paris, Taillandier, 2014.

³ Kamienski Lukasz: “*Shooting up. A history of drugs and war*”, Oxford, OUP, 2016.

⁴ Arthur W. Brian: “*The nature of technology. What it is and how it evolves*”, London, Penguin, 2009.

In the near future, this primary psychopharmacology will be combined with pharmacogenetics,⁴ the choice of the substance, its dosage, will be based on the genotype of the soldier, and perhaps one day nanometric particles will deliver the active substance to the exact place in the body. From a holistic, undifferentiated, more or less dangerous approach, with adverse, uncontrolled effects, the use of psychopharmacology could shift to a more tailored, personalized form, with *targeted delivery*.

Upsetting the art of war, the military ethos, the soldier's habitus, the esprit de corps, enhancement raises doctrinal, legal, ethical, unprecedented and crucial questions. Far from being limited to the military sphere, to the theatre of operations, we can already imagine that it will affect society as a whole, for example in the case of a device decoupled from *military necessity*, whose reversibility is not controlled: a path explored in fiction by the novelist Andreas Eschbach in "*Der Letzte seiner Art*".⁵

A RECENT HISTORY

We must be wary of linear histories, of a posteriori reconstructions. If there is a common genealogy between the use of drugs in war and the enhanced soldier, this concept is recent. Indeed, at the beginning of the 21st century, there has been a *bifurcation* within anthropotechnics.

The fact that we talk openly about military enhancement, as we are doing now, and display research programs, as the DARPA does, in the form of almost provocation, bears witness to this bifurcation. It should be remembered that the ARPA (the d for Defence was added in 1972) was born during the Cold War from a shock: the placing in orbit of Sputnik in 1957, the first artificial satellite: a breach in American power.⁶ In a context of a balance of terror, the Soviets had not only set a decisive milestone in the conquest of space but also and above all announced a probable coupling of long-range ballistic missile technology and a thermonuclear bomb.

Established since 2009 in Arlington, Virginia, close to The Pentagon, DARPA, which enjoys relative independence and an annual budget of 3 billion dollars (the American defence budget is more than 600 billion), works closely with the academic and industrial community.

⁵ Eschbach Andreas: "*Der Letzte seiner Art*", Luebbe Verlagsgruppe, 2003.

⁶ Dickson Paul : "*Sputnik: The shock of the century*", New York, Walker Publishing Company, 2001; DARPA. Defense advanced research projects agency, 1958-2018, available at https://www.darpa.mil/attachments/DARAPA60_publication-no-ads.pdf, accessed 15 February 2020.

With a pragmatic approach,⁷ its mission is to maintain an advantage over the enemy at all costs by producing breakthrough technologies. The agency has thus contributed to the birth of the F-117 and Northrop B-2 Spirit stealth aircraft, the Predator UAV, the M16 rifle, the guided bullet, the GPS and Arpanet (the Agency's network of advanced research projects). Its mission is not only to encourage research, but also to anticipate the threat in order to avoid surprises.⁸ Stimulated by various imaginations, ARPA then DARPA was helped until 2002 by the Jason committee, a club of physicists and mathematicians founded in 1960 which produced many reports, including Human performance.⁹ Since 1993, it has been taking advice from SIGMA, a think tank of science fiction authors.¹⁰

It's from this *bifurcation* that took place in the United States, at the end of the 1990s, that the historiography relating to the use of drugs by the soldier was born, retroactively forging a genealogy of the enhanced soldier, from which he is partially cut off and which blurs the analysis. The lack of research interest in the study of military drug use until recently seems to support this hypothesis.¹¹

In 2002, in the report entitled *Convergence of technologies for improving human performance*, everything was already there.¹² Imbued with transhumanism, a philosophy based on the belief in unlimited techno-scientific progress, the latest avatar of the American technological utopia,¹³ this document acknowledges the need to instrumentalize a cross-potentialization between nano-bio-info and cognitive sciences (NBIC) in order to increase not only human performance but also American productivity.¹⁴ In this document,

⁷ Dugan E. Regina and Kaigham J. Gabriel: “*Special forces’ Innovation: How DARPA attacks problems*”, Harvard Business Review, October 2013, available at <https://hbr.org/2013/10/special-forces-innovation-how-darpa-attacks-problems>, accessed 15 February 2020.

⁸ DARPA. Defense advanced research projects agency, 1958-2018, op. cit.

⁹ JASON Defense Advisory Panel Reports, available at <https://fas.org/irp/agency/dod/jason/>, accessed 15 February 2020.

¹⁰ SIGMA – The science fiction think tank, available at <http://www.sigmaforum.org>, accessed 15 February 2020.

¹¹ Kamienski Lukasz: “*Why have military historians ignored drug use in the military*” History news network, 5 May, 2016 ; Kamienski Lukasz: “*Shooting up. A history of drugs and war*”, op. cit.

¹² Roco C. Mihail and Brainbridge S. William: “*Converging technologies for improving human performance*”, Arlington, June 2002.

¹³ Damour Frank and Doat David : “*Transhumanisme. Quel avenir pour l’humanité ?*” Paris, Le Cavalier Bleu, 2018, p. 29.

¹⁴ Roco C. Mihail and Brainbridge S. William: “*Converging technologies for improving human performance*”, op. cit. p. 1.

there is a small text signed by Michael Goldblatt then director of the Defense sciences office (DSO): the DARPA technical department most involved in research on the enhanced soldier.¹⁵ Biologist, Michael Goldblatt was recruited in 1999 on a project to develop self-sterilizing packaging for the battlefield and field hospitals.¹⁶ Michael Goldblatt personally declared himself in favour of transhumanist ideas, suggesting that he would do anything for his daughter touch by cerebral palsy.¹⁷

The dominant idea is that with technology, the soldier has become the *weakest link* in theatre, physiologically and cognitively. The objective is therefore to compensate for the soldier's biological vulnerabilities by providing him with super capabilities.¹⁸ By developing a *new frontier* within the DARPA which he places inside the body, Michael Goldblatt aims to produce a super-soldier.¹⁹ This bold approach is part of a biological orientation that began within the DARPA in 1998 with the Unconventional pathogen countermeasures program led by Dr. Shaun Jones, a former SEAL officer, whose task is to protect soldiers from an unconventional pathogen. This initial research, according to Michael Goldblatt, consists of protecting the soldier against the unknown and even the unknowable by discovering the mechanisms common to all pathogens.²⁰

Shortly before the September 11, the United States had been hit by numerous attacks.²¹ The biological threat was ubiquitous, as shown in the military scenario called Dark Winter of June 2001, which simulates a large-scale

¹⁵ Goldblatt Michael: “*DARPA’s programs in Enhancing human performance*”, in Roco C. Mihail and Brainbridge S. William, op. cit., p. 337.

¹⁶ Jacobsen Annie: “*The Pentagon’s brain. An uncensored history of Darpa, America’s top secret military research agency*”, NY, Back Bay books/Little, Brown and Company, 2015, p. 309.

¹⁷ Ibid., p. 312.

¹⁸ Goldblatt Michael: “*DARPA’s programs in Enhancing human performance*”, in Roco C. Mihail and Brainbridge S. William, op. cit., p. 337.

¹⁹ Jacobsen Annie: “*The Pentagon’s brain. An uncensored history of Darpa, America’s top secret military research agency*”, op. cit., p. 308.

²⁰ Travis John: “*Interview with Michael Goldblatt, Director Defense Sciences Office, DARPA, Biosecurity and bioterrorism: biodefense, strategy, practice, and science*”, vol. 1, no 3, 2003, p. 156, available at <https://www.ncbi.nlm.nih.gov/pubmed/15040193>, accessed 6 March 2020; See also Miller Judith, Engelberg and Broad William: “*Future germs defenses, Bioterror*”, November 2001, available at <https://www.pbs.org/wgbh/nova/bioterror/germs.html>, accessed 6 March 2020.

²¹ The 9/11 commission report. Final report of the National Commission on terrorist attacks upon the United States. Executive summary, 2003 available at https://govinfo.library.unt.edu/911/report/911Report_Exec.pdf, accessed 6 March 2020.

anthrax attack.²² It is with the budgets devoted to biological warfare,²³ and then those aimed at responding to the difficulties encountered by soldiers in Afghanistan and Iraq, that DARPA will finance programs aimed at producing a radical change for the soldier. After having worked for 30 years on armaments, it's human's turn to go through the DARPA *spirit* filter, an agency whose essence is not to produce incremental research but necessarily radical, disruptive.

A PROGRAMMATIC MATRIX

From the end of the 1990s, the DARPA rolled out programs which were both optimization and enhancement, and whose research axes still condition the contemporary approach. Fueled by new questions, these programs are opening up new avenues in anthropotechnics. Their common denominator is to be led by iconoclastic researchers, recruited for three to four years, who approach the super soldier, from a biological angle on different scales by reversing perspectives.²⁴ In this approach, which appears consequentialist, what matters is to keep the soldier alive, to give him every chance to go home, to find back those who cherish him.²⁵

For example, the program Persistence in Combat (PIC), launched in 2002, aims to make a radical change: allow the soldier to take control of his pain and stop hemorrhage. Under the tutelage of Navy commander and doctor Kurt Henry, this research is done in collaboration with Rinat Neuroscience corporation, a Silicon Valley company. Within this program, neurologist Harry T. Whelan, attached to the Medical College of Wisconsin, works on the rapid repair of damaged tissue by exploring a new technique of wound healing by exposure to infrared light : photo-biomodulation.²⁶

²² The dark winter scenario and bioterrorism. Hearing before the subcommittee on emerging threats and capabilities of the committee on armed services United States Senate, One hundred seventh congress. First session, October 25, 2001, available at <https://www.govinfo.gov/content/pkg/CHRG-107shrg79479/html/CHRG-107shrg79479.htm>, accessed 6 March 2020.

²³ Jacobsen Annie: “*The Pentagon’s brain. An uncensored history of Darpa, America’s top secret military research agency*”, op. cit., 2015, p. 308.

²⁴ Garreau Joel: “*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*”, NY, Doubleday, 2005, p. 42-43.

²⁵ Ibid., p. 43.

²⁶ Ibid., p. 27; Manzocco Roberto: “*Transhumanism - Engineering the human condition. History, philosophy and current status*”, Chichester, Springer Praxis Books, 2019, p. 174 ; Defense advanced research projects agency, Fact file. A compendium of DARPA Programs, August 2003, p. 47, available at <https://www.hSDL.org/?view&did=440746>, accessed 3 March 2020.

On another side, the Continuous assisted performance program (CAP), launched in 2002 by neuropharmacologist and founder of Centaur Pharmaceuticals John Carney, aims to extend the soldier's physical and cognitive activity for 7 days, without sleep (24/7), by optimizing training, the use of new pharmacological substances and devices. Unlike *classic* brain stimulations based on the intake of caffeine and amphetamines, the program does not aim to stimulate wakefulness, but rather to reduce the need for sleep while accentuating cognitive activity of the soldier. It is explicitly a matter of changing the “*operational tempo*”.²⁷ By this reasoning we went from optimization to enhancement. Within the framework of this research, investigations are carried out on animals in particular dolphins and whales which have the reputation of never sleeping; within the framework of this research, investigations are carried out on animal in particular dolphins and whales which have the reputation of never sleeping: substances such as ampakines which would promote attention, alertness, memory, or modafinil are tested but as well new devices such as transcranial magnetic stimulation (TMS) which reduces fatigue.²⁸ John Carney has also been the director, since 2000, the Unconventional pathogen countermeasures program (UPC), whose mission, as we have seen, is to make the soldier's immune system invulnerable by finding similarities in the genomes of pathogens as different as the bacteria responsible for anthrax, or strains of malaria, make them harmless.²⁹

²⁷ Garreau Joel: “*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*”, op. cit. p. 28 ; Cray Jonathan: “*24/7. Late capitalism and the ends of sleep*”, New York, London, Verso, 2013, p. 2 ; Defense advanced research projects agency, Fact file. A compendium of DARPA Programs, op. cit., p. 46 ; Bielitzki Joe (DSO), Enhancing human performance, available at https://www.esd.whs.mil/Portals/54/Documents/FOID/Reading%20Room/DARPA/15-F-1424_Enhancing_Human_Performance.pdf, accessed 3 March 2020.

²⁸ Defense advanced research projects agency, Fact file. A compendium of DARPA Programs, op. cit., p. 46; Manzocco Roberto: “*Transhumanism - Engineering the human condition. History, philosophy and current status*”, op. cit., p. 173 ; Tether Tony: “*Subcommittee on terrorism, unconventional threats and capabilities*”, House Armed Services Committee, U.S. House of Representatives, March 27, 2003 p. 12, available at [https://www.darpa.mil/attachments/TestimonyArchived\(March%2027%202003\).pdf](https://www.darpa.mil/attachments/TestimonyArchived(March%2027%202003).pdf), accessed 6 March 2020; Jacobsen Annie: “*The Pentagon's brain. An uncensored history of Darpa, America's top secret military research agency*”, op. cit., 2015, p. 310.

²⁹ Garreau Joel: “*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*”, op. cit., p. 30.

Even more ambitious is the Metabolic Dominance program. Begun in 2003,³⁰ it's directed by zoologist and triathlete Joseph Bielitzki. After a first experience as a veterinarian in a zoo, Joseph Bielitzki worked for NASA, then was recruited by the DARPA to conduct research on human strength and endurance. In the specific context of the war of Afghanistan (2001-2014), then of Iraq (2003-2011), it's a question of accompanying the transition of young recruits towards more rusticity, helping them to face a theater of particularly hostile operation.³¹ Unprecedented difficulties which echo the revelations of the Afghanistan papers which show that the soldiers deployed in this place encountered unexpected difficulties due to a lack of knowledge of the enemy, of the terrain but also the absence of strategies and objectives.³²

Faced with these new problems, a new set of questions emerges: what is the right amount of daily calories necessary for the soldier so that he can accomplish his task without being tired? What does the soldier need when he is in combat? How to get the best energy for him? In general, this program aims to optimize the soldier's metabolic performance, his energy performance and associated his emotional stability on different scales: nutritional, intracellular. Regarding nutrition, Joseph Bielitzki develops questions of this type: how much energy does a special forces soldier spend per day, 7000 calories? According to the Continuous assisted performance program, if the soldier is not sleeping, he will need 12,000 calories per 24 hours. Instead of ingesting such an amount of energy, why not suppress the calorie intake and use the one already present in the body? At the granular level, this program attempts to optimize mitochondrial activity, to multiply the *energy centers* of the muscle cells, to identify the causes of fatigue and to stimulate energy production.³³ Referring to the US Army's slogan

³⁰ Ibid., p. 32 ; Defense advanced research projects agency, Fact file. A compendium of DARPA Programs, op. cit, p. 47.

³¹ Olonan Zhill: "*Military development of ketone esters for enhancing performance ft. Joe Bielitzki*", May 10, 2018, available at <http://blog.hvmn.com/podcast/episode-67-military-development-of-ketone-esters-for-enhancing-performance-ft-joe-bielitzki>, accessed 3 March 2020.

³² Whitlock Graig: "*At war with the truth. The Afghanistan papers. A secret history of war*", Washington Post, December 9, 2019, available at <https://www.washingtonpost.com/graphics/2019/investigations/afghanistan-papers/afghanistan-war-confidential-documents/>, accessed 3 March 2020.

³³ Garreau Joel: "*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*", op. cit., p. 32-33.

of the 1980s and 1990s, Joseph Bielitzki has an expression: “*Be all that you can be*”, to which he added “*and much more*”.³⁴

In this initial matrix, one approach is at odds with the Brain-machine interface program. Its successive leaders have the ambition to give rise to new technologies to increase the soldier’s performance via access to their neural signatures, coupling the brain to peripheral technical devices³⁵ to enable *teleoperation*, such as taking control of an exoskeleton or a fighter plane, but also to communicate through thought between soldiers.³⁶ Within the framework of this program, in 2002 the DSO approached specialists in neuroengineering, which was still emerging. A partnership was established with several laboratories.³⁷

AN ACCULTURATED CONCEPT

Originating in the United States of America, the concept of the enhanced soldier, with a variable incubation period, has gradually spread to other countries and is subject to acculturation. In France, it was mentioned in 2010 by the Institute for Strategic Research (irsem, Paris) in reference to the report *Converging Technologies for Improving Human Performance*.³⁸ From 2015, an exploration has been initiated by Saint-Cyr Military Academy and its research centre (CREC); it has taken shape in 2017, during a study day.³⁹ Some surveys among some French officers show resistance, even fierce opposition to this modulation of anthropotechnics, which contrasts with a first optimization based almost exclusively on psychopharmacology, an aversion even for a soldier perceived as dehumanized, instrumentalized for an end.

³⁴ Olonan Zhill: “*Military development of ketone esters for enhancing performance ft. Joe Bielitzki*”, op. cit.

³⁵ Defense advanced research projects agency, Fact file. A compendium of DARPA Programs, op. cit. p. 46; Garreau Joel: “*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*”, op. cit., p. 36.

³⁶ Jacobsen Annie: “*The Pentagon’s brain. An uncensored history of Darpa, America’s top secret military research agency*”, op. cit., p. 311.

³⁷ Duke University: “*Darpa to support development of human brain-machine interfaces*”, Science Daily, August 21, 2002, available at <https://www.sciencedaily.com/releases/2002/08/020820071329.htm>, accessed 3 March 2020.

³⁸ Vincent Jean-Didier, Colin Agnès: “*Augmentation des performances humaines avec les nouvelles technologies: Quelles implications pour la défense et la sécurité*”, Travaux de l’IRSEM II : Club de réflexion et de recherche stratégique de l’IRSEM, rapport final, March 2010 ; Agnès (dir.): “*L’homme augmenté, réflexion sociologique pour le militaire*”, IRSEM, Paris, March 2016.

³⁹ CREC: “*Le soldat augmenté. Les besoins et les perspectives de l’augmentation des capacités du combattant*”, Actes enrichis de la journée d’études du 19 juin 2017 au ministère des Armées, Paris, Les Cahiers de la défense. Revue Défense Nationale, 2018.

On hearing it, one cannot help but be struck by the singularity of the French Army in relation to the American concept, the importance given to the physical resistance of the soldier, his mental resilience, his cohesion, the surpassing of oneself by a collective, the legal surpassing and the deep entanglement between body, mind and soul; in a word, the persistence of metaphysics, of humanistic, religious values, perhaps, which contrasts with the consequentialist approach of the United States, which, at least in appearance, has as its end, exclusively the advantage over the adversary, whatever the means. A French approach, hitherto largely conditioned by budgetary constraints that prevent the practice of a serendipity that could produce technological breakthroughs.

How can we explain DARPA's outbidding, as its director, Steven Walker, recently did when he stated that the agency was working, through the editing of the genome, on targeted manipulations of the soldier, modifying his genetics to make him resistant to diseases and biological and chemical agents?⁴⁰ Is there a desire to neutralize the power game? Does the French Army need to fear downgrading?

In Russia, the concept of the enhanced soldier, if it exists, is very recent. In October 2017, President Vladimir Putin announced the forthcoming arrival of a genetically modified soldier who “*will be able to fight without fear, compassion, regret and pain*”.⁴¹ A statement that echoes the release of the Russian film *Guardians*, which features soldiers whose appearance has been altered by genetics.⁴² In February 2019, the magazine of the Ministry of Defence *Armeisky Sbornik* suggested that the Russian Army had super-soldiers capable of using parapsychology to destroy enemy computers remotely, to read thoughts, but also to understand documents locked in safes, without knowing the language of the text.⁴³ Is the concept of enhanced soldier relevant to less ethically constrained China?

⁴⁰ Lopez C. Todd: “*Darpa director talks promise of life sciences research*”, US Dept of defense, September 24, 2019, available at <https://www.defense.gov/Explore/News/Article/Article/1969741/darpa-director-talks-promise-of-life-sciences-research/>, accessed 3 March 2020.

⁴¹ Smith Oli: “*Worse than nuclear bombs! Putin reveals terrifying sci-fi weapon amid world war fears*”, Express, Home of the Daily and Sunday Express, October 23, 2017, available at <https://www.express.co.uk/news/world/869678/Vladimir-Putin-Russia-super-soldiers-nuclear-bombs>, accessed 5 March, 2020.

⁴² Andreasyan Sarik: “*Guardians*” (Защитники, Zashitniki), 2017.

⁴³ Poroskov Nikolai: “*СУПЕРСОЛДАТ ДЛЯ ВОЙН БУДУЩЕГО СУПЕРСОЛДАТ ДЛЯ ВОЙН БУДУЩЕГО*”, *Armeisky Sbornik*, February 2019, p. 86-90, available at http://sc.mil.ru/files/morf/military/archive/AS_02_2019.pdf, accessed 5 March, 2020.

EXTENDING THE LIMITS OF THE SOLDIER, EXCEED THEM

For a long time, anthropotechnics consisted of taking control of the soldier's chemistry by means of a vector. The aim was to optimize his physiological and psycho-cognitive capacities by stimulating his alertness, attention, concentration and will, as was the case from the 1930s onwards with amphetamines such as pervitine, benxedrine and then dexedrine.⁴⁴ In this vein, the use of modafinil, an *awakener* diverted from its therapeutic dimension, which also promotes vigilance, appeared to be more effective. Unlike amphetamines, which can cause dependence, nervousness, and anxiety, modafinil has fewer side effects. The challenge for psychopharmacology is to control the side effects. Ideally, a thorough knowledge of the subject would make it possible to avoid, on the one hand, weakening the soldier instead of optimizing him, but also adding uncertainty to a group of combatants registered in a chain of command and mobilized for a specific objective.

The personalization of the optimization coupled with a true informed consent of the soldier would facilitate the work of the military doctor, who is divided between medical ethics and military action.⁴⁵ Since Operation Harmattan (Libya) in 2011, the French Army has been using extended-release caffeine, a functional food that helps circumvent a potential dependency associated with amphetamines, which are now considered narcotics.⁴⁶

Since the early 2000s, the optimization of the soldier, anchored in therapeutics, has been put into perspective by neuroengineering. In contrast to psychopharmacology, it's claimed to be anthropotechnical from the outset.⁴⁷ With neuroengineering, we are witnessing a conceptual leap that no longer consists in pushing the limits of the soldier, but in exceeding them; we are in a discontinuity.

⁴⁴ Kamienski Lukasz: "Shooting up. A history of drugs and war", op. cit.

⁴⁵ Bouvet Renaud: "The role of the medical officer in the soldiers' enhancement", European journal of health law, no 26, 2018, p. 590, available at https://brill.com/view/journals/ejhl/25/5/article-p587_8.xml?language=en, accessed 3 March 2020.

⁴⁶ Bobbera C.: "Optimiser la vigilance du combattant", ministère des Armées, available at <https://www.defense.gouv.fr/actualites/articles/optimiser-la-vigilance-du-combattant>, accessed 3 March 2020 ; see also Beaumont M.: "Gestion de la vigilance au poste de travail : intérêt de la caféine à libération prolongée", Médecine du sommeil, vol. 3, no 9, September 2006, p. 19-24, available at <https://www.em-consulte.com/en/article/201696>, accessed 3 March 2020.

⁴⁷ Hetling John: "Comment on what is neural engineering?" Journal of neural engineering, vol. IV, 2008, p. 360 in Dorian Neerdael: "Une puce dans la tête. Les interfaces cerveau-machine qui augmentent l'humain pour dépasser ses limites", Paris Fyp, 2014, p. 33-34.

Stemming from the information paradigm, initiated by cybernetics, which bridges the biological and the artifact, the human and the machine,⁴⁸ its objective is to manipulate the brain of the patient or the healthy person. Polymorphic, neuroengineering is embodied in neurostimulation and brain-machine interfaces (BMI).

Neurostimulation can be external (non-invasive) or internal (invasive), temporary or permanent, passive or active. In its external dimension, it includes three approaches: magnetic (TMS), electrical (TDCS) or with the use of ultrasound (Transcranial focused ultrasound-TFUS). Transcranial magnetic stimulation consists of subjecting certain areas of the brain to a magnetic pulse that modifies the activity of neurons. Transcranial direct current stimulation works by means of electrical impulses. These two techniques have in common that they stimulate the superficial part of the brain, no more than 2 centimeters deep. The TMS can be used punctually to fight against tiredness, both would have virtues to stimulate memory and learning. Transcranial focused ultrasound, on the other hand, is associated with the use of magnetic resonance imaging (MRI) to direct ultrasound waves precisely to an area of the brain. Unlike magnetic and electrical techniques, it works in depth and with great precision.⁴⁹ For a few years now, DARPA has been trying to develop helmets equipped with this device.

Besides this external approach, the invasive internal deep brain stimulation (DBS) consists in activating or inhibiting a part of the brain via an implant. Associated with a growing medical spectrum, it could stimulate memory and learning.⁵⁰ Invasive, the risks of infection, epilepsy and stroke are to be feared.⁵¹

In addition to these neurostimulation devices, there are brain-machine interfaces (BMI) that literally connect the human in contact with the machine. The first milestones were set with the recording of the electrical activity of the brain by the German neurologist and physician Hans Berger in 1924.⁵²

⁴⁸ Lafontaine Céline: *“L’empire cybernétique. Des machines à penser à la pensée machine”*, Paris, Seuil, 2004 ; see also Arturo Rosenblueth, Norbert Wiener and Julian Bigelow: *“Behavior, purpose and teleology”*, Philosophy of science, no 10, 1943, p. 18-24.

⁴⁹ Landhuis Ester: *“Des ultrasons pour guérir le cerveau”*, Cerveau & psycho, no 104, October 24, 2018, available at <https://www.cerveauetpsycho.fr/sd/medecine/des-ultrasons-pour-guerir-le-cerveau-14962.php>, accessed 3 March 2020.

⁵⁰ *“Les grandes avancées - La stimulation cérébrale profonde : une petite révolution”* (interview de Pierre Pollak, pionnier de l’usage de la SCP, avec Alim-Louis Benabib), Inserm, 2014.

⁵¹ Vidal Catherine: *“Nos cerveaux resteront-ils humains ?”* Paris, Pommier, 2019, p. 47.

⁵² Berger Hans: *“Über das Elektroencephalogramm des Menschen”*, Archiv für psychiatrie und nervenkrankheiten, n° 87, 1929, p. 527-570.

Brain-machine interfaces lie at the intersection of computer science and neurophysiology. Although the first work dates back to the 1970s,⁵³ the first invasive brain-machine interfaces, which make it possible to extract information from an animal and human brain, were carried out in the United States at the end of the 1990s by several teams of researchers.

In just a few years, the evolution has been dazzling. In 1997, John K. Chaplin (Hahnemann School of Medicine, Philadelphia) and Miguel Nicolelis (Duke University Medical Center) developed a BMI that allows rats to activate a lever by thought to obtain water (the article is dated 1999).⁵⁴ In 1998, an invasive brain-machine interface designed by Philip Kennedy and Roy Balay (Emory University, Atlanta) gave a person with locked-in syndrome the ability to move a cursor on a screen.⁵⁵ In 1999, a non-invasive device produced by Niels Birbaumer gave a person with the same syndrome the capacity for writing words using a word processor.⁵⁶

In 2002, DARPA made several million dollars available to Miguel Nicolelis and Craig Henriquez⁵⁷ to develop a device that allows a female macaque named Aurora to take control of an arm and then a pair of robotic legs by thought.⁵⁸ Already, in 2000, the two researchers had developed an experiment described as telekinesis (tele, far, remotely, kinētikós, set in motion) sponsored by the DARPA⁵⁹ that allowed another macaque named Belle to take control of two robotic arms through thought, one in their laboratory, at Duke University

⁵³ Vidal J. Jacques: “*Toward direct brain-computer communication*”, *Annu Rev Biophys Bioeng*, no 2, 1973, p. 157.

⁵⁴ Nicolelis Miguel: “*Beyond boundaries: the new neuroscience of connecting brains with machines and how it will change our lives*”, New York, Time Book and Henry Holt and Compagny, 2011, p. 134 ; Chaplin K. John et al.: “*Real-time control of a robot arm using simultaneously recorded neurons in the motor cortex*”, *Nature neuroscience*, vol. 2, no 7, July, 1999, p. 664-670.

⁵⁵ Kennedy Philip and Roy Balay: “*Restoration of neural output from paralyzed patient by a direct brain connection*”, *Neuroreport*, vol. IX, no 8, June 1, 1998, p. 1707-1711.

⁵⁶ Birhaumer Niels et al.: “*A spelling device for paralyzed*”, *Nature*, no 398, 1999.

⁵⁷ Duke University: “*DARPA to support development of human brain-machine*”, August 21, 2002, available at <https://www.sciencedaily.com/releases/2002/08/020820071329.htm>, accessed 5 March, 2020.

⁵⁸ Neerdael Dorian: “*Une puce dans la tête. Les interfaces cerveau-machine qui augmentent l'humain pour dépasser ses limites*”, op. cit., p. 106 ; Carmena M. Jose et al.: “*Learning to control a brain-machine interface for reaching and grasping by primates*” *Plos biology*, October 13, 2003.

⁵⁹ Garreau Joel: “*Radical evolution. The promise and peril of enhancing our minds, our bodies – and what it means to be human*”, op. cit., p. 19.

and the other, via the Internet, at the Massachusetts Institute of Technology (MIT), more than 600 miles away.⁶⁰ The challenge of this experiment was to detect the electrical activity of a sample of about 100 cortical neurons distributed 300 milliseconds before a motor action, then amplify, filter and convert this signal into a motor *trajectory*. With this interconnection, it's possible to take control of exosomatic devices (exo: outside and soma: body) by thinking like a swarm of drones, an exoskeleton, a fighter plane; the dream of an extension of the body becomes possible. In 2011, with a brain-machine-brain interface (BMBI), a rat equipped with an implant was not only able to communicate information to a machine (extraction) but also to receive some through brain stimulation (communication). With this kind of device, a robotic arm can provide a tactile sensation like the texture of an object: the exosomatic becomes sensory.⁶¹ Even more extraordinary, in 2013, this time with a brain-to-brain interface (BTBI), Miguel Nicolelis succeeded in extracting and sending rudimentary information between two rats equipped with electrodes.⁶² Almost simultaneously, a brain-to-brain communication linked a man and a rat, then two men from Harvard Medical School (Boston)⁶³ and the University of Washington (Seattle).⁶⁴ In both cases, the aim was to extract information from subject A via a non-invasive headset, relay it via the Internet and communicate it to subject B by transcranial magnetic stimulation (TMS).

Born in the early 2000s, optogenetics, which consists of genetically modifying neuronal cells to produce light-sensitive proteins, appears to be the future of BMI. With this new sensitivity, it will become possible to take control of the activity of a neuronal sub-population with a light beam by exciting or inhibiting them. Equipped with a better spatiotemporal resolution, this combinatorial technique would not affect neighboring cells and would thus optimize neurofeedback.

⁶⁰ Wasseberg Johan et al.: “*Real-time prediction of hand trajectory by ensembles of cortical neurons in primates*”, *Nature*, November 16, 2000, p. 361-365.

⁶¹ O’Doherty Joseph et al.: “*Active tactile exploration using a brain-machine-brain interface*”, *Nature*, no 479, 2011, p. 228-231.

⁶² Pais-Viera Miguel: “*A brain-to-brain interface for real-time sharing of sensorimotor information*”, *Scientific reports*, vol. 3, no 1319, 2013.

⁶³ Grau Carles et al.: “*Conscious brain-to-brain communication in humans using non-invasive technologies*”, *Plos one*, August 19, 2014.

⁶⁴ Rao P.N. Rajesh et al.: “*A direct brain-to-brain interface in humans*”, *Plos one*, November 5, 2014.

THE ENHANCED SOLDIER AS A MIRROR

What if one of the ultimate goals of the enhanced soldier was his physical disappearance from the theatre of operations? An answer to the so-called Vietnam War syndrome: the fear that the United States has become too weak to risk the lives of its soldiers, and that the wounded and the dead could turn civil society against the war.⁶⁵ In 2001, the philosopher Jean Baudrillard pointed out that by putting their lives on the line to kill, terrorists had revealed America's Achilles' heel: the difficulty of exposing its soldiers.⁶⁶

Media specialist William Merrin sees with the BMI, after the drone, a further step towards the *telepresence* of the soldier via the use of a substitute robot.⁶⁷ A concept present in fiction in the films *Avatar* or *Surrogates* for example.⁶⁸ While telepresence can offer the possibility of carrying out a reconnaissance mission in hostile terrain without exposing a soldier's life, one may be more skeptical about its ability to offer the possibility for an army to impose its will on the enemy, to win a conflict.⁶⁹ Technological solutionism? We can already imagine that this presence/absence will pose unprecedented problems, that it will require retro-evolution.⁷⁰

Isn't this man/machine interconnection the mirror of a loss of control, the expression of a technological counter-productivity threshold? The symptom of an emerging vulnerability linked to an unbridled quest for technological power. A threat described by the American General John Allen by the concept of hyperwar. A war inscribed in a super-fast machine temporality, with largely automated devices, mediated by an artificial intelligence with autonomous functions.⁷¹

⁶⁵ Merrin William: "*Chap 12, Augmented War*" in *Digital war. A critical introduction*, London, Routledge, 2018.

⁶⁶ Baudrillard Jean and Derrida Jacques: "*Pourquoi la guerre aujourd'hui?*", controverse présentée, animée et actualisée par René Major, Fécamp, Nouvelles éditions lignes, 2015 ; Baudrillard Jean: "*L'esprit du terrorisme*", *Le Monde*, November 3, 2001.

⁶⁷ Tennison N. Michael and Moreno D. Jonathan: "*Neuroscience, ethics, and national security: the state of the art*", op. cit. p. 2 ; see also Merrin William: "*Chap 12, Augmented War*" in *Digital war. A critical introduction*, op. cit.

⁶⁸ Cameron James: "*Avatar*", 2009; Mostow Johnathan: "*Surrogates*", 2009 (based on the 2005-2006 comic book series *The surrogates*, Robert Venditti).

⁶⁹ Merrin William: "*Chap 12 : Augmented War*", in *Digital war. A critical introduction*, op. cit.

⁷⁰ Michel Goya: "*Du bon usage du soldat augmenté*", *Inflexion*, no 32, 2017.

⁷¹ Allen R. John (Gen) and Husain Amir: "*On hyperwar*", *Proceedings Magazine*, vol. 143, July 2017, available at <https://www.usni.org/magazines/proceedings/2017/july/hyperwar>, accessed 5 March, 2020 ; see also Allen R. John (Gen): "*Hyperwar is coming*", available at https://www.youtube.com/watch?v=ofYWf2SKd_c, accessed 5 March 2020.

Here, the soldier as *weak link* takes on a systemic color: a system from which humans could be expelled. From this perspective, the strengthened soldier appears as a counter-effect of technological development, a necessary adjustment to the asymmetry that technology allows on the adversary. In other words, the soldier, forced to adapt, is determined by the machine. With this reversal, the US Army is faced with a double technological constraint: an implicit machinic constraint, which comes from within, which is associated with its own power, and an explicit constraint, external this time, that of the potential enemy.

CONCLUSION

The concept of the enhanced soldier is part of the genealogy of a thwarted power. It originated in the United States in the late 1990s in response to a new vulnerability: the potential use of a biological weapon against the soldier. As a counterpoint, within the DARPA, whose essence is to produce breakthrough technologies, a research has crystallized which consists in making the immune system of the soldier invulnerable. In a context of technological revolution, nourished by transhumanist promises, but also by new military challenges associated with new theatres of operations, the concept has gradually taken shape. At this point, the first anthropotechnical effort to push back the limits of the human bifurcates for a new direction: the emancipation of these same limits. The concept of the enhanced soldier is now underpinned by the need to adapt the human organism to the machine system. A grammar that opens up new biological holds, new connections with the artifact. While this concept of the enhanced soldier is subject to acculturation according to military values and beliefs, one denominator persists in all its expressions: being a revealer. Indeed, behind the exhibition of omnipotence, necessarily illusory, the place, the target of the enhanced soldier reveals where vulnerability lies.

HUMAN ENHANCEMENT

A EUROPEAN ETHICAL PERSPECTIVE

Ioana Maria Puscas,
Research Officer, Geneva Centre for Security Policy.

MILITARY human enhancement technologies represent a future reality for the armed forces. A study commissioned by the European Defence Agency (EDA) in 2018 refers to the *enhanced soldier* as one of the *future capabilities requirements* for national defence organisations.¹ However, the report forewarns that “*the use of these technologies will be limited by the ethical and legal constraints of the day*”.²

Establishing legal and ethical constraints on military human enhancement will be a complicated task, at times going to the very heart of the meaning of the military profession. This paper provides an overview of the major ethical challenges of enhancement technologies in select European countries. The focus will be on areas of military ethics where enhancements are likely to prove problematic and will thus raise challenging questions for military values. This focus certainly does not imply that human enhancement exclusively poses ethical problems: in some instances, better performance on the battlefield may reflect not only in higher chances of operational success but also in greater compliance with international law.

MILITARY HUMAN ENHANCEMENT – DEFINITION AND EXAMPLES

Human enhancement is defined as the “*biomedical interventions that are used to improve human form or functioning beyond what is necessary to restore or sustain health*”.³ This standard definition of human enhancement, established in the foundational literature in the late 1990s, distinguishes enhancement from treatment, and, in the words of Eric Juengst, sets enhancement apart as a “*moral boundary concept*”.⁴ Enhancements mark “*the limits of professional obligations to pursue biomedical interventions*” and that is because – unlike treatment – enhancement interventions “*do not respond to legitimate medical needs*”.⁵

¹ European Defence Agency: “*Exploring Europe’s capability requirements for 2035 and beyond*”, June 2018, 21-25, <https://www.eda.europa.eu/docs/default-source/brochures/cdp-brochure--exploring-europe-s-capability-requirements-for-2035-and-beyond.pdf>

² Ibid.

³ Eric Juengst and Daniel Moseley: “*Human enhancement*” <https://plato.stanford.edu/entries/enhancement/>

⁴ Eric Juengst: “*What does enhancement mean*”, in Erik Parens (ed): “*Enhancing Human Traits: Ethical and Social Implications*” (Georgetown University Press: Washington DC, 1998), 29.

⁵ Ibid. 31.

The distinction between treatment and enhancement is not always clear-cut, and there are numerous ambiguities and controversies that can make the line between the two blurry. Nevertheless, and in the context of the present discussion, this definition provides a useful starting point for qualifying what separates standard medical care from interventions that enhance physical and cognitive abilities “*beyond the typical level or statistical range of functioning for humans, generally speaking*”.⁶ Simply put, while treatment restores lost functions, and thus brings the patient back to *normal functioning*, enhancement interventions depart from *normal functioning* to confer extra abilities and strengths (above the typical level for humans of the same size, age, build etc, or above the personal unenhanced abilities of the individual).

The military interest in human enhancement is hardly surprising, as well as easy to justify from an operational standpoint. As outlined in an unclassified document from the US Defence Advanced Research Projects Agency (DARPA) from 2003, one of the fundamental goals of the Enhanced Human Performance project was to prevent soldiers from becoming *the weakest link* in the US military.⁷

Militaries have always been interested in *enhancement* for their soldiers and the idea of boosting soldiers’ physical abilities, vigilance, resilience and mood is as old as the history of warfare. For example, coca leaves were widely consumed by Inca warriors for their energizing properties. Some indigenous Siberian groups in the 18th century consumed mushrooms known for their psychoactive properties. The Zulus fighting against the colonial British army were given psychoactive plants and herbs by their shamans, especially an extract of intezezi, a traditional plant known for its mood-boosting property, and dagga, a South African version of cannabis – both of which contributed to their *vicious “method of fighting”*.⁸

Psychostimulants were widely used for military purposes in the 20th century. Both Nazi Germany and Japan supplied extensive amounts of methamphetamines to soldiers and military personnel, and the British approved amphetamines for combating fatigue.

⁶ Patrick Lin: “*Ethical Blowback from Emerging Technologies*”, Journal of Military Ethics 9:4, 317 <https://www.tandfonline.com/doi/pdf/10.1080/15027570.2010.536401?needAccess=true>

⁷ Statement by Tony Tether (DARPA) to the Subcommittee on Terrorism: “*Unconventional Threats and Capabilities*”, 27 March 2003, 12, [https://www.darpa.mil/attachments/TestimonyArchived\(March%2027%202003\).pdf](https://www.darpa.mil/attachments/TestimonyArchived(March%2027%202003).pdf)

⁸ See Lukasz Kamiński: “*Shooting Up. A Short History of Drugs and Warfare*” (New York: Oxford University Press, 2016) .

Drug consumption reached unprecedented levels during the Vietnam War, when according to a 1971 report by the House Select Committee on Crime, between 1966 to 1969, armed forces used 225 million tablets of stimulants, mostly a derivative of amphetamine called dextroamphetamine (sold as Dexedrine). For instance, a typical medical kit for a 4-day mission for soldiers infiltrating in Laos contained, among others, 12 tablets of Darvon (a painkiller), 24 tablets of codeine (an opioid) and six pills of Dexedrine; for longer and more demanding missions, members of special units received additional steroid injections.⁹

MILITARY HUMAN ENHANCEMENT TODAY

Stimulants in the form of drugs continue to be used today, although in recent decades, the focus has considerably shifted towards technological approaches and techno-integration, which is defined as “*the symbiotic coupling of humans with technology to amplify human physical and cognitive capabilities*”.¹⁰

First, a brief look at some current pharmacological approaches to enhancement. In addition to dextroamphetamines, which continue to be prescribed in limited situations, newer classes of drugs have become more prominent. One of these is the ampakines, which have been researched for several years (yet, the military use is not entirely certain at this point) for their effective ways to counter the negative effects of sleep deprivation.¹¹

Other drugs, such as methylphenidate (Ritalin) and modafinil are used as cognitive enhancers and stimulants. Ritalin is mainly prescribed for ADHD, and in healthy adults it has been shown to enhance several cognitive functions, such as spatial working memory and planning. The long-term effects are not entirely clear. Modafinil, a psychostimulant first created in the 1970s, promotes wakefulness and it appears to be a safer alternative comparative to other drugs, showing fewer side effects and lower abuse potential.

⁹ Keating Susan Katz: “*Flying on Amphetamines is no Departure from Tradition*”, Washington Times, 22 August 1988: 18-19, quoted in Ł. Kamiński, op.cit. 189.

¹⁰ Stefan Reschke et al: “*Neural and Biological Soldier Enhancement: From SciFi to Deployment*”, presented at RTO Symposium on Human Performance Enhancement for NATO Military Operations, Sofia, Bulgaria, on 5-7 October 2009, 3, <http://ii.tudelft.nl/oud/?q=node/9567>

¹¹ Tether, 12.

Tests have shown that modafinil enhances pattern recognition, spatial planning and reaction time in sleep-deprived individuals.¹² Modafinil has been prescribed in the military for many years, especially for pilots, and for missions over eight or twelve hours; successive studies have shown the effectiveness of modafinil in maintaining alertness, cognitive function, risk perception and a feeling of well-being for as long as 40-h periods of sustained wakefulness.¹³ It comes as no surprise that Western militaries have procured large quantities of “*stay-awake*” pills. Reportedly, in France, modafinil, sold under the brand name Virgyl, was first purchased in 1991, during the Gulf War, under the promise it would keep troops awake for up to 72 hours.¹⁴ An investigation in 2004 showed that just in the previous six years (since 1998), the UK MoD had purchased around 24,000 tablets of Provigil (brand name for modafinil).

Interest and funding in technological approaches to enhancement have soared in recent years, with important innovations underway. One key approach is neurostimulation with electricity (which has been used for a long time in the treatment of certain disorders). Stimulating specific areas of the brain can lead to increased performance, attention, alertness; conversely, it can also be used to suppress or inhibit certain functions. For example, tested in military settings, transcranial direct current stimulation (tDCS), which passes weak electrical currents through electrodes attached to the scalp, has been shown to enhance memory, attention, and to improve performance in situations of multitasking, as well as visual search.¹⁵

DARPA’s Targeted Neuroplasticity Training program explores ways to accelerate learning and performance through peripheral nerve stimulation: soldiers could therefore learn faster thus reducing training time and cost. Another program, Neurotechnology for Intelligence Analysts studies ways to

¹² The Royal Society: “*Neuroscience, Conflict and Security*”, February 2012, 35-36, https://royalsociety.org/~media/Royal_Society_Content/policy/projects/brain-waves/2012-02-06-BW3.pdf

¹³ See A. Estrada et al: “*Modafinil as a Replacement for Dextroamphetamine for Sustaining Alertness in Military Helicopter Pilots*”, *Aviation, Space, and Environmental Medicine* 83: 6 (June 2012).

¹⁴ Yves Bordenave, Cécile Prieur: “*Les cobayes de la guerre du Golfe*”, *Le Monde*, 18 December 2005”, https://www.lemonde.fr/societe/article/2005/12/18/les-cobayes-de-la-guerre-du-golfe_722462_3224.html

¹⁵ Justin Nelson et al.: “*The Effects of Transcranial Direct Current Stimulation (tDCS) on Multitasking Throughput Capacity*”, *Frontiers in Human Neuroscience* 29 November 2016, <https://www.frontiersin.org/articles/10.3389/fnhum.2016.00589/full>

exploit the P300 signal, which is produced by the brain when it recognizes an object it was seeking and is detectable by electrodes before the person is consciously aware of it. The Cognitive Technology Threat Warning System is a project that aims to take the insights about the P300 signal into the field; it requires wearing an electrode skull cap and being fed images from surrounding cameras: the result in tests showed that the use of this device led to spotting twice as many threats compared to using conventional field glasses.¹⁶

The use of technology for enhancement has also included approaches focused on brain-computer interfaces and devices implanted within the body. One example is “*neural dust*”, a range of tiny wireless sensors that can be implanted in individual nerves, using ultrasound for power and communication. These motes, smaller than a grain of rice, could record nerve activity and stimulate peripheral nerves.¹⁷ Other projects target *metabolic or cellular interventions* to steel the body against extreme trauma or injury, and the associated blood loss. This would ensure survival past the “*golden hour*” – the time of intervention normally needed for life- saving treatment. DARPA’s Biostasis program aims to develop molecular interventions which could slow biological systems until medical intervention became possible. In effect, these applications would mean quite literally “*pausing biological processes*”.¹⁸

From a basic calculation of efficiency, enhanced soldiers would be an asset for the operation: they would be able to stay awake, focused and alert for days at a time, they could heal faster in case of injury, memorize complex instructions more rapidly, or be more physically enduring. This could also result in more lives saved or spared, and higher likelihood of applying international humanitarian law (IHL) (if enhanced soldiers are, say, better able to detect threats against civilians or to distinguish civilians from combatants more clearly as a result of an intervention that enhances attention and alertness). In effect, enhancements may enable soldiers to cope with stress and detect threats more swiftly, which are important feats especially in urban combat, where conditions are abnormally difficult. However, they will simultaneously challenge some of the established values of the army.

¹⁶ “*Know Your Enemy : How To Make Soldiers Better At Noticing Threats*”, The Economist 27 July 2017, <https://www.economist.com/science-and-technology/2017/07/27/how-to-make-soldiers-brains-better-at-noticing-threats>

¹⁷ “*Implantable “Neural Dust” Enables Precise Wireless Recording of Nerve Activity*”, DARPA, 3 August 2016, <https://www.darpa.mil/news-events/2016-08-03>

¹⁸ Biostatis, DARPA, 20 March 2018, https://www.darpa.mil/attachments/Biostasis%20Webinar_Full%20Deck_For%20Posting.pdf

A CHALLENGE TO MILITARY ETHICS – A EUROPEAN PERSPECTIVE

The military community has historically relied on a set of timeless values that sets service in the military apart from other professions and experiences. *Courage, sacrifice, loyalty, commitment and honour* are among the values that bind members of the armed forces together; at the same time, these values also dictate certain expectations from service members and set limits to what is permissible. The high-mindedness of these values, however, frequently meets the draconian and unpredictable conditions of the battlefield.

Western militaries usually employ hybrid ethical codes that capture such complexities. These codes of military ethics draw significantly from Aristotelian virtue ethics, and from deontological ethics. Virtue ethics are premised on elements such as contextual relativity, actor relativity, and character formation. Because in a military setting conditions vary a lot, so do definitions of what is acceptable or extreme in each context. While deontological ethics dictate absolute rules (for instance about the applicability of IHL) that require the same type of action for every person and every situation, virtue ethics prepare the soldier for making quick decisions, often with high moral impact, in unexpected and challenging situations. Aristotle called the skill of applying the right virtue at the right time *phronesis*, and in the military, this is cultivated through practice – hence the unique role of the military in forging a special identity for its members.¹⁹ Furthermore, in a military context, many traits typically seen as personal merits are fostered through education and training. For example, extensive research on courage in the military shows it is not only an intrinsic quality of an individual, but also developed through social cohesion.²⁰

These values are widely shared across European militaries. For example, the German concept of *Innere Führung* (inner guidance), which defines the leadership philosophy of the German armed forces (Bundeswehr), is strongly premised on personal responsibility and ability to conduct oneself ethically, in line with Germany's constitutional norms. This principle also requires the soldier to be able to uphold and implement these values independently,

¹⁹ Marcus Schulzke: “Rethinking Military Virtue Ethics in An Age of Unmanned Weapons”, *Journal of Military Ethics* 15 (2016), 189-192.

²⁰ See Peter Olsthoorn: “*Courage in the military: Physical and Moral*”, *Journal of Military Ethics* 6:4 (2007), 270-279.

meaning to be able to show flexibility and adaptability when the situation changes and it is not possible to consult the superior.²¹

The UK's Army Leadership Code emphasizes critical values such as: courage, discipline, respect for others, integrity, loyalty, selfless commitment. It also highlights the importance of “*effective and cohesive teams as building blocks of operational success*”, and that foremost in making teams effective is trust.²²

In France, *Le Code du Soldat* similarly lists fundamental values such as professionalism, determination, honour, dedication, and cohesion and agility within one's team.²³

However, “enhancements will raise the question of the *authenticity of these values* if, for example, decision-making and risk-taking abilities can be artificially enhanced through technology, and not carved within the community. These questions will likely emerge even if the range of interventions did not target cognitive functions. In many instances, physical enhancement *per se* – such as in the form of metabolic interventions, genetic engineering, or implantable devices – may lead to an incentive to take more risks (knowing that even in case of severe injuries, chances of survival and recovery are significantly higher).²⁴

Another critical question concerns the *system of rewards and military honours*: could an enhanced soldier receive a medal of honour if their outstanding performance in a military operation was verifiably prompted by or due to enhancement(s)?²⁵ National decorations currently do not account for the implications of enhancements. The French Legion of Honor (Légion d'honneur) rewards *outstanding merit*, and acknowledges that “*merit takes on the most diverse forms*”.²⁶ The Military Medal is granted for

²¹ Uwe Hartmann: “*What's the matter with Innere Führung?*”, Ethics and Armed Forces 1 (2016), 22. See the rest of the issue, entitled: “*Global Warriors? German Soldiers and the Value of Innere Führung*”.

²² https://www.army.mod.uk/media/5219/20180910-values_standards_2018_final.pdf

²³ <http://www.emb.terre.defense.gouv.fr/spip.php?article331>

²⁴ I. Puscas: “*Military Enhancement: Technologies, Ethics And Operational Issues*”, D. Messelken, D. Winkler: “*Ethics of medical innovation, experimentation and enhancement in military and humanitarian contexts*” (forthcoming: Springer 2020).

²⁵ I. Puscas: “*Military Human enhancement*”, W. Boothby: “*New Technologies and the Law in War and Peace*” (Cambridge University Press, 2018), 212.

²⁶ National Orders and Decorations, <https://www.legiondhonneur.fr/en/page/award-criteria/405>

outstanding service and one of the criteria is *having been distinguished by an act of courage and devotion*. In the United Kingdom, the Victoria Cross is awarded for acts of *extreme bravery and devotion* and the Georgia Cross is the highest award for *gallantry and conspicuous bravery*.²⁷ In Germany, the Bundeswehr Cross of Honor for Valor rewards “*an act of gallantry in the face of exceptional danger to life and limb whilst demonstrating staying power and serenity in order to fulfil the military mission in an ethically sound way*”.²⁸ Strictly speaking, these criteria would not disqualify enhanced soldiers because they largely refer to conduct, results and achievements; it is, however, safe to expect that radical enhancements will lead to a push-back to define criteria for honors more narrowly.

This leads to an important reminder in this discussion, which is that *enhancements do not make war a risk-free experience*. While enhancements could make combat relatively easier for the enhanced soldier (at least in certain situations), they would not take away the simple fact that by being on the battlefield, the soldier remains exposed to the risk of death or life-long injuries. Additionally, some enhancements, especially in more radical forms, could lead to unwanted health consequences in the long term. Concluding that enhanced soldiers no longer demonstrate courage or *personal sacrifice* is therefore unjustifiable. Enhancements will most likely lead to a redefinition of the meaning of personal sacrifice, which may in fact trigger a race amongst soldiers to sign up for extreme and more dangerous forms of enhancements.²⁹

ACCEPTABLE TRADE-OFFS

The discussion on human enhancement, in general, is marked by highly divisive opinions, ranging from views that enhancements are dehumanizing, to more militant positions arguing that enhancements are not only necessary but *a moral obligation*, and one way to accomplish a moral upgrade across society.³⁰

²⁷ UK Honours and Awards in the Armed Forces, <https://www.gov.uk/guidance/medals-cam-paigns-descriptions-and-eligibility>

²⁸ The Federal Ministry of Defense: “*The Bundeswehr on Operations*”, June 2009, 112-113.

²⁹ Puscas, *supra* note 25, 213-214.

³⁰ See John Harris: “*Enhancements are a Moral Obligation*” Julian Savulescu & Nick Bostrom (eds.): “*Human Enhancement*”, Oxford University Press (2010).

The policy approaches have been equally polarizing, from views urging for banning enhancements (especially radical or *species-altering interventions*), to libertarian views arguing for a free market approach and minimal regulations.³¹ In the military, however, the costs of enhancement will be weighted differently from the rest of society. If enhancements will demonstrably enable soldiers to fight better and, furthermore, to behave more ethically or spare more lives, it will be harder to make a decisive moral case against them.

The civilian and military spheres will differ over many acceptable notions of enhancement, and this includes acceptable trade-offs. Because the principle of ‘military necessity’ guides many strategic choices in deployments and operations, it can more easily accommodate the need for enhancements, with its attendant risks; yet, the same may not be the case in society. Juengst & Moseley offer the example of an enhancement that makes reflexes faster while also increasing the risk of committing errors. This may be an acceptable trade-off for military pilots in solo combat but not for civilian pilots with hundreds of passengers aboard. This example is highly evocative of the fact that enhancements, like all innovations, come with trade-offs and risks. On many occasions, some trade-offs could be morally acceptable for some military personnel, but not for their civilian counterparts. Delineating the boundaries of what is an *acceptable trade-off* will be one of the most significant tasks for military ethicists going forward. Ultimately, key to harnessing the benefits of enhancements will be ensuring their legitimacy across the entire military community.



Copyright © armée de Terre

³¹ Juengst & Moseley: “*Human enhancement*”.

INTERCEPTION: A POSSIBLE ANSWER FOR THE ENHANCED SOLDIER? : A VIEW OF THE FRENCH MILITARY HEALTH SERVICE

*Médecin en chef Marion Trousselard,
Neurosciences & Cognitive Sciences Department,
Institut de Recherche Biomédicale des Armées (IRBA).*

FROM time immemorial men have sought ways to be more powerful, to go faster and further, and more efficiently. In the context of defence, the multiplication of operations justifies for each army to position itself in the face of the current possibilities of increasing cognitive performance to the benefit of the soldiers involved. Within NATO, each nation has defined, with or without regulations, the modalities for using some of the means available according to operational constraints. While the international context of missions requires a pragmatic consensual position for the operability of forces in the field, the definition of a common employment framework cannot avoid ethical reflection on the question of increasing cognitive performance. In this context, ethics implies asking why, to what extent and with what means?

These questions are, of course, within the remit of military ethics, and necessarily involve the biomedical defence research of each country. This research is characterized by a dual specificity of engineering and medicine. It places the combatant in the dual status of citizen and component of weapons systems. These dual perspectives guide the ethical questions that arise in the face of the current possibilities of increasing the cognitive capacities of the human being. A particularity of France is that most of the biomedical defence research is conducted by doctors, which places all the reflections conducted under the perspective of medical ethics.

DEFINITION

Normative framework

Ethics is defined as “*the science of morality, the art of directing one’s conduct*”. Etymologically, ethics in Greek has a double meaning: (a) *ethos* is behaviour and (b) *dwelling place*. This creates an original semantic ambiguity. Indeed, the latter meaning was imported by the Latin in *Habitus* which in French gave “*L’habitude*” and in medical jargon “*habitus*”, i.e. what we look like in the iterative way we behave. In other words, ethics is only

the science that appreciates the way we behave. There is in fact no notion of morality in this definition.

Ethics, which can only be individual in its definition, has, however, been systematized. In practice, in institutions, particularly military institutions, the ethical question is posed to leaders at two distinct levels: (a) the question is whether the ends pursued are the right ones. (b) alternatively, if the answer is yes, the question is whether the means used are the best. Each time, making a decision requires making a value judgment and therefore, in order to judge, relying on a value system (and sharing it if the decision is a collective one). In short, if nothing human can be foreign to me, the standard behaviour of the human species is the minimum I must conform to, without effort since it is only the expression of my humanity. Yet on reflection, the ethics of a human being is a patchwork combining on a fundamental ethological animal layer, a societal and cultural layer. The ethics we are talking about is indeed the behaviour of the human primate as it is modelled in civilization and as far as we are concerned in Western civilization.

All of the reference texts only take up the Western point of view of the normal behaviour of a man, that is to say that below which he cannot derogate from the risk of leaving the status of man. Thus, the normal behaviour of a soldier is governed by the Geneva and Hague Conventions.

The definition of this normal behaviour has another impact, that of ensuring harmonious living conditions in human society. Thus, the individual ethics of French citizens are built around the civil code which governs interactions between men and the penal code which sets out the penalties for deviations from the rules of life in society. It is in this respect that ethics can be considered to be *“at a higher level than morality. It is what is demanded of everyone beyond the feeling of obligation”*.

The doctor's ethics

In view of these elements, the ethics of a physician is simply the behaviour expected by all of us from a man with the status of a physician. There are no morals here: A physician must only carry out what he promised at the time of his thesis in the Hippocratic Oath. In time, this behaviour will become his habit, then a habitus. The individual has chosen to become a doctor and has found himself transformed into a doctor. This founding text that defines this behaviour was extended by other texts that define how Western physicians view themselves in society: the codes of ethics: a set of rules and duties and professional sanctions governing a profession.

This ultimately abstract definition of a physician's ethics is made operational by observation and reflection on medical facts and acts, which ultimately shapes the behaviour expected of a physician in a given society. The code of ethics, in its dynamic imposed by the evolution of society and science, offers a safeguard to physicians to help them behave in accordance with their status in the delicate situations they encounter.

Bioethics

However, the explosion of biological issues has changed the relationship between patients and doctors and society has found it necessary to define the behaviour of an individual biology professional, contributing to the advent of a new science, bioethics, in the United States in the 1970s. It is a crucial point to note that the power over life has escaped, at least partially, doctors and that it has become necessary to think about the power of man over himself beyond medicine.

Bioethics refers to the *principle of humanity* which has several facets: respect for the human person, his or her integrity and dignity. These universal principles impose limitations on all those involved in biology. The scientific explosion, and in particular the revolution in neuroscience, places the question of limits in the foreground because the scientific capacity to decipher an individual's behaviour opens a considerable breach in the autonomy of the individual. Seeing the brain functioning live on fMRI is about understanding the underlying mechanisms that underlie behaviour.

There is therefore a great temptation to use this means of investigation to gain power over the other in terms of : (a) truth (judicial field, development of the lie detector), (b) economics (development of neuromarketing), (c) education (development of pedagogical methods) and (d) defence. There is also a great temptation to optimize the capacities of individuals to make them fit for missions that are increasingly demanding in terms of performance.

OPTIMISATION OF HUMAN CAPABILITIES

Characteristics of the operational framework

In defence, the temptation is to do everything possible to be at your best to carry out your mission in sometimes difficult conditions. While the behaviour of a combatant in front of his alter ego of another army is well defined, the behaviour of combatants in front of themselves remains difficult to discern.

This is where the ethical problems of optimising human capabilities lie. In this discussion, there are three actors: (a) the command in the broadest sense,

which determines the missions, (b) the combatant as an autonomous person, who determines his level of involvement, and (c) the doctor who monitors the combatant's health. There is also a local, individual and collective framework, a general, legal and professional framework and an international framework.

With the emergence of the neurosciences, the optimization of human capacities is joining the problem of doping, but not solving it. It goes beyond the mechanisms of the traditional pharmacological approach by neurophysiological mechanisms that are more a matter of conditioning. This crucial question must be raised (a) from a transcendental point of view by the human community, (b) from a behavioural point of view through the need for the various actors to behave according to their social status, i.e. the laws of the country and the professional code of ethics, and (c) from an emotional point of view through the recognition of an otherness that establishes the medical act as a loyal partnership. The prerequisite for these points of view is the absolute autonomy of the subject, which allows the other person to perceive only what he or she wishes.

Cognition

Cognition has been defined since the 1970s as the set of processes implemented by an organism to process the information it encounters. The processing steps are numerous and operate both in parallel and in series. They are based on a cerebral cellular machinery whose regulation and interactions are far from being fully understood. In fine, what guides behaviour is a set of processes combining the more or less sharpened and oriented perception of the world, the subject's history in terms of conditioning, the level of coherence between what the subject expects to do and what he must do in the light of the world.

Before defining the increase in human performance in the field of cognition, it is necessary to define the level of cognition sought. It is technically relatively easy to make a qualitative, quantitative and subjective (lived) assessment of the level of cognitive performance of a subject with a correct level of reproducibility. The notion of cognitive capacities therefore implies the definition of norms, based on the distribution of cognitive capacities measured in a population with identical socio-demographic characteristics. From a populational point of view, the military represents a population trained and educated in its trade, with the ability to perform or not perform a specific task (sniper, golden ear). It cannot therefore be assimilated to an average population.

In neurophysiology, a performance is a specific behavioural entity whose expression requires a limited number of neurophysiological mechanisms. They can be optimized by specific exercises of course but also by playing on non-specific mechanisms. This optimization then resonates in other fields of performance. The increase in cognitive performance can be defined as an extension of one or more of these generic information processing capacities, either by internal or external action on the processes involved in these capacities. It should also be stressed that this definition of performance only makes sense in armies in terms of performance obtained in stressful situations. That is to say, performance is not degraded. This then raises the question of the objective pursued by training: do we train men to develop exceptional performance in situations of mental calm but extreme fragility in situations of constraint, or to develop a hardening, in other words a resistance of the individual to the constraint that ends up protecting the few standard performances at his disposal?

Wanting to increase performance requires knowing what one wants to obtain for established objectives and for deciphered cerebral capacities. This implies having data with a large sample and in different contexts of constraints and repetitions of constraints.

DOPING AND ENHANCEMENT IN THE MILITARY ENVIRONMENT

Doping framework

The etymology of the word *doping* refers to the word *doop* which means broth, mixture or blend and is said to come from a patois used by Dutch immigrants who, in 1666, built the city of New Amsterdam, which later became New York. This broth possessed exceptional stimulating qualities that made it possible to work tirelessly and without apparent fatigue. The composition of this drink is not known, but it is known that it sometimes caused fatal tachycardia, which forced the bosses of these tireless pioneers to prohibit its use.

The professionalization of sport has led to the emergence of doping, even as the development of the practice of sport has revolved around this quest to surpass oneself. Doping was considered to be an aberration that was taken into account by the legislator as early as 1965. The Public Health Code defines doping as “*the use, during or with a view to participating in competitions and sporting events, of substances or procedures likely to artificially modify performance which may be detrimental to sporting ethics and to the physical and psychological integrity of the athlete*”. From this definition, it follows that an athlete who resorts to doping not only harms sport as a whole, by

failing to respect equal opportunities, but also harms himself and his physical health. This law has a repressive side which sanctions the use of stimulants in competitions. The ban on doping currently concerns only the profession of sportsman or sportswoman, whereas the use of doping substances concerns society as a whole, and particularly the working environment in situations of professional overwork.

Doping in the military environment?

The “*you won’t dope*” calls for a context other than sport, which is that of war. Applied to the military context of war, the definition of the public health code for the sports world becomes that of “*the use, in view of or during conflicts, of substances or processes likely to artificially modify performance. Such use in a conflict situation may be detrimental to military ethics and to the physical and psychological integrity of the combatant*”. Whatever the sporting or military environment considered, for the brain, doping involves making all the connections function beyond their capacities. There is no risk to the identity of the person who has been doped, particularly in terms of the reversibility of the doping actions carried out.

The arsenal available to increase the individual’s cognitive potential is vast and testifies to multiple more or less old-fashioned means, more or less scientifically validated for their effectiveness and safety. The increase in human capacities in the context of doping is based on the mechanisms of the traditional pharmacological approach as well as those of neurobiological conditioning. Some tools are commonly accepted, others much less so, regardless of the cultural, religious and ethical reasons highlighted (Table 1). The cleavage between what is legitimate and what is not is the whole issue of ethics in the field. Without dwelling on the existing modalities, let us just mention in passing a few ethical problems raised by the pharmacopoeia, for example.

Conventional means of cognitive enhancement largely accepted	Unconventional means tend to evoke moral and social concerns
Education, enriched environments and general health	External hardware software systems Brain-computer interfaces
Prenatal and perinatal enhancement	Nanotechnologies Nanomedicine
Mental training & coaching	Collective intelligence Connective intelligence
	Genetic modifications
Drugs	

Table 1: non-exhaustive list of the existing arsenal according to its societal acceptance.

The use of psychotropic substances to potentiate cognitive abilities or to confront a reality of fear has been part of our way of life since ancient times. The arsenal ranges from anxiolytic relaxing agents (mead, alcohol, marijuana), to activating agents that provide vigilant arousal (caffeine, tobacco, coca), to agents that generate automatic relaxing activity (chewing gum). If these generic products bring more well-being in a degraded war condition, it is difficult to speak of performance optimization. In the case of awakening agents, it is a question of maintaining a certain level of performance at a time in the circadian rhythm when they are particularly degraded (1-3 hours). In the case of anxiolytic agents, the aim is to reduce emotional activation to a level that allows a minimum of cognitive reflection. The pharmacological situation has changed radically with the introduction of arousing substances such as amphetamines and Modafinil®. These substances were developed by the pharmaceutical industry with therapeutic objectives. Modafinil is indicated for idiopathic hypersomnia and narcolepsy, for which it has marketing authorization in France with a prescription limited to specialists. Irrespective of all ethical considerations and efficacy criteria, the use of these substances in a military context poses two sets of theoretical difficulties. These substances are evaluated in a pathological context for their therapeutic efficacy and in a physiological context solely for their safety in normal conditions of use, i.e. in everyday life).

It should be noted in particular that drug validations are carried out in a controlled context. However, their use in a context of stress raises the problem of the pharmacology of a stressed brain. In addition to the fact that stress profoundly modifies the basal pharmacokinetic and pharmacodynamic characteristics, it modifies the functioning of the brain independently of the action of these substances. This can lead to effect potentiations that shift a controlled dose from safety to risk.

The art and the way?

“*Sometimes lion, sometimes eagle*”, this motto of the 13 Airborne Dragon Regiment reflects not only the need for multiple skills of the soldier but also a need for skills adapted to the phases of the conflict. The regiments with their experience have thus assimilated to their mottos whose diversity underlines the temporal need for performance in war situations which arise in terms of precaution, combat and survival.

Artificially increasing the performance of the selected soldiers can thus concern the preparation (training and training) for war with biological (CBRN protection), physical and psycho-cognitive targets. This precautionary doping certainly poses doping as the acquisition of protection against future constraints, but the borderline is held with the desire to make the military an “*enhanced man*”, in the sense of an optimisation of the military, in other words a man who can do better than what he is already doing.

Combat doping seeks rather to increase or at least maintain physical and psycho- cognitive performance in view of the constraints of combat. This doping pursues the goal of making the soldier an “*enhanced man*”, a clearly ambiguous objective since it opens the door to a possible optimization of the soldier within the framework of a realistic conception of warfare where the absence of moral constraint risks being harmful to the soldier.

Finally, survival doping is a matter of life and death and calls on the military’s ability to optimise all its skills in a short period of time. The aim is precisely to help an “*overwhelmed man*” to get out of a potentially fatal situation.

Thus, the question of *military doping* cannot be considered as a reflection positing doping as a univocal, isolated action, but rather as a set of possible actions according to the different phases of the conflict and the functionality of the stages of the military profession per se.

It is in the context of this partition that the question of the ethics of doping with a view to increasing performance must be considered.

At present, there are two dominant currents of moral reflection on war that are clearly opposed to each other and lead to a very different position on the legitimacy of war doping. The just war current seeks to answer two main questions: on the one hand, what are just wars and, on the other hand, what are the ways of waging this just war. The reflections have led to the definition of the theory of the law of war and the law in war. The use of means proportionate to the ends is one of the fundamental principles for a just war.

Through this fundamental principle of proportionality of means, this ethical reflection poses the clear need for a limit to war doping. One of the main objections to this trend is a realistic conception of war. By postulating that war is beyond good and evil, this current posits that there are no moral constraints limiting the means employed in war, which leaves the door open to any means of increasing the efficiency of the military.

PERSPECTIVES: INTEROCEPTION, A TARGET OF ENHANCEMENT GUARANTEEING HUMAN INTEGRITY?

Recent neuroscience data pose two relevant frameworks for reflections on enhanced man. The first is the enactivism framework: enactivism being this body/environment relationship which sees the two terms of the relationship changing each other¹. If the individual “*gives shape to his environment, he is at the same time shaped by it*”. Literally, our environment constitutes us. In fact, each event leaves a trace in the brain and any intense and/or prolonged constraint transforms the brain morphology durably since the brain is, permanently, enacted; the increase can thus only be thought of in an incarnated, situated way. The second is that of the probabilistic human brain. The individual does not tolerate uncertainty; he constantly makes inferences from the information that his brain filters and interprets to make predictions about the state of the world. In return, he adjusts these predictions according to the deviation from what he expected from his predictions. A high level individual is therefore an individual who predicts well, perceives the smallest deviation and takes it into account to improve subsequent predictions. These inference loops are based on an adjusted perception of the state of interoception, defined as the perception of information coming from the body, or the ability to perceive the physiological state of the body (heartbeat and breathing rhythm, state of satiety, etc.). Awareness of one’s physiological state moment by moment allows for appropriate inferences to be made.

This ability to relate to one’s internal feelings has a well identified neuro-functional substrate. In particular, it involves an area of the cerebral cortex called insula, which is nested at the front of the brain within each hemisphere and is dedicated to the integration of interoceptive information: this is the insula, an area of the cerebral cortex (Figure 1).

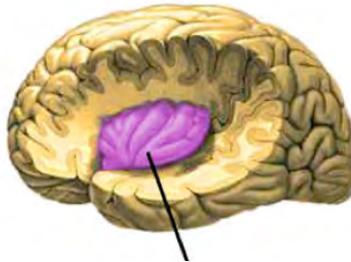


Figure 1: location of insula inside the brain

¹ Varela FJ, Thompson E, Rosch E.: “*The Embodied Mind*”, Cambridge MA: The MIT Press, 1991.

Insula is a probabilistic brain supervisor. She is at the heart of the prediction system. It would also allow an updated estimate, moment by moment, of the balance between the body's available functional resources (metabolic, immunological, etc.) and needs. It would participate in the emergence of emotions and the resulting behaviours in order to restore/maintain this balance with regard to the demands of the environment in which the subject evolves.

These elements lead us to consider that human adaptability to constraints targets the functional quality of the insula as one of the principal mechanisms. They question the modalities allowing an optimization of the prediction system that insula allows and pose this optimization as an ecological action of increase in that it is based on the adaptive functioning of the individual per se.

A first optimization modality leads to interventions aiming at a better self-awareness moment by moment. It is a question of targeting a psychophysiological functioning that allows attention to one's sensations here and now, which allows acuity of adjustment to the internal and external stimuli of each moment. Meditation programs, regardless of the way they are practiced, help develop self-awareness and underlie better prediction. These benefits are associated with a better regulation of stress, described for a long time and widely demonstrated (deliverable DGA).²

Immersive approaches using virtual reality and/or augmented reality could also contribute to an optimization of inter-conceptive skills. These approaches allow the development of the first neurobiofeedback centred on the body's internal signals. The mechanisms of action target the development of presence and embodiment, which are two central dimensions of the user experience in an immersive virtual environment. These virtual environments stimulate the brain as a real environment although simulated and induce neuroplasticity. First data in the field of psychotrauma management or aesthetic experiences are beginning to become available. They are part of the emerging field of embodied virtual medicine, a promising field under construction to think about a respectful increase in human functioning (Riva 2018).³

² MCS M. Trousselard: "*Mindfulness and health of the soldier deployed abroad*", registered L2019-04, IRBA.

³ Riva G, Wiederhold BK, Mantovani F. (2019): "*Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine*". *Cyberpsychology, behavior, and social networking*,22(1):82-95.

FROM THE EXAMPLE OF THE BSSS (BATTLEFIELD SUPER SOLDIER SUIT), TOWARDS A RESPONSIBILITY ETHICS FOR MILITARY ENHANCEMENT

*Christine Boshuijzen-van Burken,
PhD, University of New South Wales at the Australian Defence Force Academy,
Faculty of Military Science of the Dutch Ministry of Defence.*

INTRODUCTION

A group of researchers has yet successfully started to test the technical functioning of remote sensors and drug delivery devices that are meant to be interwoven in the suit of future soldiers.¹ Future soldiers on the battlefield will be wearing a specialized suit, called a Battlefield Super Soldier Suit (BSSS) designed to enhance and maximize soldier performance, combat survivability, communications and status surveillance.² It will serve several goals, namely as a ballistic protection armour, a chemical/biological detection device, a medication or life sustaining delivery instrument, and a health status monitoring device.³ The BSSS will be lined with hundreds of nanotechnology biosensors that provide an external sensory network for the soldier.⁴ It also has micro drug delivery patches integrated into the suit that can be activated from a distance.⁵ This will allow for autonomous measurement, monitoring and assisting of the soldier's modes of adaptation while on the battlefield. The bioinformatics will be processed in order to support direct manipulation by both manned and unmanned systems. The BSSS provides an integrated interface between soldiers, medical specialists, and others through a broader information and communications network. In practice this means that, in case the soldier gets wounded on the battlefield, her vital life signs (such as heart rate, blood pressure and breathing) can be monitored by a remotely connected medical specialist. Also, drug administration can take place via networking technologies. Combat Life Saver (CLS) or battlefield medics can be supported by artificial intelligence systems or remote experts who have control over the BSSS. An experimentation campaign has started to fully comprehend how this innovation may impact existing doctrines, organizational structures, training, etcetera.⁶

¹ Naval Postgraduate School, 2011; Miles 2011; Adams 2009.

² Adams 2011.

³ Institute of Medicine of the National Academies 2001.

⁴ Duc et al 2011; Rosen and Elman 2012.

⁵ Elman, N.M., Ho Duc, H.L. and Cima, M.J 2009.

⁶ Adams 2009; Naval Postgraduate School, 2011; Miles 2011.

These developments promise much for the future and have the potential to not only aid a wounded soldier, but also to enhance mental capabilities of soldiers if drug delivery is done to optimize cognitive capabilities. For example, soldiers may be administered enhancers that keep them awake or alert for longer periods or that take away fear or psychological trauma.⁷ This raises questions on how the introduction of these technologies affects soldiers and medical personnel, especially when it concerns questions of responsibility.

Philosophers of technology have given extensive and diverse accounts of the non-neutral and ethical aspects of technology.⁸ Langdon Winner for example, argues that *“too many (particularly social science) analyses of technologies simply looked at side effects and impacts, thereby often continuing the implicit belief that technologies are neutral, and employing a simple cause/effect mode of analysis.”*⁹ Also in military doctrine and procedures the implicit belief that technology is neutral is often present. However, technology affects the way in which people actually do their jobs. The endeavour of connecting people together through technology, striving for cooperation at all hierarchical levels, goes hand in hand with shifts on the level of organizational and individual responsibilities. Responsibilities can become blurred when different partners are connected through networking technologies and things may become even more complicated if artificial intelligence takes over certain duties. All of a sudden, in joint efforts, questions such as *“Who is responsible for what and in what way?”* may arise. These questions are important to ask, since the employment of autonomous systems increases. A blurring of responsibilities may even lead to unfortunate actions. For example, when someone assumes certain responsibilities that actually belong to others, or avoids taking up responsibilities by shirking responsibility.

The example we use for explaining our view is the BSSS, which is a health status monitoring system that is integrated (literally interwoven) with the suit of a soldier and at the same time can fulfil a drug administrative function. This example has civil counterparts and therefore our analysis may be relevant for a broader, also non-military audience.¹⁰ In the civil application of these tele-medication technologies, medical specialists have stated that questions of responsibility are at the heart of their concerns.¹¹

⁷ Galliot and Lotz (2016).

⁸ See for example Verbeek 2006; Feenberg 1991; De Vries et al. 2013.

⁹ Ihde 1993.

¹⁰ Detweiler et al. 2012.

¹¹ See Lehoux et al. 2002.

When we speak about responsibility and technology use, we do not mean the *responsibility* of technical systems, as some scholars argue for (see for example Stahl 2002), but about the responsibility of human beings who are being connected through technological systems.

In this paper we make use of the concept of a practice in order to elucidate normative issues which arise when working with advanced technologies on the battlefield. We also adopt a model of responsibilities and analyse in what way the use of networking technologies change the concepts of responsibility of people in a network. We show that the BSSS technology is embedded in a specific practice, namely the battlefield medical practice. We will systematically address how these technologies affect different concepts of responsibility; how these concepts can be understood from a *normative practice* perspective and finally how different meanings of responsibility may change in view of network battlefield medical practice.

BATTLEFIELD MEDICAL PRACTICE AS NORMATIVE PRACTICE

Technology-in-practice

How can we get a better understanding of how the introduction of technologies, such as BSSS, potentially changes responsibilities on the battlefield? In order to answer the question we adopt a normative practice perspective. The normative practice view starts with an intuitive understanding of what a practice, such as a medical practice, engineering practice or military practice is. Generally speaking, people have an understanding of what a specific practice is ultimately about. This is not just about the ends, or *telos*¹², such a *healing people* or *enhancing peace*, it also entails the *ethos* of a practice, or what counts as good or excellent decisions or actions. According to Jochemsen and Glas (1997), there is a structural side to the practice (the procedures, norms, rules, manuals that are all constitutive for the practice) and a directional (worldview, regulative) side to the practice.¹³ See Figure 1. When speaking about the structural side, the concept of norms and rules should be understood in a broad manner. A good analogy here is the game of chess: the rules of chess are not only restricting this particular game, but are constitutive of the game, i.e. they make it possible to play the game of chess.¹⁴

¹² See also MacIntyre, 1981.

¹³ Jochemsen and Glas 1997; Jochemsen 2006; Glas 2012.

¹⁴ Searle 1969.

They also make it possible to be effective, or to begin to understand what effectiveness means for the practice. Also in Gherardi we find this idea and he formulates it as follows: “*norms are regarded as repositories of knowledge and not just as constraints*”.¹⁵ One could say, the norms are not hindering effective actions within a practice, they co-constitute effective actions.

The structural side of the battlefield medical practice can be captured as “*care for the wounded soldier*”; this is what characterizes the primary process and all the rules that guide this primary process.

The directional side of a practice has to do with ones worldviews and (moral) beliefs, and what drives someone to work in that specific practice. Often these beliefs, such as what makes up a good nurse, influence the way in which the practitioner makes her decisions. Our understanding of *ethics* or *normativity* is not just the rules and principles (since rules and norms can be unethical), but also what an individual action or a technological development aims for: for example, does it aim for the greater good, or for pleasure for the lucky few? Or, in our case, does the BSSS aim at technological progress (more technology is better), quantitative improvement (aiding more soldiers at the same time is better), or qualitative improvement of soldiers’ health (ability to aid individual soldier in a specific manner is better)? Reflecting upon technology from this perspective takes it beyond usability and effectiveness and into what is meaningful in the practice.

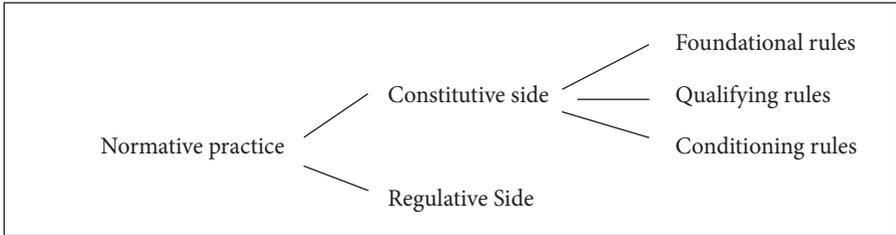


Figure 1. Model of a Normative Practice¹⁶

¹⁵ Gherardi 2006, p. 92.

¹⁶ Jochemsen and Glas, 1997.

The notions of structure and direction are sometimes respectively replaced with the notions of what is constitutive and what is regulative about the practice. A further distinction can be made between the qualifying, conditional and foundational rules with regard to the constitutive side of the model of normative practices. For our analysis, however, these distinctions are not crucial and therefore we leave them aside. In section four we will connect the constitutive and regulative side of a practice with different understandings of responsibility. In the following subsection we will show how the normative practices concept gives insights into working with the BSSS.

Meanings of Responsibility

From the model of normative practices we may, at first sight, conclude that the rules, norms and procedures that hold for the battlefield medical practice as such will not change: a doctor remains a doctor, a soldier a soldier and their corresponding responsibilities will not change either. However, a view on responsibility that only focuses on the roles and tasks is rather narrow. The term *responsibility* has no univocal meaning and is used in different contexts and fiercely debated. We will follow Van de Poel and Royakkers¹⁷ who have distinguished a number of different meanings of responsibility, see table 1. Their taxonomy is partly derived from literature on the concept of responsibility.¹⁸

¹⁷ Van de Poel and Royakkers, 2015.

¹⁸ For example Hart 1968 and Bovens 1998.

Table 1. Adaptation of Van de Poel and Royakkers' taxonomy of meanings of responsibility (with BSSS as example).

1. Descriptive¹⁹	
Responsibility-as-cause	Being the cause. As in: the toxic gas is responsible for the death of the casualty.
Responsibility-as-task ²⁰	Having the task. As in: the medical expert is responsible for the diagnoses of the casualty.
Responsibility-as-authority ²¹	Having the authority or being in charge. As in: she is responsible for the medical evacuation mission, meaning she is in charge of the mission.
Responsibility-as-capacity	The ability to act in a responsible way. This includes for example the ability to reflect on the consequences of one's actions, to form intentions, to deliberately choose an action and act upon it.
2. Normative	
<i>2a Normative and Forward-looking</i>	
Responsibility-as-virtue	The disposition (character trait) to act responsibly. As in: she is a responsible person.
Responsibility-as-(moral) obligation	The obligation to see to it that something is the case. As in: she is responsible for the diagnosis and treatment of the casualty, meaning she is responsible to see to it that the casualty is diagnosed and treated.
<i>2b Normative and Backward-looking</i>	
Responsibility-as-(moral) accountability	The (moral) obligation to account for one's actions and their outcomes. E.g. she was responsible for releasing an incorrect dose of morphine through the BSSS.
Responsibility-as-blameworthiness	The appropriateness of blame. As in: she is responsible for overdosing the casualty, meaning she can be blamed for the overdose happening.
Responsibility-as-liability	The obligation to remedy a situation or to compensate for it. As in: she is liable to pay damages.

¹⁹ For now, we use the descriptive- normative distinction as proposed by Van de Poel and Royakkers. In a later section we raise some questions on this distinction and taxonomy itself.

²⁰ This is what Hart (1968) calls role-responsibility.

²¹ This may also be called responsibility-as-office or responsibility-as-jurisdiction. It refers to a realm in which one has the authority to make decisions or is in charge and for which one can be held accountable.

Blurring of responsibilities

In the case of a mission in which the BSSS is deployed, the working environment consists of multiple roles and tasks blurred together and responsibilities can be conflicting. In hectic situations, with geographically remote experts, who are of different nationalities and functioning within different hierarchical and juridical structures, it can become unclear who is responsible for what, when, in which way and when one is discharged. For example, is the remote expert responsible for a correct diagnosis, or has she only an advisory role? And is she responsible to act upon the availability of information provided through the BSSS? What in case there is an information overload, meaning that she has all the information on the basis of which she should be able to make a decision, but that due to the overload, her capacity to act responsibly is diminished? Also, the responsibilities of people working in the different practices may not be distributed in a clear and fair manner.²² So, in case a casualty dies under the (remote) hands of remote medical experts, battlefield commanders and local Combat Life Savers due to bad cooperation between the partners, who is responsible? Is no one in the network responsible, or are all individuals in the network responsible, and in which sense and till what degree, etcetera?

BSSS evokes changes in responsibilities

Below we have completed the list given by Van de Poel and Royakkers for the case of a network of remote medical practitioners that are working with the BSSS. We have adapted the descriptive versus normative distinction, so that responsibility taxonomy is now aligned with the model of a normative practice. This is done because the normative-descriptive distinction is misleading, in that in most cases descriptive responsibilities have a normative weight (e.g. responsibility-as-task is something someone ought to do).²³ The distinction that we now use is structure and direction. Structural responsibility relates to the rules, norms and procedures. Directional responsibilities relate to worldview, moral dispositions and ethos. As you may notice in the overview below, we moved responsibility-as-liability to the structural side of responsibility. Van der Poel and Royakkers mention responsibility-as-liability in the normative (as distinctive from descriptive) side of responsibility.

²² Doorn 2010.

²³ An elaboration of this argument can be found in Van Burken (2014).

Structural side of responsibility:

Responsibility-as-cause: there is no difference between BSSS or traditional cause for an event. For example, an overdose of morphine causes a person to die, irrespective if this was administered through the BSSS or through an injection needle brought in by a nurse on-site.

Responsibility-as-task: individual roles of soldiers or nurses or specialists do not change; a doctor remains a doctor also when working with the BSSS. However, the task may be affected; for example, the task of a nurse now also implies the sharing of information over the network. Whereas in the traditional setting information was verbally “*transmitted*” on the spot, now she may need to actively upload information. Therefore, the description of her task may be altered and include a responsibility to actively share information over the network. This means she can be held responsible for withholding of information. Also, an additional task may need to be created, which includes a responsibility-as-task to regularly check if the network is actually sending and receiving information.²⁴

Responsibility-as-authority: in a networked setting, authority structures may change. Doctor-patient relationships and soldier-officer relationships do not change with respect to the hierarchical ranks. However, these authority structures may become less visible and become blurred. For example, now those different authorities interact in a networked manner, as opposed to hierarchical interaction, who has the last say in a decision, and in which field of expertise? Or do the actors tacitly assume a democratic decision making structure in the network? What about the relationship between the remote expert and local medic? Are the remote experts playing an advisory role, or are they the decision makers? Interviews suggest that medics are not fond of a “*backseat driver*”, in the person of a remote expert, who is monitoring their job. Thompson’s criteria for the way in which an advisor (i.e. our remote expert) can be held responsible may be helpful, if we consider the remote expert to be in an advisory role.²⁵

²⁴ An interesting case in this respect took place in the Netherlands in 2012. The national emergency number 112 network was down for a couple of hours due to maintenance and no one, except those who were in urgent need for (medical) assistance, noticed this. The backup line was not working, but no one had checked this before the maintenance started. Neither the network provider, maintenance company nor 112-agency took the responsibility-as-task to check this. Some of the people in need claimed that a life could have been saved, had the network not been down. (Officiële bekendmakingen: Vragen van het lid Kuiken aan de minister van Veiligheid en Justitie over het bericht “*Telefoontjes onbeantwoord door storing 112*” <https://zoek.officielebekendmakingen.nl/h-tk-20112012-100-4.xml>, retrieved 26 april 2013).

²⁵ See Thompson 1983, p. 559.

Responsibility-as-capacity: in a networked setting, the ability to act in a responsible way may not be derived from mental capacities, resources or freedom to act, but also include technical abilities and constraints. For example, BSSS may hinder the ability to act, in cases when no access to the system from the remote end can be made. Also, taking into account the numerous technical options and abilities of the BSSS (the built-in capacities of BSSS), it may increase a doctor's responsibility to act, due to the fact that he or she can employ multiple technological and medical means that are built-in in the BSSS. When reasoning from the can implies ought argument, it means that more technical capabilities (implying an agent has more opportunities to act) increase an agent's responsibility to act.

Responsibility-as-liability: cooperating with different nationalities may be a source for ambiguous legal situations, due to the variety in rules and regulations for drugs and medical treatment that differ per country. Another question to consider is whether remote actions fall under the legislation of where the remote actor physically sits (and pushes the button), or where the actions takes place (where the medication is released).

Directional side of responsibility:

Responsibility-as-virtue: the BSSS dimension may put higher demands on this aspect, because it includes dealing responsibly with increasingly more information, which was less to the fore in the traditional settings. Also other virtues that were traditionally important may become less important or vice versa or even change.²⁶ For example, the virtue of integrity already entailed that you "*do and say nothing that deceives others... [are] honest and truthful*".²⁷

²⁶ Garreth Williams lists character traits which he associates with people that have this [responsibility as a moral] virtue as follows: (i) a person who has this virtue is reliable, (ii) she has commitment to- and carries through with projects once she has started them, (iii) she has initiative, (iv) she can exercise her own judgment, (v) she is trustworthy, (vi) she identifies with her actions and omissions, (vii) she can answer- or is accountable for her actions and omissions, (viii) she makes up for her actions and omissions, (ix) she is conscientious in discharging her responsibilities, (x) she recognizes and deals appropriately with her various and sometimes conflicting responsibilities, (xi) she can judge whether others are fulfilling their responsibilities, (xii) she can judge who should hold whom responsible for their actions and omissions (2008, pp. 459-462), and (xiii) if appropriate she steps in when others neglect their responsibilities by reporting this to the relevant authorities so that appropriate measures can be taken, and maybe she even takes on those responsibilities herself if no one else can take those measures (2008, p. 467).

²⁷ Olsthoorn 2011, p. 102.

It means that a notion of integrity now includes that a person does not withhold or shield off information that may be relevant to others.²⁸

Also on the battlefield medical side a reformulation for responsibility-as-virtue may be needed, for example, the criteria for distinguishing a responsible medic from an irresponsible medic may become less clear now that they have to interact remotely with a casualty and medical specialists. Random and insignificant behaviour, such as walking away from a casualty, may in some cases be considered irresponsible in the face-to-face context, but it may be no problem on the remote end (where it means that you walk away from a monitor for a minute). A reason for why it is unproblematic to walk away in the networked setting, is because it is assumed that other partners in the network also monitor and take over in case immediate action is needed.

Responsibility-as-(moral)-obligation: this aspect becomes more important in a BSSS environment, because “*seeing to it that something is the case*” may not be well defined in the cases where multiple partners come together, with (sometimes) overlapping fields of expertise. For example, who sees to it that the network link is active? Can we expect a medic or a soldier to take up this responsibility? Or who sees to it that the casualty gets treatment in time, if the treatment can be started from multiple remote sites? Or who sees to it that the vital signs of the casualty are continuously monitored? Medical care is about a constant re-evaluation of the casualty while available resources change continuously.²⁹ Many experts may be involved, without any of them taking up these obligations.

Responsibility-as-accountability: since diagnosis and treatment are no longer individual actions, but have become a joint effort of experts in geographically dispersed places, it may not be clear beforehand how one will be held accountable in a BSSS mission. An account of one’s actions can perhaps be articulated in cases of individual actions, but it is much harder to give an account of a joint action. In a strict (philosophical) sense, one may wonder if it is possible at all.

²⁸ See for example Gebauer and Goetz (2010) where one member of the military network withheld information, leading to a catastrophe.

²⁹ Orlikowski 2000.

The difficulty is firstly, in terms of who should give the account, since in the BSSS setting there is no hierarchical top-position, or representative, or spokesperson. But also in terms of what should be the content of the argument (the reason for why certain actions were performed or decisions were made). Here the directional side of responsibility comes into play again: arguments for why an agent considered his or her action to be a valid action, may differ, depending on one's worldview. One may adopt a utilitarian based account, while others think the account should be given in terms of rules or procedures that needed to be followed. With the question of responsibility-as-accountability, the blurring of responsibilities comes most clearly to the surface.

Responsibility-as-blameworthiness: in a BSSS environment, which highly depends on technological assets, blame can easily shift from the level of persons onto the technical level. For example, members of the network who are steering the BSSS may blame engineers responsible for system failures, technical breakdowns, network problems, etcetera which are all valid candidates for blame in case of accidents or incidents.³⁰

CONCLUSION

The list above aims to show that, with the introduction of novel technologies such as the BSSSS, there is a need to rethink the way roles, tasks and responsibilities are formulated. Another issue that this list reveals is that clashes and blurring of responsibilities may take place not only in the roles and responsibilities, so at the structural side of the practice (these can be captured in doctrines, procedures and job descriptions), but also on the directional side where worldviews come into play (where it is often difficult to give a clear description of the responsibility). From a functional perspective, it may look like a redefinition of tasks and roles and lining up the different legal norms may win half of the battle in the blurring of responsibilities. However, there is also a directional side to responsibilities, which is important too. People who work with BSSS may have different cultural backgrounds and therefore may have different worldviews. BSSS can link up a Chemical Biological Radiological Nuclear (CBRN) expert in Poland with Singaporean technicians and American medics at the same time. Misunderstandings following from these differences in worldview, leading to different understandings of responsibility, may follow.

³⁰ Del Frate's (2011) interdisciplinary taxonomy for failure may be helpful to better understand who the proper recipient for praise or blame is.

We conclude that a redefinition of responsibilities on the structural side is needed, but that this alone cannot avoid a blurring of responsibilities. Therefore, with the introduction of new technologies such as BSSS, there should be awareness that responsibilities may become blurred and that this is unavoidable. Following from this, is the need for a *revival* for the directional side of responsibility. Responsibility-as-virtue and responsibility-as-accountability should gain more attention in networked missions and serve as direction point in the case of a blurring of, for example, responsibility-as-task or responsibility-as-authority, which belong to the structural side of responsibility.

Another challenge may be that differences in ethical approaches may exist between remote experts and local actors that deal with the BSSS. In military practice, the focus is often on virtues.³¹ In medical practice the focus is on rules and regulations. When working with BSSSs, it may be helpful to be able to voice concerns in the responsibility terms that were discussed in this paper. An agent may realize that he or she cannot take up this responsibility-type for this moment, but I can take up that responsibility type now. For the different partners in the network, different responsibility may be more appropriate, or less appropriate, depending on the circumstances and actual demands, but also dependant on rules and consequences that hold for that moment. The responsibility taxonomy is helpful to articulate these concerns that arise in the normative practices in which the actors who deal with the BSSS work.

³¹ see for example Olsthoorn 2010.

REFERENCES

- Adams, A.A. (2011), *Exploring Battlefield Healthcare Documentation and Information Transfer: Implications for Tactical Network Topology (TNT) Battlefield Experimentation to Enhance Soldier Survivability, Command and Control (C2) & Biomedical Informatics*. Unpublished Directed Study. Naval Postgraduate School, California, Monterey.
- Bovens, M. (1998), *The quest for responsibility: Accountability and citizenship in complex organisations*, Cambridge University Press.
- De Vries, M. J., Hansson, S. O., and Meijers, A. W. M. (Eds.). (2013), *Norms in technology*, Dordrecht: Springer Netherlands.
- Doorn, N. (2011), *Moral responsibility in R&D networks: A procedural approach to distributing responsibilities*, Dissertation, Delft: 3TU.Centre for Ethics and Technology.
- Duc, H. L. H., Elman, N., Hayward, A. M., Rabideau, D. J., and Cima, M. J. (2011), In vivo rapid delivery of vasopressin from an implantable drug delivery micro-electro-mechanical device, in: *International Journal of Drug Delivery*, 3(2), p. 219-227.
- Elman, N.M., Ho Duc, H.L. & Cima, M.J. (2009) An implantable MEMS drug delivery device for rapid delivery in ambulatory emergency care. *Biomed Microdevices* 11, p. 625–631 doi:10.1007/s10544-008-9272-6
- Feenberg, A. (1991), *Critical theory of technology: An overview*, New York: Oxford University Press.
- Frate, L. D., Franssen, M., and Vermaas, P. (2011), Towards a trans-disciplinary concept of failure for integrated product development, in: *International Journal of Product Development*, 14(1), p. 72-95.
- Galliot, J. and Lotz, M. eds. (2016) *Super Soldiers: The Ethical, Legal and Social Implications*. London and New York: Routledge
- Garrett, T. M. (1966), *Business ethics*, New York: Prentice-Hall.
- Gherardi, S. (2006), *Organizational knowledge: The texture of workplace learning*, Oxford: Wiley-Blackwell.
- Gherardi, S. (2010), Telemedicine: A practice-based approach to technology, in: *Human Relations*, 63(4), p. 501-524.
- Glas, G. (2012), Competence development as normative practice - educational reform in medicine as heuristic model to relate worldview and education, in: *Koers*, 77(1).
- Hart, H. L. A. (1968), *Punishment and responsibility: Essays in the philosophy of law*, Oxford: Clarendon Press.
- Ihde, D. (1993), *Postphenomenology: Essays in the postmodern context*, Illinois: Northwestern University Press.
- Institute of Medicine of the National Academies, *To Err Is Human: Building a Safer Health System. Quality Chasm*, ed. Linda T. Kohn, Janet M. Corrigan, and M.S. Donaldson. National Academies Press, Washington DC, 2001.
- Institute of Medicine of the National Academies, *Preventing Medication Errors. Quality Chasm Series*, ed. Philip Aspden, et al. National Academies Press, Washington, DC, 2008.

- Jochemsen, H., and G. Glas. (1997), *Verantwoord Medisch Handelen. Proeve Van Een Christelijke Medische Ethiek*, Amsterdam: Buijten & Schipperheijn.
- Jochemsen, H. (2006), Normative Practices and Theoretical Ethics and Morality, in: *Philosophia Reformata*, 71(1), p. 96-112.
- Lehoux, P., et al. (2002), The theory of use behind telemedicine:: how compatible with physicians' clinical routines?, in: *Social Science & Medicine*, in: 54(6), p. 889-904.
- MacIntyre, Alasdair. (1981), *After Virtue: A Study in Moral Theory*, London: Duckworth.
- Naval Postgraduate School, BFM Experimentation Campaign AAR April 2011, PI: Dr. A. Bordetsky, *Internal report*.
- Olsthoorn, Peter. (2011), *Military Ethics and Virtues: An Interdisciplinary Approach for the 21st Century*, New York: Taylor & Francis.
- Olsthoorn, P., and Verweij, D. (2012), 'Military ethics and Afghanistan', in: R. Beeres, J. Van Der Meulen, J. Soeters & A. Vogelhaar (Eds.), *Mission uruzgan: Collaborating in multiple coalitions for Afghanistan*, Amsterdam: Pallas Publications, p. 81-92.
- Orlikowski, W.J. (2000), Using technology and constituting structures: A practice lens for studying technology in organizations, in: *Organization Science*, 11(4), p. 404-428.
- Orlikowski, W. J. (2008), Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations, in: *Resources, Co-Evolution and Artifacts*, Springer London: Springer London, p. 255-305.
- Rosen, Yitzhak and Noel Elman, (eds). (2012), *Biomaterials Science: An Integrated Clinical and Engineering Approach*, Boca Raton, FL.: Taylor and Francis Group, LLC.
- Searle, John R. *Speech Acts: An Essay in the Philosophy of Language*. Book, Whole. Cambridge, UK: Cambridge University Press, 1969.
http://books.google.nl/books?hl=nl&lr=&id=t3_Whfknv-0C&oi=fnd&pg=PA3&ots=0QIU9UU2K4&sig=toXDjzjWqA_cAY0s8t6p5AM4nQU#v=onepage&q&f=false.
- Stahl, C. B. (2002), Information technology, responsibility, and anthropology, in: *System Sciences*, HICSS. *Proceedings of the 35th Annual Hawaii International Conference*, 7-10 January 2002.
- Thompson, Dennis. (1983), Ascribing responsibility to advisers in government, in: *Ethics*, 93(3), p. 546-560.
- Van Burken, C.G. (2014), *Moral Decision Making in Network Enabled Operations*. Dissertation, Eindhoven: Technische Universiteit Eindhoven. <https://doi.org/10.6100/IR778508>
- Van de Poel, I., Royakkers, L. (2015), Introduction, in: van de Poel, I., Royakkers, L., Zwart, S. (eds) (2015). *Moral Responsibility and the Problem of Many Hands*. New York: Routledge, <https://doi.org/10.4324/9781315734217>
- Verbeek, P.P. (2006), Materializing Morality – design ethics and technological mediation. *Science, Technology and Human Values*, (31)3, p. 361-380.
- Williams, Bernard, (1973), 'Integrity', in J.J.C. Smart and Bernard Williams, *Utilitarianism: For and Against*, New York: Cambridge, p. 108-117.

CONSENT: AN OBSTACLE TO THE REQUIREMENTS OF GROUP COHESION AND MILITARY EFFICIENCY ?

From the book :

A Theory of the Super Soldier: The Morality of Capacity-Increasing Technologies in the Military, p. 148-163, 2018, published by Manchester University Press

*Jean-François Caron,
Associate Professor,*

Chair Department of Political Science and International Relations, Nazabayev University.

IT has to be admitted that soldiers have [...] accepted voluntarily – if they are not conscripts – to relinquish certain rights and privileges by joining the military, such as their capacity to remain healthy and alive. Indeed, contrary to civilians who go to work on a daily basis, soldiers might be asked to risk their life even during a dangerous or routine mission. Moreover, when they are given a lawful order, they do not have the possibility to discuss or negotiate with their superior – just as is very often the case for civil servants – the ends and means of its fulfilment. They must simply obey even if they feel the order is unreasonable or that the goal of the mission could be achieved in a more effective way. [...]

One main incompatibility between the civilian and the military reality is certainly the question regarding consent. According to the latter, individuals involved in research should have the legal capacity to give consent, be able to exercise free power of choice without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior forms of constraint or coercion, as well as receive sufficient knowledge and comprehension of the elements of the subject matter involved to enable him to understand and make an enlightened decision. This latter element requires that before acceptance of an affirmative decision by the experimental subject, it should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person, which may possibly come from his participation in the experiment. However, this informed consent is not necessary in the military as it is an organization that can interfere with its members' will and preferences in order to protect them and their colleagues from potential harm.

¹ According to the Food and Drug Administration, an investigational drug is a medicine used in clinical investigation. At the time these drugs were administered to soldiers, neither had been studied in a formal clinical trial and no manufacturer was conducting studies.

This paternalism used by the military explains why soldiers are sometimes forced to take certain medicines. This situation arose during the First Gulf War in 1990–1991 within the US Army. Fearing that Saddam Hussein’s army might use nerve agents, the Department of Defense ordered that all the soldiers deployed in the Persian Gulf to be given pyridostigmine bromide (BP) and botulinum toxin (BT) without their consent, even if these medicines were not at the *investigational* stage of development.¹ Fearing that this might be illegal under the Nuremberg Code, the Department of Defense asked (and was granted) the right to establish a special procedure which allowed them the right to give these products without the soldiers’ consent. Known as an *interim rule*, the Food and Drug Administration (FDA) gave the military the right to waive soldiers’ consent regarding the administration of investigational drugs for military purposes. Some Gulf War veterans later challenged this rule, but all were dismissed by the courts (*Doe and Doe v. Sullivan*, 756 F. Supp. 12 (USDC 1991); *Doe v. Sullivan*, 938 F.2d 1370 (US app DC 1991)). In 1999, the right to waive soldiers’ consent for these types of drugs was transferred directly to the President (Executive Order 13139). Since 2004, the US Congress gave elected officials another way to waive soldiers’ consent by implementing the Emergency Use Authorization which allows the use of unapproved drugs or vaccines in case of a national emergency. Moreover, in 1998, the US military decided that all its members should be vaccinated against anthrax. At the time, the vaccine was not approved by the FDA for airborne exposure, but it was nonetheless given to soldiers without their consent.

Through such dispositions lies a clear tension between the duty of care of the military and the possible problems they could lead to. We can presume that faced with a potential life-threatening bacteriological warfare, the military would like to deploy all the means at its disposal – even untested ones – to ensure the best protection for its members. However, at the same time, this paternalism might simply backfire, as the administration of untested medicines or drugs can lead to unexpected health issues for members of the armed forces. Although it has never been proven, it is impossible to ignore the fact that the Gulf War syndrome, a chronic multisymptom disorder which affected an estimated 250,000 of the 697,000 soldiers deployed in the 1991 Gulf War, is associated with various vaccines as a possible reason for this problem (McManus et al., 2005, p. 1124). Also, on the basis of what has been discussed in the previous chapters, the administration of drugs and medicines without the soldiers’ consent could open the door to cases of involuntary

intoxication, which would deprive members of the armed forces of criminal responsibility, and run counter to the principles of *Jus post Bellum*. This begs the question of what should be done: an obvious question, but which answer is far less evident.

Although the application of civilian research ethics might seem appealing as a means to avoid these problems, it must be acknowledged that such a possibility raises a significant problem. Indeed, there is a need to consider the potential negative consequences of this voluntary approach.² Various arguments can be raised against this proposal. First of all, the necessity to obtain the soldiers' consent for every medicine they might have to take might simply be impractical. Indeed, we can assume that some missions require urgency and a quick deployment – such as catching a terrorist leader who has the reputation of changing his location on a daily basis. We can easily imagine that performing such operations might require the use of certain medications that can truly increase soldiers' chances of survival. However, allowing them the right to obtain a full disclosure of the associated potential risks – which implies granting them sufficient time to discuss these with doctors who have knowledge of them – might simply delay the mission and prevent the military from achieving what could be a legitimate goal.

But, if we leave this strategic reason aside, there is also a moral argument that plays in favour of not granting soldiers the right to refuse to use certain medications. More precisely, soldiers' right to fulfil their duties with limited impact on their health and safety does not depend exclusively on the military. On the contrary, it also depends on their comrades, because individuals serving in the same unit are interdependent. One mistake from a colleague might increase the risk of death for his brothers in arms. This is the reason why a sentinel found asleep or drunk at his post is usually punished severely [...]. Therefore, soldiers are also a constitutive element of the duty of care and, consequently, have a collective obligation toward others.

This duty has implications for the use of technologies or medicines, because if a soldier refuses to use them, not only would he increase his own vulnerability, but that exposure could also make his comrades more likely to be harmed. In other words, the fear of protecting oneself from the potential ill-effects of drugs and vaccines in the military might

² This policy is currently implemented in the British and Canadian armed forces, both of which have adopted a voluntary approach for vaccination against anthrax (McManus et al., 2005, p. 1124).

actually lead to situations where members of a unit would have to proceed to a dangerous evacuation on the battlefield, thereby creating a situation that would increase their exposure to death. Considering the camaraderie and the ties that unite soldiers (for which they often referred to their relation as *brothers in arms*), we can assume that they would nonetheless refuse to use their right to refuse the use of capacity-increasing technologies. As argued by Michael Frisina:

“The success of small unit tactics depends upon unit members being able to perform their assigned tasks when called upon to do so. Unprotected soldiers suffering injury from chemical and biological agents become liabilities to the welfare of their unit members when they are unable to perform their assigned role. Ultimately, the success of the overall mission is potentially jeopardized. If there is a derived benefit from taking these investigational agents and some members fail to accept this benefit, the negative effects of biological and chemical weapons not only impacts on those members not protected but degrades the capability of the entire unit and ultimately the welfare of the other unit members” (Frisina, 2003, p. 551).

The same argument has been used by Patrick Lin, Maxwell Mehlman and Keith Abney for whom *“(…) The flip-side of consent is refusal to consent, and warfighters are likely to be reluctant to refuse to use a performance enhancement if they think that this would adversely affect other members of the unit, for example, by placing on them more risk or more of the responsibility for carrying out the mission”* (Lin et al., 2013, p. 74). This risk is constitutive of the military’s paternalistic nature and a reason why its members’ personal preferences might be legitimately suppressed (Wolfendale & Clarke, 2008, p. 341). In order to avoid the collateral harm that could result from the necessity to obtain soldiers’ consent before using medicines or other technologies, it is therefore necessary for the military institution to show a form of paternalism by subordinating the individual’s interests to the collective welfare.

From this perspective, how is it possible to create a situation that would allow soldiers to waive consent without exposing them to risks to their health and moral responsibilities? Needless to say that this balance is very difficult to establish. For instance, the Presidential Advisory Committee on Gulf War Veterans’ Illnesses and the Advisory Committee on Human Radiation Experiments have suggested that, given the voluntary nature of enlistment in the military, potential recruits should be warned that they might receive vaccines or have

to take medicines during their service and that joining the military will be considered as a willingness on their part to accept them. In the same perspective, Maxwell J. Mehlman and Stephanie Corley have proposed an interesting framework. For them, respecting the welfare of soldiers can be achieved if the military respects certain principles, namely, proportionality and paternalism (Mehlman & Coley, 2014). In practice, this would mean that military officials should analyse whether “(...) *the risks and benefits of [vaccines, drugs or medicines] [are] understood as well as possible and that imposing them on troops [is] necessary in order to accomplish a legitimate military objective, in that there is no less risky alternative to achieve the mission*” (p. 342). Moreover, people who are ultimately responsible to take the decision should only act “(...) *on the basis of the best evidence of safety and efficacy available within the existing timeframe*” (p. 342). [...]

Moreover, it must be noted that the question of soldiers' autonomy and consent over the use of medicines of all sorts cannot only be waived directly, but also indirectly by implicit pressures. First, contrary to civilians, soldiers are trained to obey orders and to defend their country. This constitutes an implicit incentive on their part to accept situations that many civilians would not accept. As Victor Sidel and Barry Levy argued, the nature of the military organization will inevitably interfere with the notion of consent. “*Because they cannot simply “quit their jobs”, file a grievance with a union, government agency, or professional organization, military personnel may not believe that they can truly refuse to participate in these experiments. They may feel more like a “captive audience” than like volunteers*” (Sidel & Levy, 2003, p. 297). A fear that has been echoed by the House Committee on Government Reform has concluded on this matter that “*in a culture based on a chain of command and the power to compel, attempts at persuasion and education often devolve into intimidation*” (US Congress, 2010, p. 46). [...]

As a former scientist at Porton Down once explained, “*If you advertised for people to suffer agony you would not get them*” (Report of a Court of Inquiry, 1953, p. 86). This belief, which serves as an indirect incentive for soldiers, can of course prevent the military organization from respecting its duty of care. As long as there is an element of trust between the soldiers and the military, the former will be tempted to obey their superiors, which is not the case for civilians.

Also, it is clear that soldiers' refusal to obey often leads to negative consequences for their careers and even their lives. [...] This is why the US Army has imposed rules that are supposed to eliminate pressure from superiors.³ Despite this mechanism, we can nonetheless assume that there is a difference between the theory and the reality of the armed forces. Even with the best intentions, the army will remain a coercive institution that encourages conformity, loyalty, and above all, obedience. In this regard, the policy regarding the use of go-pills is a good example. Even if the US Air Force insists that the use of these amphetamines is voluntary and that pilots must sign a consent⁴ form before using them, the form also states that pilots can be grounded if they decline. Anyone who remotely knows the military system is aware that pilot grounding – whatever the circumstances – can have serious implications on someone's career. As a result, this policy tends to put indirect pressure on a pilot to take the pills, even if he technically has the option to refuse using such drugs (Bower, 2003).

Finally, soldiers' consent may also be altered by another fundamental factor which is not inherent to civilian research. Indeed, just like other human beings, soldiers are led by a strong instinct of self-preservation, and we can assume that many of them will blindly take an advantage, by any means, that would allow them to improve their immediate chances of survival on the battlefield. This point can be highlighted through the experience of former Luftwaffe bomber pilot Horst Freiherr von Lutwitz who said in an interview,

³ The US Department of Defense rules state that “unit officers and non-commissioned officers (NCOs) are specifically restricted from influencing the decisions of their subordinates to participate or not to participate as research subjects”. It also states that “unit officers and senior NCOs in the chain of command are required to be absent during research subject solicitation and consenting activities” (US Army, Human Research Protection Office). Finally, participants need to be informed that “participation is voluntary, that refusal to participate will involve no penalty or loss of benefits to which the subject is otherwise entitled, and that the subject may discontinue participation at any time” (US Army, 1989, Reg. 15-2 I/11/89).

⁴ As echoed by Patrick Lin, Maxwell J. Mehlman and Keith Abney: “The form clearly states that consent is voluntary: “My decision to take Dexedrine”, it reads, “is voluntary. I understand that I am not required to take the medication. Neither can I be punished if I decide not to take Dexedrine”. But the form goes on to say: “However, should I choose not to take it under circumstances where its use appears indicated, I understand safety considerations may compel my commander, upon advice of the flight surgeon, to determine whether or not I should be considered unfit to fly a given mission” [...]” (Lin et al., 2013, p. 74).

*“Of course you don’t abstain from Pervitin because it “might” have minor adverse effects on your health. Not when you could die at any moment anyway”.*⁵ Decades after the Second World War, the same logic is also a constitutive reason why American pilots still use go-pills during some of their flights. Lukasz Kamienski writes in this regard :

“During extremely long sorties, which at times continue for more than forty hours, pilots have no choice, despite officially having the right to choose freely. They are aware that if they do not want to fall asleep or make an error due to enormous operational fatigue, in other words, if they want to return to their base safely, then in specific circumstances they should – for their own sake – resort to stimulants” (Kamienski, 2016, p. 270).

From this perspective, in a situation where the military encourages (sometimes through the fear of punishment) its soldiers to take medicine as the best way to increase their chances of survival on the battlefield or to avoid getting diseases, we can easily presuppose that the notion of *free and enlightened consent* is significantly altered. Considering these forms of pressure, we can wonder how this affects their criminal responsibility if these technologies lead them to commit crimes or deadly mistakes. Can we consider that soldiers taking capacity-increasing technologies because of the aforementioned implicit pressures are entirely morally responsible for the eventual collateral damages associated with their use? Yet, even though they are offered the possibility to consent or not to their use, the case could be made that this choice was not entirely free. A good example in this regard is certainly the use of go-pills used in the US Air Force. These amphetamines do not directly intend to decrease soldiers’ moral judgement and increase their sense of obedience. On the contrary, the use of this drug is strictly a matter of military effectiveness as a way to let pilots fulfil their mission and also to increase their chances of survival by making sure that they will stay alert for the whole duration of their flight. Since fighting a war is not a 9 to 5 job, soldiers must remain alert for unusually long periods of time as a matter of survival for themselves, but also for their comrades who they are protecting from the sky. For instance, in Afghanistan, the average soldier in combat gets only four hours of rest a day; sleep deprivation is the single largest factor in reducing combat performance.

⁵ *“Pervitin, la pilule de Goering”*, Arte Documentary 2015.

<https://www.youtube.com/watch?v=1BHxWrZYISI>

Not only are tired soldiers less physically able to fight and run, they also make more mistakes operating complex weapons systems at their disposal – mistakes that can prove deadly to themselves and their comrades.

What is seen as a necessity by the military was probably best exemplified by a comment made by Colonel Peter Demitry, Chief of the Air Force Surgeon General's Science and Technology division, who said, "*When a civilian gets tired, the appropriate strategy is to land, then sleep. In combat operations when you're strapped to an ejection seat, you don't have the luxury to pull over*" (Hart, 2003).

However, the use of this type of medicine is not without unintended risks, as the Tarnak Farm incident that occurred near Kandahar in 2002 has shown. On that fateful night, an American F-16 dropped a 500-lb bomb on Canadians who were conducting a night firing exercise, which resulted in the death of four soldiers. The investigation found that the pilot violated established procedures and his letter of reprimand stated that he flagrantly disregarded a direct order, exercised a total lack of basic flight discipline and blatantly ignored the applicable rules of engagement. In this case, go-pills were directly mentioned as a factor that could explain the pilot's decision, who was ending a 20-hour workday. It was reported that two hours before the incident, the pilot took a 10 mg dose of dextroamphetamine, and his defence attorney stated that the Air Force had pressured his client to take this pill, which, he argued, may have impaired the pilot's judgement (Simpson, 2003).

Although the hearings that followed this tragic incident did not attribute the friendly fire to amphetamines, the pilot nonetheless blamed the incident on the use of these drugs taken following orders from his superiors. Once again, we will never know whether the use of these types of amphetamines – which have side effects, such as confusion, delusions, or auditory hallucinations – were central elements that contributed to this incident. For the sake of argument, let us assume that the use of go-pills indeed affected the pilot's judgement. In such a scenario, how should we determine his responsibility for the deaths of the four Canadian soldiers? On the one hand, it would be possible to argue that it is absolute since he had the choice to refuse to use these stimulants, but, because of all the implicit pressures previously mentioned, there are reasons to believe that he was pressured to take these amphetamines. This begs the question of whether such a pressured soldier should be sanctioned or not? Would it be fair to do so? What could be the possible repercussions of amnesty on the aforementioned principles of *Jus post Bellum*?

This discussion shows the difficulties of simply copying the principles of civilian research to military research. Not only is the soldier's capacity to consent to experiments or the use of capacity-increasing technologies altered directly or indirectly, but allowing the possibility to refuse their use might also result in exposing the safety of comrades. In other words, the freedom to choose could potentially make them life-threatening liabilities for others. Consequently, the military institution – which is ultimately responsible for the duty of care it owes to its members – would have solid grounds to reject soldiers' right to consent to the use of these technologies. However, considering the sad past associated with military research in numerous countries, there are valid reasons to doubt the military's commitment to a sincere form of paternalism. [...] It seems that the military needs to find new ways to affirm and project a renewed and stronger version of paternalism when it comes to the use of new devices or medicines – elements that are at the core of capacity-increasing technologies. Therefore, there is a need to think about a totally different framework which would, at the same time, respect the military's duty of care and, on the other hand, make sure that soldiers would not be treated simply as a means, but rather as ends in themselves.

REFERENCES

- Bower, Leah. 2003. "Services: No Reason to Change Go-Pill Policy", <https://www.stripes.com/news/services-no-reason-to-change-go-pill-policy-1.2322>
- Doe and Doe v. Sullivan, 756 F. Supp. 12 (USDC 1991)
- Doe v. Sullivan, 938 F.2d 1370 (US app DC 1991).
- Frisina, Michael. 2003. *Medical Ethics in Military Biomedical Research. Textbooks of Military Medicine: Military Medical Ethics*, Vol. 2. Office of the Surgeon General, Department of the Army.
- Hart, Lianne. 2003. "Use of Go Pills a Matter of Life and Death, Air Force Avows", *Los Angeles Times*, January 17.
- Kamienski, Lukasz. 2016. *Shooting Up. A Short History of Drugs and War*. Oxford: Oxford University Press.
- Lin, Patrick, Maxwell J. Mehlman and Keith Abney. 2013. *Enhanced Warfighters: Risk, Ethics, and Policy*, The Greenwall Foundation.
http://ethics.calpoly.edu/Greenwall_report.pdf
- McManus, John, G. Sumeru G. Mehta, Annette R. McClinton, Robert A. De Lorenzo and Toney W. Baskin, 2005. "Informed Consent and Ethical Issues in Military Medical Research", *Academic Emergency Medicine*, Vol. 12, No. 11, pp. 1120-1126.
- Melhman, Maxwell J. and Stephanie Corley. 2014. "A Framework for Military Bioethics", *Journal of Military Ethics*, Vol. 13, No. 4, pp. 331-349.
- Report of a Court of Inquiry*. 1953. Reference AY. 1030. Chemical Defence Experimental Establishment, Porton: Wilts, May.
- Sidel, Victor & Barry S. Levi. 2003. "Physician-Soldier : A Moral Dilemma ?". In Edmund D. Pellegrino, Anthony E. Hartle, Edmund G. Howe & Walter Reed (eds.), *Textbooks of the Military Medicine: Military Medical Ethics*, Vol. 1. Washington, DC, Department of the Army, pp. 293-312.
- Simpson, Doug. 2003. "Air Force pushed pilots to take amphetamines, lawyer says in 'friendly fire' case", *The Detroit News*, January 2.
- US Army, 1989. Office of the Surgeon General, Reg. 15-2 I/11/89.
- US Army, Human Research Protection Office, Institutional Policies and Procedures. VII. 7.c.2 (Possibility of coercion or undue influence).
- US Congress, House of Representatives Committee on Government Reform. 2010. *The Department of Defense Anthrax Vaccine Immunization Program: Unproven Force Protection*, No. 106-556.
- Wolfendale, Jessica and Steve Clarke. 2008. "Paternalism, Consent, and the Use of Experimental Drugs in the Military", *Journal of Medicine and Philosophy*, Vol. 33, No. 4, pp. 337-355.

POLITICS FACING THE SOCIETAL USES OF THE ENHANCEMENT AND THEIR IMPACTS FOR THE MILITARY

*Dominique Reynié,
Director General, Fondation pour l'innovation politique.*

I have to answer a question that was asked of me in the form of the following statement: “*the politics of societal uses of enhancement and their impacts on the military world*”. First off, I would like to define a few words. By *the politics*, I mean all the legitimate actors involved in political decision-making. The quality of this ensemble and its functioning depend, among other things, on the form of the State. I will make a schematic distinction between the liberal State, based on the limitation of power by law and the judgment of the governed - by which the liberal State is a democratic type of regime - and the illiberal State, based on an affirmation of State power, with no other limit than the temporary or permanent impossibility of further growth due to the obstacles encountered and to which its power comes up against - by which the illiberal State seems to me to inevitably be an authoritarian type of regime. The idea of an *enhancement* aims at increasing the physical and cognitive capacities of humans through various technologies, whether they are chemical, mechanical, nanotechnological or biotechnological.

In the context of these clarifications, I will try to answer the question asked here on the basis of the three following hypotheses:

- the effort to increase human performance is anthropological, while the will to increase power has to do with the nature of the State;
- this anthropological determination compels States to accept the project of human enhancement, including applying this paradigm to military issues, notably in the form of the *enhanced soldier* project;
- Liberal States and authoritarian States are not on equal footing when it comes to the question of the enhanced soldier.

ANTHROPOTECHNICS AS AN ANTHROPOLOGICAL FACT

Regarding the first point, it will be considered that, although our era is rich in radically disruptive technologies, all of them are the result of an ageless effort and are part of the distant legacy of the human species' constant attempt to overcome its original condition by increasing its capacities.

Roger Bacon, a great 13th century British scholar, already pointed this out in his time: *“Now an instrument for sailed without oarsmen can be produced such that the largest ships, both riverboats and seagoing vessels, can be moved under the direction of a single man at a greater velocity than if they were filled with men. A chariot can be made that moves at an unimaginable speed without horses; such we think to have been the scythe-bearing chariots with which men fought in antiquity. And an instrument for flying can be made, such that a man sits in the middle of it, turning some sort of device by which artificially constructed wings beat the air in the way a flying bird does. And an instrument small in size for raising and lowering almost infinite weights. [...] And instruments can be made for walking in seas and rivers, right down to the bottom, without bodily danger. For Alexander the Great used these to see the secrets of the sea, according to what Ethicus the astronomer says. These things were all made in antiquity, and it is certain they have been made in our times, unless it be the flying machine, which I have not seen, nor do I know anyone who has, though I do know a wise man who has thought of a way to carry out such a device. Almost infinitely many such things can be made, such as bridges that span rivers without pillars or any support, and machines and unheard-of devices.”*¹

Deep down, in this prescience, we can well perceive an understanding of what human ingenuity can produce as is technologically possible.

We can also quote the famous speech of Giovanni Pico della Mirandola, which shows that already in 1486 it was considered that the human body, the human being himself, could become the object of great human projects of transformation:

*“You, by contrast, impeded by no such restrictions, may, by your own free will, to whose custody We have assigned you, trace for yourself the lineaments of your own nature. I have placed you at the very center of the world [...] in order that you may, as the free and proud shaper of your own being, fashion yourself in the form you may prefer.”*² It may mean *“the form you would have preferred if you had been consulted before you were born.”*

It is a kind of child design through thought experiment. We can see how deep-rooted and powerful this human effort to transform human beings is. It was explicit during the Renaissance and largely initiated what we are the result of, at least still today.

¹ Roger Bacon, *“The Letter of Roger Bacon Concerning the Marvelous Power of Art and Nature and the Nullity of Magic”*, quoted by Cianchi, Marco, 1984, *“Les machines de Léonard de Vinci”*, Florence, Becocci Publisher.

However, not everything is equivalent. By dint of obstinacy and constancy, the increase in human performance has finally brought humanity into an undoubtedly singular cycle, the one which is ours today, where the possibilities seem considerable, on the physical level, on the cognitive level, on the technical level. Our contemporary world aims to modify the body as we have done so far with nature. The naturalness of the body is constantly being questioned, as if it is being pushed back into its ultimate edge by a proliferation of artifices, an intense artificializing of our bodies and our existences, giving life itself an increasingly human foundation, which is less and less natural.

New objectives have emerged. Medicine, long considered an art of repairing the human body, has become an art of increasing its capacities. The paradigm shift is decisive. Augmenting human life, in intensity, capacity, duration, by genetic programming, by the implementation of nanotechnologies, by the presence of prostheses, exoskeletons, etc., at the crossroads of NBICs (nanotechnologies, biotechnologies, computer and cognitive sciences) form a nucleus of expertise and techniques that generate an acceleration of innovation and knowledge. A new step has been taken towards the shift to a post-human goal that some are calling for.³ This can be observed through the questioning of procreation as a means of giving life, through the decline of sexual intercourse as a means of procreation. We are beyond the techniques of artificial insemination and in vitro fertilisation, which already gave life without mating.

We get a glimpse of the idea of a conception outside the human body, outside the woman's body, in an artificial uterus, which we are told is still a long way off but not so much so in the animal world.⁴ Perhaps it is the same with the *genetic scissors*, the CRISPR technology, and the possibility of giving life to a humankind which is genetically programmed by humans, a world where human technology and human life are inextricably intertwined. Natural origin and artifice compete with each other. We are now entering the era of reproduction without sex, the era of the personalised child, the so-called child design, this world where parents wish to predetermine the nature, the quality of their future child, believing that they will ensure, in advance, social success, based on criteria present in the minds of the parents.

² Giovanni Pico della Mirandola: "*Oration on the dignity of man*" [De hominis dignitate], translated from Latin by A. Robert Caponigri, introduction by Russell Kirk, A Gateway Edition, Henry Regnery Company, Chicago, 1956, p. 7.

³ Max More, *Extropian Principles 3.0* (1998-2003) Axe Publishing for online version: <http://editions-hache.com/essais/pdf/more1.pdf>.

⁴ Henri Atlan: "*Lutérus artificiel*", Seuil, Paris, 2007.

At the other end of the birth spectrum is death, which is also the subject of these technological and societal ambitions. The idea of not dying coexists today with the ageless idea of dying as late as possible. This idea, to die as late as possible, has saved our life expectancy many years: under Louis XIV, life expectancy was 25 years because half of the children did not reach adulthood; today the life expectancy of a French person is 82 years. By this spectacular stretch, put within the reach of the greatest number of people, enhanced humanity is already an indisputable reality.

Such an increase in life expectancy provides the basis for general support for enhancement techniques, which are expected to make further progress. These technologies and the breakthroughs they generate are fueling a political movement that is demanding a shift to post-humanism. Fascinating, sometimes naive, contradictory or weak, this movement nevertheless shows the emergence of a new claim that should take on greater importance, that of a human right to benefit from techniques for increasing human capacities.

SOCIAL DEMAND AND POWER POLITICS FAVOUR ANTHROPOTECHNICS

Promises of enhancement meet an anthropological expectation that States do not oppose, not so much because they cannot, but because they have no interest in doing so. I will make the assumption here that these enhancement technologies are going to unfold, are going to be deployed, and that, fundamentally, States will not be able to and will not want to oppose them. What is there to resist? Could governments in liberal states hope to regulate human enhancement technologies when they are supported by powerful social aspirations? Namely: to have healthy children, to ensure the success of one's children, to ensure one's own professional and social success, to experience *happiness*, to reduce the chances of the appearance of diseases considered incurable, to reduce psychological suffering, not to age or at least to age as slowly and as well as possible, not to die...

How could the rulers resist the power of attraction of such expectations in societies where regulation is at least partly based on the consent of the governed? The difficulty is all the greater as these aspirations can turn into demands. This movement in favour of increasing human capacity may indeed be a political demand, for example in terms of justice. In this case, changes to the genome must be justified on the grounds that they are aimed at the equalisation of genetic conditions. The justification here consists in trying to repair the unequal distribution of capacities that occurs by chance in nature and gives some individuals more than others, in the living world in general

but in the human living world in particular, where the existence of inequalities is also regulated by symbolic differences, appearance, etc. We would thus go from chance, which brings luck and bad luck, to choice, with genetic equality as a perspective. “*From chance to choice*” is the motto of this school of thought that seeks to justify the use of genomic technologies.⁵

But the regulation of the possibilities offered by anthropotechnics is not only difficult to carry out because of an already manifest and potentially considerable social demand; it is also difficult because the relevant scale of this regulation is not established: is it at the national level or at the level of a group of States, such as the European Union? Or is it on a global scale, which would involve a cosmo-political framework? However, at the global level, the different States are not on the same level. The absence or weakness of public debate in democracies, beyond a few limited circles, is perhaps indicative of the unease of rulers who are afraid to thwart collective expectations and who find it difficult to make regulatory decisions.

THE ADVANTAGE OF AUTHORITARIAN STATES : ANTHROPOTECHNICS AS A POWER POLICY

Anthropotechnics represent a scientific and technological upheaval of historical significance. Research in this field is also a battle between the great powers, and progress is driven by geopolitics. Anthropotechnics are dominated by a few countries, the United States and China in particular.

However, it will be assumed here that there is no equality among States in this regard, in particular because of the differences in their forms of political organisation. Comparing the United States and China sums up this dichotomy perfectly. A liberal state, the United States, and an illiberal or authoritarian state, China, are not bound by the same constraints. Basically, these two States and the societies they govern can also respond favourably to the demand for physical or cognitive enhancement, to the demand for comfort and progress brought about by these anthropotechnical innovations, simply by letting it happen, i.e. by accompanying social demand. It is conceivable that in both countries and under both types of regimes this demand will continue to grow and that there will not be, on this point, a great difference between one form of organisation and another. At least that is what we are seeing today. Maybe it will be different tomorrow. However, with regard to the more specific issue of the enhanced soldier, there may be

⁵ Allen Buchanan, Daniel Brock, Norman Daniels, Dan Wikler: “*From Chance to Choice: Genetics and Justice*”, Cambridge University Press, 2009 for the ninth edition.

a difference, and even a significant one. Faced with this issue, it seems to me that the policy of the liberal State is subject to a triple constraint, only one of which is shared by the illiberal State.

The first constraint is that of public justification: the liberal State must be able, at all times, to justify its decisions, its actions. The second constraint is that of eventual accountability: at the end of their right to decide, of their mandate, every governor must necessarily give the power back and also be accountable. These two limits characterise liberal or democratic power. The third limitation on the power of the liberal state is the impossibility of further growth due to the encountered obstacles upon which its power stumbles. This limitation is due to the fact that no human power is infinite. It is therefore not a characteristic of the liberal State. Whatever State or whatever form it may take, there comes a point at which it fails to achieve what it has undertaken because it does not have sufficient capacity. However, this does not characterise the power of the liberal State, but the power of any State as a human institution, historically doomed to decline and disappear. The authoritarian State, at its heart, is mainly subject to this one, irreducible limit, the limit of its capacities, the limit represented by the resistance of the obstacle it encounters which it cannot overcome, the limit inevitably carried by the certainty of a decline in history. It is spared the constraints of justification and accountability. The authoritarian State, by its nature, has emancipated itself from the institutional obligation to bring power back into play, since it is possible to hold power for life.

This framework of weak constraints creates a radically different situation when it comes to questioning, reflecting and debating on issues such as the enhanced soldier. I would say that the enhanced soldier sparks ethical questions, the ones we are interested in today, to which political systems will be unequally sensitive. The public debate on this subject will only exist in a compulsory and recurrent manner within the political framework of a liberal State. Yet the enhanced soldier hypothesis is based on profits that are invisible or hardly visible to governed societies, especially in liberal states, still deeply dominated by an irenic mentality. One may question the ability of liberal societies, if not to understand them, at least to approve the plans for enhanced soldiers. The debate could be more strongly influenced by the possible negative aspects: the health of the soldier, the irreversibility of the effects, the sacrificial dimension, including the possible destructive consequences for the enemy, the financial cost that such an investment could represent, etc.

Certain liberal societies, with their irenic culture, will find it more difficult to see the investment of significant financial resources in the defense sphere as useful, even if there is a reason to consider that once again we are witnessing an increase in peril, as is the case in the current context. The perception of risk may not be sufficient or the mechanisms of collective consent may be released too late. Or, on the contrary, it is the prospect of the enhanced soldier that will foster consent for power politics, no longer through the increase of human capabilities but rather through robotisation. The automation of weapons and combat would thus be to the professional army what the professional army was to conscription. Perhaps in this way some of the misunderstandings or resistance of civil society to a liberal State focused on preserving or increasing its power could be reduced. The other option, which is more credible today, is that the advent of the enhanced soldier heralds a weakening of the liberal world through the difficulty these States will have in making decisions on issues that are extremely serious and will be incomparably more controversial than in authoritarian societies. It is in the nature of authoritarianism to achieve significant progress more rapidly and, consequently, greater power if tyrannical power also includes a policy of leadership in science and technology, in a regime that could be likened to a kind of knowledgeable despotism.

INITIAL REFLECTIONS ON AN ETHICAL FRAMEWORK FOR ENHANCING SOLDIERS' PERFORMANCE

*Jeanne Andrade,
Student at the Law, Economics and Management Department,
Ecole Normale Supérieure de Rennes*

WHILE enhancing the performance of soldiers has always been a major concern, the ethical framework has not been a historical priority. Today, however, the prospects offered by technological progress, particularly in terms of cognitive abilities, call for the definition of a rigorous framework.

First of all, we can break down the generic term *enhancement*, which could be interpreted more as *improvement*, to reveal all the subtlety of the fields that enhancement could cover. Not every enhancement is necessarily an improvement. The etymology is enlightening: to improve (*améliorer in French*) refers to the Latin *melior*, better, i.e. to make better. To increase (*augmenter in French*) refers to the Latin *augere*, that is to say to make bigger, more important. Thus, if one uses the term *enhancement*, one must however add a qualitative dimension to its understanding, and for this to set limits to the development of techniques used militarily: the field of the possible is not the field of the desirable (I). Secondly, the implementation of these techniques also calls for a certain degree of caution, which requires exemplary behaviour on the part of the commander and the medical officer (II).

THE FIELD OF THE POSSIBLE IS NOT THE FIELD OF THE DESIRABLE

Scientific progress opens the way to an extremely large number of hypotheses of enhancement, which must however be restricted for ethical reasons but also for reasons of military efficiency. Indeed, the possibilities offered by technology go beyond what civil and military society considers to be ethically acceptable. Thus, while the range of possibilities is immense, it is not desirable to go beyond certain limits, which we shall try to establish in this section. We shall therefore mention three situations that must absolutely be avoided: the loss of cognitive autonomy (1.1), the temptation of a moral enhancement (1.2) and, finally, the transmissibility of enhancements (1.3).

Loss of cognitive autonomy

The soldier in a combat situation is required to use his cognitive skills at all times: concentration, environmental analysis and decision-making are inseparable from the combatant's mission. Enhancing these skills could

reduce the risk of a wrong decision made under fear, stress or pain. Nevertheless, the soldier must never be deprived of his free will, otherwise the humanity that guides his choices will be abolished. Thus, annihilating the influence of emotions would lead to the suppression of indicators that are nonetheless essential¹ : fear of danger, as long as it is not paralyzing, forces the soldier not to put himself in excessive danger, just as empathy leads to the solution sacrificing as few enemy lives as possible. It must therefore be kept in mind that eliminating these human emotions completely would lead to increased mortality: soldiers becoming insensitive to the possibility of their own death and that of the enemy.² The logic of efficiency is then confronted with the ethics of respecting human life and not causing *unnecessary harm*. There should be no disproportionate violence by insensitive soldiers.

Decision-making must therefore necessarily include the human element because the ethics of the combatant, with its human *weaknesses*, will probably never be artificially affected. This idea is summed up by Marshal Maurice of Saxony: “*the human heart is the starting point for all aspects of war*”. In *The Ethics of the French Soldier*, General Benoît Royal gathers several testimonies of soldiers confronted with Cornelian choices, who were finally able to make decisions that were far from obvious, but whose ethical value was remarkable.³ No pharmacology, no implant, however elaborate, can and should replace this fundamentally human ability.

The issue of the loss of cognitive autonomy of the combatant must also be seen in the context of war crimes. Should a soldier who is impervious to emotions as a result of an enhancement in the number of emotions, guilty of criminal acts towards an enemy, a civilian or even a comrade, be held responsible? Under criminal law, an individual with impaired mental faculties is irresponsible, unless the impairment is the result of voluntary intoxication (alcohol, drugs). However, the qualification of a *voluntary act* will depend on the conditions of the enhancement: if the soldier had not been informed of the adverse effects, or even had no choice as to the use of the enhancement technique, he would probably be declared irresponsible. The problem of consent then arises: does a soldier obeying an order really perform a *voluntary act*?

¹ Captain Jean Thomas Rubino DSI “*Le soldat augmenté*” page 35 Special issue n°45 Defence & International Security.

² The enhanced soldier, pushing the limits to adapt.
Ned Dobos: “*Soldier enhancement : New technologies and the future battlefield*”, conference organised by the ICRC, Melbourne, 27 mai 2014.

³ See the exemple given by Michel Stouff “*Chad, pacification campaign, 1970*” page 1 to 3.

While it is legitimate to doubt it, the answer is nonetheless decisive for the treatment of a war crime. Indeed, the appeasement of the conflict necessarily requires the recognition of the faults committed by both sides, and the disempowerment of the soldiers, on the grounds that they were not lucid, would appear to be an attempt to avoid the consequences of wrongful acts. This issue is problematic, especially since some of the prospects of an enhancement aimed at acting on memory could complicate the investigation of these crimes. Thus, the gigantic BRAIN (Brain Research through Advancing Innovative Neurotechnologies) project, launched by DARPA⁴, includes the RAM Replay⁵ program, which aims to act on the formation of soldiers' memories: by promoting the formation of specific memories while reducing the occurrence of traumatic memories, a neurostimulation technology would make it possible to combat post-traumatic stress disorder. Obtaining testimonies that would allow the identification of perpetrators of war crimes would be extremely difficult, as soldiers have *erased* the memories of the traumatic event.⁶

More broadly, the enhanced soldier, compared to the natural soldier, would also be by nature susceptible to *overexposure*. If the supernatural capacity he will have to manage his mission is calibrated to the mission, at the same time, the post-mission consequences could prove even more significant. The enhancement could probably lead to an additional shock that would cumulate with the *natural* shock.⁷ In this respect, it becomes legitimate to question whether it is ethically possible to make the soldier bear a post-traumatic burden that a human being by nature could not bear. The enhancement will undoubtedly inevitably have to lead to enhanced support to learn how to manage acquired overcapacity, avoid even greater post-traumatic stress syndromes and ensure the best possible rehabilitation.⁸

The dangerous temptation of a “moral uplift” ..

The ethical questionings discussed here are ultimately based on the will of the Army, and particularly of the soldier himself, to wage a war without unnecessary nuisance while maintaining moral integrity in all circumstances.

⁴ Defense Advanced Research Projects Agency, [on line]. Available on <https://www.darpa.mil>

⁵ Restoring Active Memory, [on line]. Available on <https://www.darpa.mil/program/restoring-active-memory>

⁶ This idea is developed by J.F. Caron in: “*The Super Soldier Theory*”, page 84.

⁷ This is only an assumption, in no way does this hypothesis seem to have been invalidated or affirmed for the time being (the author does not claim to have carried out an exhaustive research).

⁸ Thanks to Cyriaque Naut for his help in writing this part.

Consequently, some people imagine that this moral integrity can be reinforced by means of enhancement technologies. The Canadian philosopher Ryan Tonkens sees this perspective in particular as going hand in hand with the increase in the physical and cognitive capacities of combatants: tempering the newly acquired potential would involve strengthening the moral conduct of combatants, which would be more easily achieved with the help of technology⁹. This idea was developed by Ingmar Persson and Julian Savulescu,¹⁰ researchers at Oxford University, who envisage an increase in moral conduct to mitigate the technological power acquired by modern societies. They are based on the hypothesis that morality would have a biological basis, and that thus the administration of certain substances could inhibit the deviant behaviour of individuals. In the case of the Army, the aim would then be to suppress the immoral behaviour of combatants (abnormal sexual impulses, appetite for alcohol, racist bias¹¹, etc.) in order to encourage a *virtuous* attitude.

This proposal for a moral enhancement is far from unanimous¹², and it would be preferable that it never see the light of day. Here we are faced with an ancestral fantasy: to make individuals morally better, quickly and efficiently. Such a technology would make it possible to *repair* psychopaths, but also individuals prone to addictions, or to eliminate racist and discriminatory behaviour in general. Within the military, morally uplifted soldiers would be expected to behave in an irreproachable manner. However, in practice such an increase is unthinkable.¹³ Seeking to enhance the morale of soldiers is therefore very difficult, since it is impossible to identify a universal moral conduct. Of course, there are moral values that are easily shared, but here again, seeking to increase their importance for the combatant in all circumstances proves to be a dangerous idea. Take the example of lying: lying is almost unanimously condemned, so good moral conduct prohibits this behaviour. In the Army as elsewhere, therefore, lying is also outlawed. Therefore, it is decided that the soldiers' aversion to lying must be enhanced. What remains of this fine intention if a fighter is captured by the enemy and is unable to lie to him?

⁹ Ryan Tonkens: “*Morally enhanced soldiers : beyond military necessity*”, in Jai C. Galliot et Mianna Lotz (ed): “*Supersoldiers. The ethical, legal and social implications*”, Farnham, Ashgate, 2015, p.53-61.

¹⁰ Ingmar Persson et Julian Savulescu: “*Unfit for the future. The need for moral enhancement*”, Oxford, OUP, 2012.

¹¹ Terbeck, S., Kahane, G., McTavish, S. et al. “*Propranolol reduces implicit negative racial bias*”, *Psychopharmacology*, 222: 419, 2012.

¹² Veljko Dubljevic: “*Moral enhancement is science fiction, not science fact*”, *Scientific American*, 30 mai 2017.

¹³ Definition given by the French “*Petit Robert*” dictionary.

While it is clear that there is no universal definition of morality, it also seems that the context necessarily influences its practical application.

Finally, any attempt to increase the morale of soldiers through technological means is obviously an infringement of fundamental freedoms. The right to privacy, a freedom protected by the 1948 United Nations Universal Declaration of Human Rights (Article 12), but also freedom of opinion (Article 19) would be seriously endangered, even more so if enhancement techniques had irreversible consequences. It is to be hoped that this hypothesis stops at science fiction; the opposite would mean a worrying upheaval in respect for the individuality of each person. Without falling into the “*To each his own morality*”, the fact remains that the subjectivity of this notion is not to be erased or even controlled.

The need for non-transferability of enhancements

A priori, the context in which the enhancement is applied would be likely to shift the unacceptable to the acceptable without even intrinsically changing the nature of the enhancement. Nevertheless, a hard core should be irreducible: the preservation of the germ line. Modification of the genome, however laudable it may be for therapeutic purposes, must under no circumstances be transmissible to the future generation. Taking the risk of disseminating a gene that is a priori beneficial but potentially harmful would directly contravene the primary objective of genome manipulation: to protect human beings. Hell is paved with good intentions. The precautionary principle, which is essential, is directly aimed at the preservation of the entire human species, without temporality. Modifying the genome to counter negative effects does not guarantee a better situation for the patient. By way of example, it would be possible to give the case of sickle-cell anaemia. This genetic disease affecting haemoglobin, more particularly present in Africa, provides better protection against malaria.¹⁴ This ambivalence of a genetic variation which can be both an advantage and a disadvantage depending on the given context ensures a *dormant* protective role which will only reveal its importance once the disease has appeared or reappeared. The gene cannot be intrinsically bad and requires contextualization. Beginning to modify the genome to compensate for an abnormality could in turn create an abnormality, which in turn would have to be compensated for, creating a need for cascading modification.

¹⁴ Dominique LABIA: “*The complex relationship between haemoglobinopathies and malaria*”, *Medicine/Science (M/S)*, 2010, vol. 26, No. 8-9, pp. 685-687, [online], Available at <https://www.medecinesciences.org/en/articles/medsci/pdf/2010/08/medsci2010268-9p685.pdf>.

On a multi-generational scale, the precautionary principle imposes the conservation of genetic diversity to maximize the likelihood of an individual being resistant to the disease, a choice aimed at directly protecting future generations. The only way to achieve this is to compartmentalize the modification of the genome, with gene therapy then having to be replicated for each generation. The transmission of a genetically modified trait must therefore be absolutely prohibited and must not be subject to any exceptions. Even if it is the only solution for treating an individual, the interests of the human species must take precedence over the interests of an individual.¹⁵

ETHICAL IMPLEMENTATION OF ENHANCEMENT TECHNIQUES

Individual assessment of the combatant's capabilities, an indispensable prerequisite

Referring to the legislation in force concerning the military use of vigilance modifying substances¹⁶, one particularly highlighted point is that it is certainly applicable in the context of the enhancement. This is the individual assessment of the capabilities of combatants.

This assessment appears to be an essential prerequisite for maximising the efficiency of the use of enhancement techniques. This must first of all make it possible to avoid automatic recourse to enhancement, which could lead to dependency. This idea can be illustrated with an example by Miguel Benasayag¹⁷: a taxi driver driving with a GPS has the subcortical nuclei (used to map time and space) atrophied compared to a person not using this technology. By analogy, the same perverse effect can be feared with fighters. For example, a soldier who does not need enhancement technology (for example, with an already very high fatigue resistance) may no longer reach his initial (i.e., natural) performance level if he resorts to automatic enhancement. It is to be expected that this assessment may eventually lead to specialisation, due to the specific needs of certain Army corps. Thus, Special Forces soldiers would potentially be preferred candidates for enhancement. However, this hypothesis is questionable, as it amounts to giving an advantage to certain soldiers, which raises the question of the perception by other Army corps of this apparent imbalance.

¹⁵ Thanks to Cyriaque Naut for his help in writing this part.

¹⁶ Ministerial Instruction No. 744/DEF/EMA/SC_PERF/BORG - No. 744/DEF/DCSSA/PC/MA on the military use of vigilance-modifying substances.

¹⁷ Miguel Benasayag: “*Brain Increase, Man Decreased, The Discovery*”, 2016, 200 pages.

The difficult and crucial issue of consent

According to Article 16-3 of the Civil Code, injury to the integrity of the human body is admitted subject to two cumulative conditions: a medical necessity for the person, and the obtaining of his or her consent. The first condition does not have an obvious place in the framework of the use of enhancement, and would surely be replaced by the notion of *military necessity*, which depends in particular on the context. On the other hand, the consent of the soldier seems to remain a prerequisite for any invasive technique that would be used. Today, the use of substances that keep the combatant awake or, on the contrary, facilitate falling asleep is unequivocally subject to his consent, for example the use of modafinil.¹⁸ The soldier is free to take or not take such a substance, and may withdraw his consent at any time until it is actually taken. Such consent must be free and informed, i.e. given with knowledge of all relevant information. The question then arises as to whether enhancement techniques should be subject to the free and informed consent of the soldier.

On the notion of informed consent, the crucial question is that of the information given to the soldier, both by the military leader and the doctor. So, should everything be said? It seems legitimate here to assert that the soldier must always be informed of the effects, both main and undesirable, of an enhancement technique, regardless of the context. One could immediately counter the following argument: an enhancement that is absolutely necessary but which may have undesirable effects will be refused by the soldier, and will endanger the group and the mission. However, this argument is contradicted by several ideas. First of all, referring to such logic denies the capacity for self-sacrifice of the soldier, who commits himself by being willing to sacrifice himself for his comrades and his country, and who, knowing the conditions of success or survival of the group, would most likely be inclined to enhancement.

Above all, there is a hierarchical relationship between the leader and his men, but also a relationship of trust based on transparency. The leader is thus led to explain in detail the progress, purpose and difficulties of a mission, and this bond of mutual trust is a solid basis for military effectiveness. Breaking this bond of trust by giving only certain information about an enhancement technique would be deleterious, especially in the long term. Indeed, a group

¹⁸ Ministerial Instruction No. 744/DEF/EMA/SC_PERF/BORG - No. 744/DEF/DCSSA/PC/MA on the military use of vigilance-modifying substances.

that is led to be enhanced but no longer has confidence in the leader's word will legitimately question the real effects of this enhancement.

This effect of suspicion is detrimental to group cohesion, but could also have harmful consequences for the individuals themselves. Indeed, in the absence of reliable information on the potential undesirable effects of an enhancement technique, soldiers could experience a nocebo effect, i.e. have their symptoms amplified by the expectation of undesirable effects. For example, a combatant could suffer from migraine headaches or pain at the end of a combat mission when the enhancement presented no risk. It therefore seems necessary for the soldier to be fully informed about the enhancements that are to be proposed to him, or even imposed on him if the context so requires, which is what we are going to discuss now.

Obtaining the consent of the soldier as a sine qua non condition for the enhancement comes up against the military reality, and in particular the different contexts in which it takes place. For example, a context of military necessity (for example, a particularly risky sustained operation that does not allow for restorative sleep while the combatants must have maximum vigilance and discernment) could push the leader to enhancement in order to ensure the success of the mission or to maximize the chances of survival of his unit. In this case, the soldier's refusal would present risks to his own survival, but also to that of the group, and even to that of civilians, hostages, etc. Consent must then be weighed against the hierarchical principle that prevails in military matters. Consent should be required, unless the enhancement becomes an order when the context justifies it. Giving such an order would be a matter for the leader, but within a defined framework: not every context requires the physical integrity of individuals to be violated. It is already necessary to ensure that the enhancement is proportionate and legitimate in order to achieve the objective, but also that there is no less dangerous alternative.¹⁹

Forcing the soldier to enhance is a worrying hypothesis, which must be reserved for very limited cases, such as the urgency for the survival of the soldier, the group, the urgency for strategic success and finally the case where the soldier's discernment is no longer sufficient for him to think in an enlightened way. Above all, if the principles mentioned above are respected, and in particular the principle of maintaining a strong bond of trust between the leader and his soldiers, then the soldier's approval will undoubtedly be

¹⁹ Mehlman et Corey: "*Military bioethics*" page 15.

obtained, for two reasons²⁰: the relationship of trust built with the leader, particularly through transparency, means that the soldier will not have a reflex of distrust but, on the contrary, will have faith in his leader, and will follow orders knowing that he is seeking to act in the interest, above all, of the mission. This ideal is only possible if the leader is actually honest about the mission, the effects of the enhancement (positive and negative), the chances of survival, etc. The soldier will not be suspicious of the mission, but will have faith in his leader and will follow orders knowing that he is acting in the best interests of the mission. The second reason is that the leader leads by example, so that if he uses enhancements, his soldiers, in confidence, will follow him. Using the same enhancement technique as his soldiers would make it much easier for the leader to win their approval.

CONCLUSION

There are multiple reasons to enhance the fighter. Operational efficiency is undoubtedly the first pillar. Indeed, between effectiveness and ever-increasing efficiency, it is a question of doing more with less. “*In an outrageously utilitarian manner, why refuse to consolidate man and soldier if they are the weak links of tomorrow?*”²¹ Awareness of the stakes involved in the enhancement seems real within the military world, however, the greatest pressure will undoubtedly come from civil society, whose technological developments are less constrained by ethical limits. The porosity of these two spheres is obvious, which raises the question of how far ethical barriers, however indispensable they may be, will be effective and persist.

²⁰ These two reasons result from an interview with Captain Marconnet (St-Cyr Military Academy).

²¹ “*The Enhanced soldier, needs and perspectives in soldier’s enhancement*”, B Barrera.

CONSENT AND THE PHARMACOLOGICAL PERFORMANCE ENHANCEMENT OF SOLDIERS

Héloïse Goodley
Army Chief of General Staff,
Research Fellow at the Royal Institute of International Affairs Chatham House.

THE LEGAL REQUIREMENT FOR CONSENT

ONE of the primary concerns relating to the use of performance enhancing drugs by the military is the issue of consent. Governments and their armed forces have an ethical and legal duty of care to soldiers.¹ And this includes the maintenance of health and prevention of sickness of all military personnel, in addition to their protection against infection diseases, lethal agents and other hazards.² Governments also hold a legal duty of care to soldiers, to afford them voluntary and informed consent to medical procedures.³ This is a legal requirement which is set out in the European Convention on Human Rights and Biomedicine, which states that any medical intervention “*may only be carried out after the person concerned has given free and informed consent to it*”.⁴ However, achieving such voluntary and fully informed consent in the military is challenging for a number of reasons.

¹ House of Commons Defence Committee. (2005), “*Duty of Care. Third Report of Session 2004-05 Volume 1*”, London: The Stationary Office Limited. <https://publications.parliament.uk/pa/cm200405/cmselect/cmdfence/63/63.pdf> (accessed 5 Jul. 2019).

² Ministry of Defence. (2007), “*Queen’s Regulations for the Army*”, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/440632/20150529-QR_Army_Amdt_31_Jul_2013.pdf (accessed 6 Jul. 2019). Ministry of Defence. (2017), Joint Service Publication 950 Medical Policy. Ministry of Defence. (1997), “*Background to the use of Medical Countermeasures to protect British Forces during the Gulf War (Operation GRANBY)*”, <https://webarchive.nationalarchives.gov.uk/20051115023018/http://www.mod.uk/issues/gulfwar/info/medical/mcm.htm> (accessed 6 Jul. 2019). Gibson, T. (2002), “*A Shot in the Arm for the Military: Consent to immunisation Against Biological Warfare Agents*”.

³ Ministry of Defence. (2017), Joint Service Publication 950 Medical Policy.

⁴ Council of Europe. (1997), “*European Treaty Series No. 164, Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine*”, <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=090000168007cf98> (accessed 6 Jul. 2019).

VOLUNTARY CONSENT

The hierarchical nature of the armed services means that soldiers are likely to feel coercion from the chain of command to undergo treatment, whether genuine or not. Especially where failure to receive treatment would render them unfit for duty, for example in accepting a pre-deployment vaccination such as Yellow Fever. Further to chain of command pressure, soldiers are also likely to experience peer pressure or personal guilt where refusal to accept medical treatments places additional burden upon their colleagues. Additionally, if failure to accept an medical intervention limits a soldier's ability to perform their duties, for example by making them non-deployable there may be career implications of refusal too. These factors all compromise the military's ability to ensure soldiers freely express voluntary consent.

The voluntary nature of consent can also be compromised where those who accept performance enhancing drugs are remunerated for doing so, as with other high-risk, arduous and unpleasant duties in the military.⁵

And if enhanced soldiers were to perform acts of heroism would they still be recognised for this with honours and awards? Such potential for additional pay and medals further clouds the nature of consent to taking performance enhancing drugs in the military.

INFORMED CONSENT

And it isn't just the voluntary nature of consent which poses problems in the military, there are challenges to providing adequate information too, especially where medical intervention is part of a classified programme for operational reasons. An example of this can be found in the implementation of the immunisation programme against biological warfare agents for UK troops during the Gulf War in 1990-91. British soldiers deploying to the Gulf faced the threat that Iraq might use biological and chemical weapons against them, so the UK Government implemented a programme of medical

⁵ For example unpleasant work allowance is awarded “*to compensate Service personnel for operating in conditions involving an exceptional degree of discomfort or fatigue, or exposure to noxious substance beyond that compensated for by*” normal pay. “*It is paid for the wide range of activities that Service personnel may be expected to undertake which fall outside their normal range of military duties and are considered to be of an objectionable, or harrowing, nature.*” (Ministry of Defence. (2019), Joint Service Publication 752 Tri-Service Regulations for Expenses and Allowances, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/813165/JSP_752_v39_July_2019_Final.pdf (accessed 9 Jul. 2019).

countermeasures to protect them. As part of this programme these soldiers received a series of vaccination against bubonic plague, whooping cough (pertussis), and anthrax, however, due to the requirement to prevent Iraq from learning of the nature of these medical countermeasures, the programme was classified as secret.⁶

Due to operational security the secret classification of this vaccination programme had the unintended outcome of limiting the information provided to soldiers who were offered these vaccinations, and as a consequence many soldiers had no real understanding of what the immunisation programme involved, or what vaccines they were given. Similarly, any military pharmacological performance enhancement programme would be likely to be protected by a comparable security classification, meaning that soldiers taking part would be unlikely to have complete information on which to make a decision to consent. This predicament places a greater responsibility on those authorising and administering their use, especially military doctors and medical practitioners, who are responsible for the treatment and medical care of soldiers in barracks and on operations.

Unlike the majority of civilian doctors, doctor's in the armed forces must navigate between two different loyalties, as a doctor to their patients, and as officers to their chain of command.⁷ These loyalties have the potential to come into tension where a doctor's ethical obligation to patients comes into conflict with the demands of military necessity. For example, when patient confidentiality restricts the sharing of information relating to justifiable military concerns regarding a soldier's fitness for active service, or when triaging conflict casualties according to their clinical needs regardless of which side they fought on.⁸ As officers, military doctors operate within the hierarchical structure of the institution and therefore are bound by service law to obey the lawful commands of those in positions of authority.⁹ And as

⁶ Ministry of Defence. (1997), "*Background to the use of Medical Countermeasures to protect British Forces during the Gulf War (Operation GRANBY)*".

⁷ Blair, D. (2011), "*To Whom Does a Military Medical Commander Owe a Moral Duty?*", in Whetham, D. (ed) (2011), "*Ethics, Law and Military Operations*", Basingstoke: Palgrave Macmillan. British Medical Association. (2012), "*Ethical Decision-Making for Doctors in the Armed Forces*": A Tool Kit, London: British Medical Association, <https://www.bma.org.uk/advice/employment/ethics/armed-forces-ethics-toolkit> (accessed 8 Jul. 2019).

⁸ Ibid.

⁹ Ministry of Defence. (2016), Joint Service Publication 830: "*The Manual of Service Law*".

medical professionals they are also regulated by their professional governing body, which has the power to sanction doctors who are in breach of medical ethics and fail to uphold the standards expected of them. In theory these dual obligations, between the military and medical professions, could come into opposition, and it has been suggested that in order to overcome this, military doctors would not be responsible for the implementation of pharmacological performance enhancement, but rather a parallel profession of *military enhancer* could be created to oversee such a programme.

DISPARATE UPTAKE

Another challenge in administering performance enhancing drugs in the military is their uptake. If consent is to be voluntary and informed, than uptake could be mixed, where some soldiers are willing to take drugs while others are not. A situation could therefore arise whereby a unit of soldiers has synthetically created performance disparities among its members, rather than those which result of natural human differences. This would leave military commanders with a predicament over whether to entirely decline the drugs, or to permit some to take it and bare the additional risks and burden, and also whether to accept the damage such a split could have to unit cohesion.

Consent isn't the only option. There is scope within human rights law to compel soldiers to undergo medical intervention without the requirement for consent, but this is strictly permitted only on the basis of public safety or in circumstances where it is necessary for the protection of the rights and freedoms of others.¹⁰ Such exceptional circumstances, requires approval at the highest level, and is only permitted under conditions where obtaining consent is not feasible, contrary to the best interests of the soldier, or not in the interests of national security.¹¹

¹⁰ Council of Europe. (1997), “*European Treaty Series No. 164, Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine*”. Council of Europe. (1997), “*European Treaty Series No. 164, Explanatory Report to the Convention for the Protection of Human Rights and Dignity of the Human Being with regard to the Application of Biology and Medicine: Convention on Human Rights and Biomedicine*”. <https://rm.coe.int/CoERMPublicCommonSearchServices/DisplayDCTMContent?documentId=09000016800ccde5> (accessed 6 Jul. 2019).

¹¹ FitzPatrick, W., and Zwanziger, L. (2003), “*Defending Against Biochemical Warfare: Ethical Issues Involving the Coercive Use of Investigational Drugs and Biologics in the Military*”, *The Journal of Philosophy, Science and Law*, 3, <http://jpsl.org/archives/defending-against-biochemical-warfare-ethical-issues-involving-coercive-use-investigational-drugs-and-biologics-military/> (accessed 6 Jul. 2019).

CONCLUSION

The potential to pharmacologically enhancing the performance of soldiers offers many potential benefits to the military, however it comes with the requirement to consider the ethical and legal predicaments of such technology, as with the introduction of all new technologies. This article has considered the particular debates concerning the issue of consent to pharmacological performance enhancement, including the requirement for consent to be obtained that is voluntary and informed, and the specific difficulties in achieving this in the military environment. Any programme to enhance the performance of soldiers using pharmacological options would place a particular tension on the role of the military doctor and medical practitioners, who's trust and professional ethics must not be compromised.

ETHICAL REFLECTIONS ON THE ROLE OF MILITARY HEALTH CARE PROVIDERS IN ENHANCEMENT

Daniel Messelken¹

*Centre for Military Medical Ethics on behalf of the Centre of Competence for Military and Disaster Medicine of the Swiss Armed Forces
Center for Ethics, University of Zurich.*

INTRODUCTION

THE aim of this short paper is to comment, from an ethical perspective, on some issues related to the use of medical enhancement by the military without providing an extensive analysis of the topic. The present paper is concerned with the potential effects that a broader implementation of medical enhancement could have on military health care providers (HCP).² For example, how such a development could affect and change the role of medical personnel from a health care provider to that of an enhancer. By sketching some ethical concerns and limits as well as some ethical challenges of using medical enhancement on soldiers, this paper aims at adding a comment to the discussion rather than an elaborate position and at providing food for thoughts in an important debate.

Why: Is there a case to enhance from a medical perspective?

It is widely held that medical enhancement³ is or will be a necessary and almost unavoidable means if one is to survive in future military conflicts. Still, the question should be asked why enhancing soldiers should possibly have this alleged importance and what objectives shall be achieved by using it. From the perspective of military medicine and military medical ethics (that this paper concentrates on), enhancement could be understood as a part of force protection, which is one of the central aims of military health services.

¹ Acknowledgments: Research on this paper was partly funded by the Centre of Competence for Military and Disaster Medicine of the Swiss Armed Forces and the author's participation at the symposium in Paris was supported by Euro-ISME.

² The term "health care provider" shall be understood inclusively to refer to all persons who are engaged in providing health care, such as physicians, nurses, paramedics, psychiatrists, etc.

³ I do not want to debate here what exactly is meant by medical enhancement. The term shall be understood in a rather broad way as "biomedical interventions that are used to improve human form or functioning beyond what is necessary to restore or sustain health" (Juengst and Moseley 2016, 1). Medical enhancement, more generally, "is about boosting our capabilities beyond the species-typical level or statistically-normal range of functioning for an individual" (Allhoff et al. 2010, 3). For an overview on definition elements see also (de Boisboissel and Le Masson 2017).

According to this argument, there is a duty to protect soldiers and to give them the best possible equipment, training, and other means of support so that they can fulfill their missions and still have the best possible chances of remaining unharmed or to survive. Medical enhancement could thus be understood as a contribution of medicine to force protection and to support the capacities of soldiers.

Two things remain questionable however: first, it is unclear if and to what extent medical enhancement is the answer to existing questions or whether it is rather adopted in anticipation of possible future challenges or of what the other side may do. Second, one could ask if the use of medical enhancement to some extent constitutes a cheaper and (for the military) easier alternative than refined and time-consuming training methods or costly equipment. Also, one may wonder whether enhancement is accepted rather quickly because it also has some appeal from the perspective of the soldiers themselves. The answers to these questions have to be weighed against the (unforeseeable) effects that medical enhancement can have on individual safety, its risk of side effects (also in the longer term and when enhanced soldiers will be back in civilian life) and similar serious issues.

Given that medical enhancement is still a rather unexplored field and that many of its methods rather belong into the domain of research and cannot count as ordinary medical treatment⁴, it is all but obvious that medical enhancement is ethically the best answer to current and future challenges. One will have to consider other approaches (such as training, equipment, and resources), but also changes in politics as alternative answers to the questions that medical enhancement seems to be the answer to. One must at least understand why the military might want to enhance members of their fighting forces and which alternatives should be explored or should be sought after. In short, medical enhancement should not be taken as an unavoidable given and certainly not as the only option available.

What could (or should be) the role of military HCP in enhancement?

In the present paper, the question of medical enhancement shall be discussed from the perspective of military HCP, that means from the perspective of those who administer rather than receive the enhancing treatment. The effects that administering medical enhancement may have on

⁴ The distinction between research and ordinary practice has prominently been established by the Belmont Report. See Beauchamp (2008) or, for a discussion of applying it to the current context, Messelken and Winkler (2020b).

the role and perception of medical personnel are often overlooked and shall be given some thought here.

The question of how the role of military HCP will be affected by the use of medical enhancement on soldiers is first an empirical question. It remains to be seen and it depends on what kinds of (medical) enhancement will come up, what methods will effectively be used, and how the actual use of enhancement will be organized. Thus, with regard to the factual role of military HCP in enhancement much depends on practical constraints and future developments; it would be speculation to go into further details here. The second way in which the question of military HCP's possible role in enhancement can be understood and analyzed is as a normative question: what should and could the role of military medical personnel in enhancement be from an ethical perspective? The answer to this challenging question has the potential to significantly alter the role of military HCP as it is currently conceptualized. First, a normalization of administering medical enhancement to (own) soldiers changes the role of medical personnel from that of a health care provider, doctor, etc. to that of a direct provider or supporter of the fighting capacity. Hence, such activities do not fall within the so-called humanitarian function of medical personnel. Second, using new technologies like enhancement is not neutral from an ethical perspective but has (at least) implicit assumptions. I will comment here on three ethical issues that arise of the mixed or double role that HCP will have when responsible for providing both curative medical care and enhancing (viz. non-therapeutic) treatment.

First and obviously, one has to decide which of the two roles is the more important one and how they are ranked in case of (role) conflicts. If one understands medical enhancement treatments as one of the tasks of military medical personnel, it may not be self-evident if the role of enhancer or the role of ordinary health care provider prevails under duress. Would a soldier be treated first who has been injured in recent battle or would his comrade be preferred who is about to go on a mission that supposes some form of medical enhancement? In other words, will HCP remain doctors in the first place or may their role as enhancer become the more important one?

Related to this issue is a second question, namely whether one person can be the doctor and the enhancer of the same soldier at the same time, that is treat the same person as a patient and as a *soldier-to-be-enhanced*? The first role is the ordinary role of the doctor and about restoring health, treating injuries or diseases that may or not be the result of working as a soldier; one could label it the *healing role*. The second role is about fostering military

capacities and providing medical enhancement to a soldier rather than to a patient on the basis of military requirements and with the aim of supporting a military activity. In this role, the doctor (or should we call him the *enhancer*⁵) is thus even more acting according to a military logic that military HCP anyway find themselves submerged in. The aim of military HCP's work is then not only *to conserve fighting strength*, but to medically enhance the fighting force. If the same personnel shall be responsible for both therapeutic and enhancing treatments, the existing dual or mixed loyalty issues that military HCP already face (see for example Allhoff 2008) will certainly be reinforced in the future.

Third and importantly, the inclusion of medical enhancement in the responsibilities of military HCP could alter their role in such a way that they may eventually lose the protection granted by IHL. Medical personnel is protected because they do not directly participate in the conflict and because they (are expected to) provide medical care in an impartial manner (Melzer 2016, Ch. 4); thus, to some extent, military HCP can be seen to work outside the conflict logic even though they are an integral part of the military organization (Messelken 2019). Still, including medical enhancement into the standard repertoire of military health care would widen the role of military HCP and clearly extend their domain beyond the humanitarian function. Legal discussions whether enhancing soldiers can be interpreted as a direct participation in hostilities or at least an act harmful to the enemy are ongoing (Liivoja 2017) and the same issue merits more attention in the ethical debate as well. Even if it appeared that legal protection remained in place, the implication of HCP in medical enhancement of soldiers may arguably still provide explanations for a loss of respect for HCP in reality as they may more and more be recognized as part of the fighting forces instead of an actor with a distinct medical role. Arguably, a clear separation of the healing from the wounding role (Sidel 2004, 2562) still offers the best protection against creating mixed and concurring responsibilities within one person. In the end, a physician better be a "*Physician First, Last, Always*" (Annas 2008).

Ethical boundaries to enhancement?

Let us assume, for the sake of the argument, that human enhancement will be administered by military HCP despite the concerns uttered in the preceding section. In this case a number of ethical boundaries have to be

⁵ On the distinction between physician and enhancer, see for example Fischer (2020).

respected in any case. Concentrating on the role of military medical personnel, this paper will limit itself to comment on some issues within the domain of (military) medical ethics.

First, the paramount principle of medical ethics, viz. informed consent, must be respected under all circumstances. Any reduction or misinterpretation of this principle for example to institutional consent cannot suffice: an enhancing treatment cannot be ordered but must be agreed to by the individual concerned. Ordinary medical ethics continue to apply in the military setting (International Committee of the Red Cross (ICRC) et al. 2015). With regard to informed consent this means that the patient must be informed and then consent freely and voluntarily to the procedure in full knowledge of chances, alternatives, and potential risks. Given that medical enhancement may include unproven interventions, the stricter framework of research ethics may have to be applied in certain cases (Messelken and Winkler 2020a). In addition, one must take into account that soldiers constitute what is called a *captive* or *vulnerable* population: because of their affiliation with a military hierarchy, they may not be able to give a truly free and informed consent. On the one hand because of dependencies in their relationship to the (military) doctors who might treat them. But also because they might face (or fear to face) negative consequences for their careers if they reject to undergo the enhancement treatment (Amoroso and Wenger 2003). Thus, ensuring the respect for the fundamental principle of informed consent constitutes a major ethical challenge in the implementation of medical enhancement of soldiers. Second, military medicine is often practiced in conditions of limited or even scarce resources. Triage and strict rules of eligibility for medical care are commonplace in conflict settings to cope with this fact and do already lead to ethically challenging situations for HCP.⁶ If medical enhancement will be added to the responsibilities of the military health care system some medical resources will have to be used for primarily military aims and may aggravate existing resource shortages for the ordinary medical treatment. It must absolutely be avoided that medical care (including the treatment of POWs and other victims of war) declines as a result of medical resources being used for (military) enhancement purposes. Medical enhancement can only ever be envisaged as a task for military HCP if the appropriate additional resources (equipment and personnel) are provided in addition to the resources reserved for genuine medical care.

⁶ For a number of exemplary cases see the collection of scenarios/ vignettes of the ZH Center for Military Medical Ethics: <https://scenarios.militarymedicaethics.ch//index.php?CategoryID=9>

Third, individual safety of the treated (i.e. enhanced) soldiers must be guaranteed. Only such treatments and methods may be applied which have been proven to be safe for the individual (or, at least, its possible side effects are well-known). Otherwise, HCP may be confronted with the ethical dangerous situation that “*military expediency may be used, albeit sub-consciously, to authorize research in soldiers that would not be permitted in the general population.*” (Bonham and Moreno 2008, 472) Soldier-patients must be respected as individuals and enhancing treatment must not go against their basic interests. If medical interventions are used with the aim of enhancing soldiers in missions, the methods used must have been explored in ordinary research trials (with all ethical limitations that apply) and must not fall into the domain of research themselves.

CONCLUSION

This paper has sketched some of the ethical issues that arise from a military medical ethics perspective with regard to the use of medical enhancement on soldiers. To summarize, the use of medical enhancement raises a number of important ethical concerns and may also lead to a serious alteration of the role of military HCP. If employed nevertheless, enhancement must at least be implemented with respect for the fundamental principles of medical ethics and within the limits that medical ethics set. Even if medical enhancement may appeal with regards to its potential military benefits, the risks and ethical pitfalls related to it must not be underestimated. This is true for both the effects it may have on individual soldiers and the effects it may have on the role and perception of military health care providers.

REFERENCES

- Allhoff, Fritz. 2008. *Physicians at War the Dual-Loyalties Challenge*. Dordrecht: Springer.
- Allhoff, Fritz, Patrick Lin, James Moor, and John Weckert. 2010. "Ethics of Human Enhancement: 25 Questions & Answers." *Studies in Ethics, Law, and Technology* 4 (1).
- Amoroso, Paul J., and Lynn L. Wenger. 2003. "The Human Volunteer in Military Biomedical Research." In *Military Medical Ethics Vol. 2*, edited by Thomas E. Beam and Linette R. Sparacino, 563–603. Washington D.C.: Office of The Surgeon General, United States Army.
- Annas, George J. 2008. "Military Medical Ethics — Physician First, Last, Always." *New England Journal of Medicine* 359 (11): 1087–90.
- Beauchamp, Tom L. 2008. "The Belmont Report." *The Oxford Textbook of Clinical Research Ethics*, 21–28.
- Boisboissel, Gérard de, and Jean-Michel Le Masson. 2017. "Le Soldat Augmenté: Définitions." In *Le Soldat Augmenté. Les Besoins et Les Perspectives de l'augmentation Des Capacités Du Combattant*, edited by Frédéric Blachon and Gérard de Boisboissel, 21–26. *Les Cahiers de La Revue Défense Nationale*. Saint-Cyr Coëtquidan: CREC.
- Bonham, Valerie H., and Jonathan D. Moreno. 2008. "Research with Captive Populations: Prisoners, Students, and Soldiers."
- Fischer, Dirk. 2020. "Human Enhancement, Transhuman Warfare and the Question: What Does It Mean to Be Human?" In *Ethics of Medical Innovation, Experimentation, and Enhancement in Military and Humanitarian Contexts*, edited by Daniel Messelken and David T. Winkler, Chapter 9. *Military and Humanitarian Health Ethics*. Springer.
- International Committee of the Red Cross (ICRC), World Medical Association (WMA), International Committee of Military Medicine (ICMM), International Council of Nurses (ICN), and International Pharmaceutical Federation (FIP). 2015. *Ethical Principles of Health Care in Times of Armed Conflict and Other Emergencies*. Geneva: ICRC. https://www.icrc.org/en/download/file/9567/ethical_principles_of_health_care.pdf.
- Juengst, Eric, and Daniel Moseley. 2016. "Human Enhancement." In *The Stanford Encyclopedia of Philosophy*, edited by Edward N. Zalta. Stanford University.
- Liivoja, Rain. 2017. "Biomedical Enhancement of Warfighters and the Legal Protection of Military Medical Personnel in Armed Conflict." *Medical Law Review* 26 (3): 421–48. <https://doi.org/10.1093/medlaw/fw046>.
- Melzer, Nils. 2016. *International Humanitarian Law: A Comprehensive Introduction*. Geneva: ICRC.
- Messelken, Daniel. 2019. "The 'peace Role' of Healthcare during War: Understanding the Importance of Medical Impartiality." *Journal of the Royal Army Medical Corps* 165 (4): 232–35. <https://doi.org/10.1136/jramc-2018-000982>.
- Messelken, Daniel, and David T. Winkler, eds. 2020a. *Ethics of Medical Innovation, Experimentation, and Enhancement in Military and Humanitarian Contexts. Military and Humanitarian Health Ethics*. Springer.
- . 2020b. "Ethics of Medical Innovation, Experimentation, and Enhancement in Military and Humanitarian Contexts. Introduction to the Volume." In *Ethics of Medical Innovation, Experimentation, and Enhancement in Military and Humanitarian Contexts*, edited by Daniel Messelken and David T. Winkler, Chapter 1. *Military and Humanitarian Health Ethics*. Springer.
- Sidel, Victor W. 2004. "Warfare (II. Medicine and War)." In *Encyclopedia of Bioethics*, edited by Stephe G. Post, 5:2560–66. New York: MacMillan.

HOW TO DEAL WITH THE ENHANCED SOLDIER IN OUR ARMY TODAY ?

Colonel Gilles HABEREY,
Chief of staff,

Centre de doctrine et d'enseignement du commandement (CDEC).

THE soldier's *raison d'être* is to win fights and achieve victory. This is the mission given by the whole society. The latter is ready to make efforts and invest, provided that its **armed branch ensures its security**. Hence, the search for the ultimate weapon or warrior is a long-standing matter in human societies. **From the past Spartan warrior to the present day Special Forces soldier, some fighters have become references or even better, myths.** Searching for a soldier selected, trained, equipped and battle-hardened above the established standards to face any situations: this has been a constant issue.

This appetite drastically changed, with a pitched battle that turned into chaotic violence within a context of Armed Forces professionalization implying a *de facto* lack of mass. We are searching for a handful of highly-trained soldiers, capable of withstanding countless waves of attackers... in a psychologically fragile society having lost the sight of any type of violence.

In parallel, medical and technological sciences seem to pave the way for limitless human enhancement (allegedly). Amplifying human physical and cognitive performance, creating new capacities through medical or biological intervention, thanks to scientific and technological breakthroughs, do not seem to faze the **attendance** of the warfighting scene. After all, in order to win, why should not we use all the available assets...?

Doesn't the end justify the means?

The matter is all but new: whether it is the haschischin warriors or fanatical combatants driven by alcohol and drug induced recklessness, the use of inhibition suppressor has been a long-lived occurrence. Today, the captagon, an amphetamine and caffeine based pill, is freely used by some combatants in Syria...

As a military leader and not a by-stander or commentator, the raised question concerned the operational added-value of this enhanced soldier concept, moreover is it compatible with the responsibility of commanding personnel, especially military personnel? This comprehensive approach is not a sign of distant overprotection, but the expression of profound respect for comrades!

According to me, we should always act **clairvoyantly** regarding this seemingly **caricatured** (and almost exclusive to movies) and **limited** idea of enhancement, so that we address the issues of today and tomorrow's combat situations...

THE ENHANCED SOLDIER, AN ATTRACTIVE ANSWER FOR THE FUTURE COMBATS AS WE IMAGINE IT

Combats getting denser and more demanding

As we all know, tomorrow's combat situations will be harder and more complex than today. Violence, geographical saturation (**no more frontline and rear**), the feeling of isolation will predominate. These battles may be frontal, probably archipelagic, certainly in urban areas. Yet, we will always have **to interact with the population** (a fundamental point in the overall reflection). War is not a continuous line of violence, but a succession of varying intensities: sudden change does destabilize...

Highly solicited bodies and intelligences

Our physical and cognitive capacities will be subject to multiple solicitations, with strong amplitudes, knowing that on the same space we will be led to form, fight, exchange, rest, reflect, and act. Fear, stress, carrying loads, noise and dust will inevitably alter a physical environment that will evolve at the rate of destruction.

Need to improve understanding and fighting skills / better recovery

The question for the soldier – practitioner and performer - is therefore raised in terms of resilience without altering effectiveness: it is necessary to relieve joints, back, manage heart rate, perception disorders... with needs evolving differently according to branches, specialties and level of responsibility. There is a strong case for using chemistry and body and mind development technology to eliminate fatigue, stress and increase abilities. We take for granted these body and mind transformations since American science fiction films allow us to glimpse the reality of it, though it is currently purely virtual (this is the power of image). And yet...

A CONCEPT THAT IS NOT WITHOUT LIMITS

Dependency on technology and chemistry “during combat”

Thanks to chemical development techniques, it is clear that a soldier can be transformed into a **superhuman**: no fear, stress, fatigue... or even **no**

inhibition! Sensory dispositions can probably be **increased tenfold**, but also **annihilated**. So **what about ethics** when you have developed a soldier to fight and destroy your opponent? Will the enhancement not act like a drug, an addiction on which the soldier will become dependent? Behind Captain America, there is always the Hulk...

What effects on organisms “after combat”?

The question of reversibility on organisms is raised. As you know, managing the return from a tour of duty, both physically and psychologically, is key to regaining a well-balanced social and family life. When the effects of the enhancement are dissipated, the substances may leave psychological or even medical after-effects (e.g. the sports world). However, as a military commander responsible for the lives of my personnel, I have no right not to care. As a reminder, one of the key factor in warfighting is the proximity with his personnel... Especially since we will have to go back into operation together a few months later!

And above all, what type of war are we talking about?

This notion of *enhancement* brings me back to a very particular, very Clausewitzian vision of war, of **destruction, even annihilation of the enemy**. However, everyone knows, and in particular performers, that military action requires **interaction with their environment** and in particular with the populations. The transition from one intensity to another requires a change of posture, sometimes rapid: will this be compatible with a radical transformation of bodies and minds? Let us not forget that **sensations and feelings are excellent indicators**. Fear, fatigue, pain are signs that the leader uses to assess a tactical situation (and possible slippages) and command his soldiers to the best of their ability.

IMPROVE WITHOUT “DAMAGING”

Building capacity through technology: towards a strengthened soldier?

The aim is to develop external strengthening capabilities that are inherently reversible: an exoskeleton, ocular lenses enhancing vision up to night –vision capability, are examples of controllable capability building.

Improving training and education: towards a non-deteriorated soldier?

The calm of the old troops means knowing, anticipating and dominating the shock of violence. The development of realism, complexity and rusticity through adapted, progressive sports and tactical training, but also confidence

in teams facing combat situations, are the guarantors that the soldier will keep his discernment and ability to concentrate on the action for longer periods (for example biathlon, but with a firing target). The repetition of so-called reflex actions significantly increases self-confidence and the morale of the forces.

Avoid damaging souls and bodies: towards a respected soldier?

I plead, beyond tactical effectiveness, for an ethics of responsibility towards the personnel entrusted to us: as we do not damage bodies and minds, we can maintain a lucid decision-making capacity and empathy for our personnel. Hence, we know that **we do not deploy robots, but subordinates, friends and brothers in arms**. Thanks to that, he can seamlessly go from an operation to another, often in another theater, **without trauma, but with confidence**.

CONCLUSION

In my opinion, chemical or medical manipulation of bodies and minds always leads to failure. To fight efficiently, we must fight with **lucidity** and the full possession of our means. Technology is there to help us achieve that. **On the other hand, we should leave no stone unturned in the research for healing and rebuilding.**

For the rest... let us keep in mind that the soldier remains **a man or a woman** on whom the war leaves indelible physical and psychological traces. The constant feature of *Marvel's superheroes* is that they are all **neurotic!**

As a **practitioner** of the military art, I am happy that the responsible nations, and in the first place ours, have banished certain weapons and methods. Because, in the end, you will always have to make your enemy a partner, if not your friend. In this sense, **ethics is not a constraint or a brake on action, but a key to a major understanding of the purpose of action.**

CAN WE TALK ABOUT SACRIFICIAL ETHICS FOR ENHANCED SOLDIERS (ESPECIALLY IN THE CASE OF POSSIBLE SIDE EFFECTS)?

Gautier Filardo,
military chaplain,
École des officiers de la Gendarmerie nationale.

INTRODUCTION

THROUGH the pen of Rabelais, Pantagruel teaches his son Gargantua his famous saying: “*Science without conscience is only ruin of the soul*”.¹

Before any reflection, it is important to start from the definition of the terms of the subject. *Ethics* even though having the same etymology as *morals* distinguishes itself by its meaning. *Morals* comes from Latin radical *mos, mores*, which becomes the adjective *moralis*. Cicero uses it as the Greek translation of *ἠθος* in the first sentences of his book *De fato*. *Ethics* and *morals* have the same origin and refer both of them to *mores*, customs and rules of behaviour.²

Today, without an absolute consensus, *morals* is defined as a theory of obligation adjoining a group of rules (cf. Kant and the categorical imperative), as the pursuit of a finality (cf. scholastics and the finality of human act). *Ethics* is considered as a theoretical reflection on *morals*, as a foundation of *morals*, as a questioning introducing the idea of moral rule (cf. Ricoeur). It is useful to distinguish at least three meanings for *ethics*: the absolute science of goodness as identification to the being (cf. Spinoza), the relative science of goods as they determine concretely the men action, and the normative science about ends that we must indicate at men.³

Sacrifice means etymologically, the “*the fact to become sacred*”; from Latin *sacrificium*, composed of *sacer facere*. It is designating the fact of disconnecting something from the profane world to give it to the holy world, as means the Hebrew term *קָדוֹשׁ* (qaddosh : holy=separated).

¹ Extract of Pantagruel, by “Rabelais”.

² Cf. J. Lagarrigue et G. Lebe, “*Ethical or morale?*”, *Recherche & Formation*, n°24, 1997. Ethical awareness and professional practices, 121-130.

³ Cf. L. Gerbier “*Éthique*”, in *Dictionnaire des concepts philosophiques*, under the direction of de M. Blay, Larousse-CNRS éditions, Paris, 2013, 289-290.

This term has also been introduced in common language to describe the fact of destroying or losing a part of a whole in order to achieve a more important purpose. The sacrifice is considered as a gift to something greater than oneself. “*No one takes it from me, but I lay it down of my own accord*” says Jesus in the Gospel of John (Jn 10,18).

We can define the term of sacrificial ethics as a superior norm that determines the concrete action through the self-gift, to the extent of offering its own life, in exchange for a good considered to be superior to its own existence.

The enhanced soldier is the continuation of the ambitious project to improve the combatant’s performances, in order to take on the double challenge to survive and to win.

The enhanced soldier notion exists, in a manner of speaking, since the dawn of time but our age offers completely new conditions of realization, with the progress of sciences and techniques in various domains such as nano- and bio-technologies, computing, artificial intelligence, knowledge of complex brain mechanisms and improvements in genetics. The definition of the enhancement of the soldier is becoming larger and non-limitative. At the same time, we are experiencing persistent and shifting geopolitical instability. The recent and ongoing conflicts teach us that remote warfare is not sufficient anymore to resolve crisis: the necessity of men on the battlefield, both in quantity and quality is still significant. It is likely that this trend will continue and even increase.⁴ Yet, the concept of the enhanced soldier may in our time be in concordance with transhumanist theories, which is a mistake because these last ones, a symptom of a deep anthropological decay linked to a loss of identity, are forgetting the limits of our human condition which is fundamental to understand a soldier.⁵

For transhumanists, enhanced soldiers would be reduced to bionic men, who run fast, do not need to sleep, eat and drink very little, and can fight all the time.⁶ A new specie is born: *Homo robocopus*...

⁴ Cf. B. Barrera, “*Needs and perspectives of enhancement of the fighters abilities*”, *Le soldat augmenté, les besoins et les perspectives de l’augmentation des capacités du combattant*, report of the study day in Paris MoD June 2017, CREC RDN, Paris 2017, 9-16.

⁵ Cf. G. de Boisboissel, J.M. le masson, “*open remarks*”, *Le soldat augmenté*..., op. cit., 7-8.

⁶ Cf. C. Galacteros, “*Enhanced man, depleted will (talks)*”, *Inflexions* n° 32 “*Le soldat augmenté*”, 2016, p. 117-122 (<http://inflexions.net/revue/numero-32>).

Side effects due to the soldier's increase may be seen as indelible signs of an increase suffered, or as accepted consequences of an intended increase. The finality then becomes a criterion of discernment to define the soldier's sacrifice. Has the increase allowed the soldier to give himself for a greater good, or has the increase only allowed the soldier to carry out his mission ?

Issue :

Thus, we should put into perspective a sacrificial ethic based on the gift of self which is in the order of being, and an increased soldier conditioned by physical, biological, physiological and psychological improvement which constitutes an increase in capacities which is in the order of means. In fact, is it still possible to talk about sacrificial ethics when the soldier suffers side effects due to his increase ?

Although sacrificial ethics is not opposed to the enhancement of the soldier (1), it remains nonetheless different as military aim (2).

ENHANCEMENT DEVELOPED INDEPENDENTLY OF THE SACRIFICIAL ETHIC

The sacrificial ethic does not contravene the soldier's increase, it becomes facilitated by an improvement in his abilities while protecting and helping him during his mission, but it has developed independently of the sacrificial ethic.

Sacrificial ethics versus ever-increasing enhancement

The sacrificial ethic seems to be facilitated by an ever-increasing enhancement of the soldier today. Its origin is based on the four cardinals' virtues: Justice, Caution, Strength, Temperance, and by extension, on the three theological virtues: Faith, Hope, Charity.

Prudence is the virtue which consists in the ability to discern the appropriate course of action to be taken in a given situation at the appropriate time. Prudence is the *right rule of the action*, wrote San Thomas of Aquino inspired by Aristotle.⁷ It is not to be confused with shyness or fear, nor with duplicity or concealment. It is said to be *Auriga virtutum*: it leads the other virtues by pointing out the rules and measures. It is leading immediately the judgments of conscience. The wise soldier decides and orders his conduct according to this judgment. Thanks to this virtue, he applies moral principles to individual cases without mistake and overcomes doubts about the right to be done and the wrong to be avoided.

⁷ *Summa Theologiae* II-IIae, q.47, a.2, sed contra.

Justice is the virtue which consists in the constant and firm will to give to the fellow man what belongs to them. The object of the virtue of justice is the other person's rights and to establish harmony in human relations that promotes fairness to individuals and common good. The soldier is by essence just, he is distinguished by the usual uprightness of his thoughts and the rectitude of his conduct towards his fellow man. "*Do not pervert justice; do not show partiality to the poor or favoritism to the great, but judge your neighbor fairly*" (Lv 19,15) : the soldier is just.

Strength is the moral virtue that characterizes the soldier even more; it ensures firmness and constancy through difficulties in the pursuit of the good it strengthens the determination to resist temptations and overcome obstacles in life. The virtue of strength makes one capable of overcoming fear, even of death, of facing trial and persecution. It allows to go to the renouncement and sacrifice of life in order to defend the right cause.

Temperance is a virtue that moderates attraction and desire for pleasure and provides balance in the use of created goods. It ensures the control of the will over the instincts and keeps desires within the limits of honesty. The tempering soldier directs his sensitive appetites towards the good, keeps a healthy discretion and doesn't let his heart be hasty (cf. Eccl. 5,2).⁸

The enhancements of soldier induce a help and an improvement of those virtues. The soldier acts in a complex environment characterized by the entanglement of three dimensions. A physical dimension first of all, the field, which is always heterogeneous, difficult, rough and partitioned. Then there is a human dimension, where people live and where crises are created and resolved through contact with populations: in this context, the soldier fights and operates. Thirdly, A temporal dimension which is, made up of seemingly contradictory imperatives : the need to move quickly to decide, to surprise the opponent, to keep the initiative, and the need to be able to persevere in order to overcome the enemy's will or to restore disturbed human balances.⁹ In the midst of this complexity, the soldier faces ethical dilemmas that engage his judgment and responsibility. They are facilitated by his enhancement, in particular with regard to the physical and temporal dimension. The soldier by his enhancement is more likely to concentrate on the cardinal virtues and develop them.

⁸ Cf. *Catechism of Catholic Church* n° 1806-1809.

⁹ Cf. French Army Staff, "*The alliance of meaning and strength. The exercise of the profession of arms in the Army*", Paris, été 2018.

The enhancement of the soldier and the side effects

Enhancement of the soldier developed independently from the sacrificial ethic focusing solely on the effectiveness of the military mission, disregarding possible side effects.

First we must make several distinctions: The first distinction is based on the nature, internal or external, of the enhancement. To remain in the military context, weapons, intelligence, means of movement, remote intervention and strategy all constitute external enhancements to the soldier's performance. There are also internal increases, some characterized by the insertion of external tools in the soldier (RFID processor, Implant, etc.) and some characterized by a chemical, biological or genetical alteration such as changes in metabolism, certain physical characteristics, performance of the body itself, its endurance or alertness, etc. The second distinction concerns the temporality of the proposed modification. There may be performance increases that are temporary and others that are permanent.

Finally, the third distinction is based on the location of the intended change. The modification may be localized in one part of the body or, on the opposite, spread throughout the whole body.¹⁰

For example, if we look at amphetamines, we notice that they are the most powerful chemical stimulant known. They have been banned since 1971, and their pharmacological profile is quite similar to cocaine, although their chemical structure is very different. During the Second War World, Spitfire pilots absorbed large quantities of it during the Battle of Britain. U.S. Soldiers all have amphetamines in their packs. Allied troops use amphetamines such as benzedrine, and Axis troops use methamphetamines such as pervitine. This consumption concerns both ordinary soldiers and their leaders, right up to the top of the military hierarchy. At the end of the war, amphetamines found many uses. They are increasingly used in all situations where special endurance is required. Nevertheless, studies also show that these same products can provoke forms of psychosis. The stimulant effects of amphetamines are generally experienced as a subjective increase in energy and self-confidence, and are associated with a feeling of well-being and even euphoria. Amphetamines are also at the root of many problems of addiction and they

¹⁰ Cf. P. NOUVEL, "Historical perspective on combatant increases, the example of amphetamines", *Le soldat augmenté ...*, op. cit., 39-44 ; P. NOUVEL, "A Scale and a Paradigmatic Framework for Human Enhancement" in S. BATEMAN, S. ALLOUCHE, J. GAYON, M. MARZANO et J. GOFFETTE (dir.), *Inquiring into Human Enhancement*, Palgrave- Macmillan, New York, 2015.

give rise to a real *speed culture*. These studies and these warnings will lead to the banning of amphetamines. This prohibition is established by the Single Convention on Psychotropic Drugs signed by the UN member countries in 1971 and entails a strict medical control around the consumption of amphetamines. However, the US Air Force's "go-pill program", the name given to pills that are taken before operations, continues to be applied. These molecules that are dangerous for civilians, are not dangerous for soldiers ... ¹¹ The ethical vision was overshadowed by military efficiency, which not only prevented any reflection on the multidimensionality of the combatant, and thus contributed to a purely efficiency-oriented vision of the soldier, regardless of the side effects.

THE ENHANCEMENT OF THE SOLDIER COULD BE CONTRARY TO SACRIFICIAL ETHICS

Nevertheless, the enhancement of the soldier by an overcapacity of means can cause side effects that are contrary to a sacrificial ethic intrinsically linked to the very being of the combatant.

Enhancement of soldier as an aim

The enhancement of the combatant risks to become a goal losing sight of the being of the soldier and consequently of the sacrificial ethic.

We note that this enhancement of the soldier concentrated on a single physico-organico-psychic aspect. The soldier has already agreed to risk his

¹¹ Cf. P. NOUVEL, "Historical perspective on combatant enhancement, the example of amphetamines", *Le soldat augmenté ...*, op. cit., 39-44, referring to studies done by : S. Brando & D. Smith, "Amphetamines in General Practice", *The Journal of the College of General Practitioners*, vol. 5, n° 4, novembre 1962, p. 603-606. Gene M. Smith et Henry K. Beecher, "Amphetamine Sulfate and Athletic Performance: I. Objective effects", *Journal of the American Medical Association (JAMA)*, mai 1959, vol. 170, n° 5, p. 542-557 ; M. Herman et S. H. Nagler, "Psychoses due to amphetamine", *Journal of Nervous & Mental Disease*, vol. 120, n° 3-4, sept.-oct. 1954, p. 268-272. Philip H. Connell, *Amphetamine Psychosis*, Oxford University Press, Londres, 1958, 133 pages ; P. H. Knapp, "Amphetamine and addiction", *Journal of Nervous & Mental Disease*, vol. 115, n° 1, janvier 1952, p. 406-432 ; O. J. Kalant, *The Amphetamines: Toxicity and Addiction*, University of Toronto Press, Toronto, 1966, 151 pages ; Richard H. Blum et al., *Society and Drugs (2 vol.)*, San Francisco, Jossey Bass, 2 vol., 1970 ; G. Berger, *Drug Abuse: The Impact on Society*, Watts, New York, 1988, 144 pages ; L. Grinspoon et P. Hedblom, *The Speed Culture: Amphetamine Use and Abuse in America*, Harvard University Press, Cambridge (Mass.), 1975, 340 pages. H. Cohen, *The Amphetamine Manifesto*, New York, The Olympia Press Inc, 1972, 164 pages ; P. Conrad, *The Medicalization of Society: on the Transformation of Human Conditions into Treatable Disorders*, Johns Hopkins University Press, Baltimore, 2007, 204 pages.

life and potentially receive death, so we can say that the notion of self-sacrifice is part of his commitment. However, if the injury or death is an unwanted effect, the potential effects of enhancement the fighter's performance should be questioned. Indeed, new pharmacological techniques with cognitive effects could emerge, the use of active implants, or even a surgical anthropotechny. Although these enhancements are mostly reversible, doctors struggle to ensure a perfectly harmless nature of means that have a direct effect on the human body.

At the military level, if circumstances so require, the enhancement may be necessary to save the mission, or even the lives of the soldiers in the unit. The Gordian knot is here: despite the medical risks faced by the enhanced soldier, are the effects of his enhancement part of the sacrificial ethic?

The answer becomes arduous because it risks getting us into an infinite casuistry, thus evaluating all the probable scenarios. It is important to rely on the fundamentals that frame the activity of the soldier and its enhancement through a specific legal framework. The supervision by legal standards of the ethical dimension of the human person has developed following the misuse of science during the Second World War, and thus attempts to guard against possible organ trafficking or biological manipulation of all sorts. The legislator has developed a strict legal framework for the intervention of science on the human body, whether the person is alive or dead. In any event, it is essential to obtain the consent of the person concerned. The bioethics laws of July 29, 1994, August 6, 2004 and July 11, 2011, in particular, set up this strict regime.¹²

Article 16-1 of the French Civil Code states that *“everyone has the right to respect for his body”* and that *“the human body is inviolable”*. In addition, Article 16-3 adds that *“the integrity of the human body can only be impaired in the event of medical necessity for the person or exceptionally in the therapeutic interest of others. The consent of the person concerned must be obtained beforehand except in the case where his condition necessitates a therapeutic intervention to which he is not in a position to consent”*. Article 16-4 prohibits eugenic practices and cloning. Article 16-10 adds that *“the examination of the genetic characteristics of a person may be undertaken only for medical or scientific research purposes”*.

¹² Cf. M. LORDON, *“the legal framework of the enhanced gendarme (police officer)”*, *Le soldat augmenté ...*, op. cit., 147-159.

Within the envisaged enhancements, the particularly worrying hypotheses of *invasive* enhancement will have to be scrupulously examined with regard to the protection of the human body and the guaranteed dignity at the international, European and national levels. Thus, Article 7 of ICCPR¹³ provides that it is forbidden to submit a person without his free consent to a medical or scientific experiment. This echoes Article 3 of the European Convention on Human Rights (ECHR) adopted in 1950 as well as Article 1 of the 1997 Convention on Human Rights and Biomedicine. The Charter of Fundamental Rights of the EU, guarantees in Article 1 human dignity by stating that it is *inviolable* and enshrines its Article 3 to the right to the integrity of the person, with emphasis on the respect of this right, particularly in framework of medicine and biology.¹⁴

The issue of soldier's consent becomes legally essential, which is why it must be examined with precision, and it goes to another legal issue, which is the dignity of the enhanced soldier. While the latter is likely to see his body transformed and his emotions altered, the question arises of his dignity as a man confronted with that of his personal autonomy, even his resilience.¹⁵

Sacrificial ethics as the consequence of the autonomy of the soldier's will

Sacrificial ethics is the consequence of the autonomy of the soldier's will, while the secondary effects due to his enhancement are the consequences of an implicit, explicit and societal coercion that affects his consent.

The assumption of an enhancement in the soldier must be considered in relation to the problem of the renunciation of fundamental rights. Thus the ECHR has not clearly identified the rights that cannot be waived. It has, on the other hand, laid down the conditions for the lawfulness of the waiver, namely in particular the absence of ambiguity and vice of consent as well as the absence of annoyance to an important public interest. It is not a question of a renunciation of the right itself but of its exercise. Thus, in the case of an *invasive* enhancement, attention must be focused on the need for *free and informed* consent on which the person concerned can return. Many difficulties are then raised by the assumption of consent to an enhancement, beginning with the question of consent to a medical act that may not be linked to a medical necessity as referred to in Article 16-3 of the Civil Code.

¹³ International Covenant on Civil and Political Rights (United Nations, December 16, 1966).

¹⁴ Cf. S. TURGIS, "*The soldier enhancement at the crossroads of human rights and the law of armed conflict*", *Le soldat augmenté ...*, op. cit., 171-180.

¹⁵ Cf. M. LORDON, "*The legal framework of the enhanced gendarme*", *Le soldat augmenté ...*, op. cit., 147-159.

Moreover, in the face of the higher imperative of protecting the common good, consent could be perceived as a derisory obstacle.¹⁶

The consent given by a member raises particular issues related to his legal status. Two aspects can then be examined:

First, it is the articulation of consent with the strict duty of obedience to which the military is compelled. It must then be asked whether the order could be given to submit to an enhancement. Article L.4122-1 of the Code of Defense states that the military must obey the orders of their superiors and are responsible for the execution of the missions entrusted to them. However, the order must not be clearly illegal or contrary to the laws, customs of wars and international conventions.

Secondly, it is interesting to assess the question of the fragility of this consent, beyond the appearance of mindfulness and expressed will. It is interesting to emphasize here the opinion given by the National Council of Ethics on neuro-improvement techniques. The board considers that the ethical issue of autonomy is strongly engaged by the phenomenon of neuro-improvement. The soldier thinks he is free of everything, but in reality, he is under the effect of an injunction to efficiency. The distracted search for the latter is driven by the imperative desire to progress, which can provoke alienations. In the military field a risk of manipulation exists. The shift from fulfilling the mission to manipulation, from *acting for* to *acting on* is a subtle effect. The coercion exercised on the soldier is threefold: it is implicit, explicit and societal. Implicit coercion is an obvious reality, which has, as main motivation by the taking of psychostimulants, the improvement of the performances with a view to success of the mission. In a competitive society, a similar situation exists in certain professions or enterprises in which people are subject to ever-increasing imperatives of increased efficiency and productivity. Proponents of this use of neuro-improvement techniques relativize this loss of autonomy by the benefit of the psychostimulants which,

¹⁶ Cf. S. TURGIS, “*The soldier enhancement at the crossroads of human rights and the law of armed conflict*”, *Le soldat augmenté ...*, op. cit., 171-180 s'appuyant sur : CEDH, *Albert et Le Compte c. Belgique*, req. n° 7299/75 et 7496/76, Judgment of 10 February 1983, § 35; Philippe Frumer, *La renonciation aux droits et libertés*, Brussels, Bruylant, 2001, pp. 525 et seq.; Julie Arroyo, *La renonciation aux droits fondamentaux*, Étude de droit français, Pedone, 2016, 670 pages; ECHR, *Trocellier v. France*, req. No. 75725/01, decision of 5 October 2006; Mihaela Ailincăi, “*Propos introductifs*”, *La Revue des droits de l'homme*, No. 8, 2015, p. 11; On this particularly delicate issue of the limits of consent: Muriel Fabre-Magnant, Michel Levinet, Jean-Pierre Marguenaud and Françoise Tulkens, “*Controverse sur l'autonomie personnelle et la liberté du consentement*”, *Droits*, No. 48, 2009.

by improving the awakening and the concentration, could avoid work accidents sometimes fatal, but they do not envisage the number of accidents related to overestimation of abilities and lack of sleep. Explicit coercion implies, in the context of the use of biomedical techniques of neuro-improvement, that a soldier is forced to do so by his superiors, without his opinion or even against it. The social coercion, in the context particularly interested in the development of neuro-improvement techniques, and even pioneer in the field, is that of the military and national security environments. In the United States, they have a considerable research budget. For example, the Defense Advanced Research Projects Agency (DARPA) has developed new techniques, such as an individual helmet based on pulsed transcranial ultrasonography, or new substances that can stimulate awakening, reduce fatigue, emotions and empathy. One of these substances is oxytocin, a hormone that could increase the expression of a number of *virtues* such as loyalty, generosity or the spirit of sacrifice. In the United States, in a combat situation, it is left to the commander on the ground to decide for his own soldiers the benefits and risks of administering a drug: such as neutralizing affects like fear. The reduction of empathy is particularly sought-after among drone pilots for whom the act of killing someone, especially a child, by an interposed screen while he is safe, is sometimes experienced as more psychologically unbearable than killing an enemy fighter on the battlefield.¹⁷

CONCLUSION

Sacrificial ethics seems to disappear in the face of this triple coercion, of the enhancement of the soldier: implicit, explicit and societal. In fact, the concept of soldier's consent seems to be different from his will. Although they seem to be synonymous, these two terms *consent* and *will* have different meanings when it comes to talking about sacrificial ethics or enhancement. The will concerns the sacrificial ethic, whereas the consent concerns the enhancement of the soldier. The act of the will would be a free act of the soldier who sacrifices himself to a superior cause, while consent would be apprehended as a form of self-abandonment.¹⁸

The will is one of the three powers of man with intelligence and memory, and it marks an interiority and an irreducible dimension of the human being.

¹⁷ Comité consultatif national d'éthique pour les sciences de la vie et de la santé, *Avis n° 122, Use of biomedical techniques for "neuro-improvement" in the healthy person: ethical issues*, 12 décembre 2013, p. 15-16.

¹⁸ P. BORDAIS, "Consent in private law put to the test of the cognitive sciences", *Le consentement. Acte du colloque de l'école doctorale 461*, Juin 2017, Montpellier 2017.

Consent is an object, a consequence of the will, its externalization in a way, but distinct from the latter. Consent is to admit, to assent, that is, to lower the flag to an objective reality or to another person. While the will consists in the strength to choose freely. It becomes the virtue of the hero, the martyr, the one who sacrifices himself. We can say that the will is in the *yes* of the choice, while the consent is a choice of submission. Force is on the side of the will; weakness on the side of consent.¹⁹

We can admit that the sacrificial ethic lies in the will of the combatant whereas its enhancement resides in his self-denial, and it does not allow the sacrifice in itself. However sacrificial ethics will always be possible for the enhanced soldier, if and only if, he transcends his enhancement by an act of will that pushes him to sacrifice.

¹⁹ M-A. Frison-Roche, “*Remarks on the distinction between will and consent in contract law*”, *Revue trimestrielle de droit civil*, 1995, p. 573-578 ; A. LALANDE, “*Consent*”, in : *Vocabulaire technique et critique de la philosophie*, coll. Quadrige, PUF, 1991, vol.1, p.117, “*will*”, in : *Vocabulaire technique et critique de la philosophie*, coll. Quadrige, PUF, 1991, vol.2, p.1217 et s.

WHAT ARE THE ETHICAL LIMITS TO THE FIGHTER ENHANCEMENT ?¹

Colonel Olivier Pinard Legry,
Director of Student Training at Saint-Cyr Military Academy.

Gérard de Boisboissel,
research engineer, CREC Saint-Cyr.

GENERAL

Operational Statement

“When you don’t do everything to be first, to become first or to stay first, you don’t stay second. You inevitably fall last”, Marshal Lyautey taught us. It is in this spirit that armies have always been committed in a real arms race with the sole aim of equipping their soldiers with the most efficient equipment, that is to say to give them their maximum warrior potential, to make them win as well as to protect them. It is therefore both an operational obligation and a moral obligation to the men and women who are sometimes asked to make the supreme sacrifice.

However, new technological opportunities now place the individual himself at the centre of this *arms race*. The increase in a fighter’s intrinsic performance is now within reach, offering him the possibility of going beyond his own physical, physiological and cognitive limits in order to last, hold and win. This is not without raising profound questions about the very meaning of the fighter’s commitment. What is the ethical difference between training - or maximizing potential - and enhancement? Can *doping* be allowed on the condition that the cause is noble? Is it morally acceptable to kill in combat when the enhanced soldier has intrinsic capabilities that are not in proportion to those of his opponent? Can the superhero be morally qualified as a hero, in short? And what is an enhanced father or husband when he comes home?

In the operational domain, the question of enhancement is asked from the point of view of modalities and not relevance, since enhancement is already underway among our allies - especially across the Atlantic - as well as among our enemies, as in the case of ISIS use of the Captagon. Remaining on the sidelines of this movement would marginalise us in the eyes of our partners on interoperability issues and would weaken us in the face of our adversaries, at the risk of leading us to defeat.

¹ This article is a translation into English of the article published in the *Revue de la Défense Nationale* in April 2020 by the same authors.

The convergence of official discourse is forging a certainty: high-intensity combat is becoming a very likely option. The robustness and resilience of the combatants is therefore becoming a major issue. The answer cannot then ignore an in-depth examination of the potential offered by technologies that enhance a soldier's performance as much as they decrease the risk he or she runs in combat - the *increased* soldier being also a soldier with a *decreased* risk.

However, in the many operational situations where violence must remain under control, where interactions with the population are frequent, the question of enhancement must be understood from a double angle: quantitative (stronger) and qualitative (more enlightened, more discriminating, more intelligent). Operational efficiency, even before entering the ethical field, requires these two aspects to be inseparable.

Societal observation

Moreover, the military approach to the enhancement will be built in parallel with societal pressure in a changing social context. The transhumanist current of thought sees man as a being who becomes master of his nature and his evolution with bioperfectibility as its own metaphysical horizon. Man will be tempted by the possible improvements proposed by enhancements in human performance and capacity, becoming an actor in his own "*physiological programming*".

Philosophical concepts will be overturned with this new approach which sees the human body as a means at the service of individual performance. Biohacking techniques will thus most probably progress in society, with the objective of *hacking* its biology in order to reach higher capacities.

On the medical level, this could result in a migration towards a more meliorative practice that is different in its purpose from a classical medical practice. If doctors have a social mandate to care and protect, a new purpose is emerging with the accompaniment of enhancement techniques, which may see the emergence of a new faculty, according to Jérôme Gaufette.²

This migration will be legally based on an evolution of the law of consent. From the current practice, where a person gives his or her consent to choices proposed by the medical profession, we will move on to the law of voluntary work, where this same person will take responsibility for his or her own choices. Doping for the purpose of enhancing individual performance is an

² "*De l'humain réparé à l'humain augmenté : naissance de l'anthropotechnie*", Jérôme Gaufette, CNRS Éditions, 2013 (From a repaired human being to an enhanced human being : birth of anthropotechnics).

example of this. The risk then appears to be a utilitarian reading of the genomic potential of each soldier, with the consequences of studying a personalised increase linked to this reading and, as can be imagined, a classification and categorisation of individuals according to inter-individual variability. One thinks here of the film “*Welcome to Gattaca*”³ where the reading of the genomic code validates an individual’s predisposition to more or less noble or demanding tasks.

The human being is now becoming at the heart of technology and, according to Dominique Reynié⁴, faced with this trend, States will not oppose this evolution. They will end up accepting it by default, as shown by the debate on bioethical laws recently passed in France despite the reluctance of part of society. Moreover, while the policies of liberal states are currently shunning the debate, some totalitarian states have a different response to these issues. This is particularly the case in countries with a collective rather than individual ethics.

Issue

Faced with the possible improvements offered by the enhancements in performance and human capabilities, the Armed Forces should not react in a technophobic manner, but on the contrary anticipate the challenges that these new technologies pose for mankind. This should be done by accompanying the forthcoming debate by proposing a transcendence other than mere individual performance and by preserving the principle of respect for human dignity.

Using the new opportunities offered by technology and giving the soldier the maximum means to win is a moral obligation of the Armed Forces. On the other hand, they also have a duty to preserve the physical and psychological integrity of their combatants, in order to make them free of short-and long-term psycho-physiological after-effects, particularly when they return to the civilian world.

This requires a reasoned approach that sets rules, and an accompaniment of the soldiers in the enhancement process.

³ Film by Andrew Niccol, 1997.

⁴ “*le politique face aux usages sociétaux de l’augmentation et leurs impacts pour le monde militaire*” dans “*Le soldat augmenté – Regards croisés sur l’augmentation des performances du soldat*”, Dominique Reynié, 2019 (politics in the face of the societal uses of the increase and their impact on the military world in the enhanced soldier, crossed views on enhancing soldier performance).

ELEMENTS OF DISCERNMENT

General

A soldier's humanity is the basis of his legitimacy to bear arms for his country on behalf of his fellow citizens. If the soldier is no longer human, he loses all legitimacy. He must therefore not become a post-human. As such, the threshold of acceptability of the enhancement must be accepted by society and without too great a gap with it.

Thus, it is imperative that the enhancement does not leave any after-effects on the soldier on the day he returns to civilian life (or in the evening when he comes home). A father returning from operations with diminished empathy for combat performance would, in a way, be diminished upon returning home. From this point of view, the physical enhancement (body and muscles) seems less problematic than the cognitive enhancement (brain, memory, etc...). The latter poses more ethical problems in the first approach than the former.

Military

The rise of the soldier poses three fundamental questions to the military institution: What about the soldier's relationship to death? What about group dynamics and the function of the leader? What about boldness and courage?

The relationship to death, which must be considered from three angles (the death of the enemy, the death of a subordinate as a consequence of a given order, and one's own death), could be genuinely altered by a decline in empathy, for at least two reasons. The first is that a psychic increase (reduction of stress) can lead to an alteration of life consciousness (one's own as well as others'). The second reason is related to a possible drift of the "*enhanced culture*" towards the cult of performance. Life would be more or less valuable depending on whether it is enhanced or not. In this field, we are close to the notion of superior race, a well-known aberration. The "*window of consciousness*" will be imperative for any enhanced fighter.

Group dynamics could also be profoundly modified by the enhancement. The latter being exclusively individual, unlike the equipment that can be collective, it is likely that it induces a tendency to individualism that only the action of the leader will be able to compensate by giving meaning and motivating the collective. For all that, the enhanced soldier may no longer

be afraid and therefore no longer need to motivate either his leader or the group. Therefore, it seems imperative that the enhancement be punctual and controlled, by the leader, depending on the mission, the environment, and the type and level of tactical commitment.

Finally, it will certainly take less courage for the enhanced soldier to storm the enemy. The induced risk is that the culture of boldness will gradually fade behind the scientific approach. This is what many major industrial groups have faced as they have developed. To avoid this counterproductive effect, it will be essential to continue to teach our soldiers to live with risk, to take risks and to estimate risks.

Medical

Medical necessity is going to collide with military necessity. If the Army Medical Officer must ensure zero risk in a nominal situation, he or she must step aside before the decision of the military commander and admit a higher risk in a combat or survival situation.⁵ It is clear here that the opportunities of enhancement are rushing into this breach and that their prohibition will be indefensible in a critical context for the soldier or one of great necessity for the military.

But for the military medical corps, if an enhancement of a healthy individual is not a care, who else but him will be able to accompany the enhancement? It is therefore their duty to ensure that the effects of the increase are under control, that it is not harmful to the individual in the short and long term, and that it is used with the highest possible benefit/risk ratio for the combatant.⁶

For example, he may consider precautionary doping on the sole condition that its effects are controlled, i.e. without addictive effects. He will also have to ensure that no undesirable effects are induced in addition to the enhancement, as for example in the case of the brain which, although it has a certain plasticity and remains in perpetual adaptation, may see the increase in one of its capacities have a deregulatory effect on another cerebral zone.

⁵ Frédéric Canini, “*Ethique médicale et homme augmenté : quelques pistes de réflexion*”, les cahiers de la Revue Défense Nationale sur “*Le soldat augmenté*”, 2018, page 184. (Medical ethics and enhanced man: some avenues for reflection)

⁶ Same, page 186.

INITIAL RECOMMENDATIONS

At the operational level

On the basis of these reflections, what could be the first recommendations to frame the enhancements in combatant performance?

First of all, the purpose of military action is based on a group logic, and not on an individual logic. It is the effectiveness of the group as a whole that matters. The principle of the enhancement must therefore move away from a purely individual objective to serve a collective objective.

Secondly, an enhancement must never transgress the requirements of the military world, which for the tactical leader are the success of the mission, the reduction of risk for his own soldiers and for himself, respect for his subordinates and for the adversary, and respect for the law and the rules of engagement.

In the face of the enemy, and in often complex environments, the soldier must not become the actor in a war that is escalated by practices that would increase the level of violence of the conflict. Nor must such practices cause a dehumanisation of the image of our combatants which would imply on the one hand that their victory would no longer be recognised as such and on the other hand that the Army/Nation link would be altered, and thus their legitimacy to bear arms for their country.

Finally, at the individual level, it would be irresponsible to envisage an enhancement of individuals if the latter do not first know their limits. Indeed, one can only enhance one's capabilities if one first naturally knows how to reach the limits of one's capacities. This requires a training of the fighter that obliges him to go to the end of himself before even considering going beyond his limits.

Necessary supervision on the deontological, ethical and legal levels

As the command is responsible for the given enhancements and their certification, a legal framework is needed to accompany their use.

From a medical point of view, any enhancement must be preceded by medical authorisation with knowledge of the effects, direct or even undesirable, and directly targeted at the individual.

Although their authority is based on military discipline, the Armed Forces will have to rely on the informed consent of the soldier and not go against his will. Under no circumstances should they punish a soldier who refuses a raise

for himself. This principle must be qualified in the particular case of an enhancement necessitated by a collective emergency or in the case where the consent of the combatant could be altered by a misperception of the military situation. It will therefore be the duty of the commander to override this consent and demand the implementation of the enhancement, while assuming responsibility for it.

From a purely ethical point of view, the enhancement must not - as we saw earlier - cause man to lose his humanity. This humanity can be understood as the harmonious balance of body, mind and soul. Thus, any enhancement in body and spirit makes it indispensable to enhance the soul, to densify the soul. The enhanced soldier must, even more than his ancestor, be nourished by a transcendence. In this respect, the teaching of philosophy and ethics will paradoxically be more and more indispensable as the soldier is enhanced.

The indispensable role of the leader

As we have already mentioned, the role of the leader will increase with the enhancement of combatants. This will require measurement, adaptation to the circumstances, without side effects on the soldier's humanity and his ability to discern.

It will therefore be necessary to sanctify the role of the leader in the enhancement process, because it is on him that all the humanity and legitimacy of the enhanced troop rests. The military leader is responsible for the effect of the enhancement on his mission but also on his soldiers. He must arbitrate between the precautionary principle and measured risk. He must decide on the enhancement according to strict military necessity. He knows what is good for the combatant, the troop and the mission depending on the context.

This requires the leader to have the ability to make decisions that is preserved or even strengthened by his own enhancement. And it is perhaps the leader's own enhancement that carries the greatest operational potential.

LIMITS TO ANY ENHANCEMENT

While the range of possibilities may appear wide or even infinite, there are salutary invariants that must prevent any use of the enhancement:

An infringement of free will

The soldier must be able to maintain his free will in any decision he makes, and to do so must retain his cognitive abilities at all times.⁷ Thus an enhancement must not be authorised :

- If it affects the responsibility of the combatant by disinhibiting him or making him lose his judgment and free will, so that he remains a responsible actor on the battlefield.
- If it allows a remote control of the fighter.
- If it alters the respect of the adversary and dehumanizes the combat by making the soldiers berserkers, those Vikings who entered into a kind of war trance annihilating any empathy for their adversaries or civilians.
- If it increases his aggressiveness by making him lose control of himself.
- If it disassociates him from his brothers in arms.

An attack on the person's psychological balance

The soldier is a unique being. He is an end in himself and not just a means. Therefore he should not be considered as a malleable material. Thus an enhancement should not be allowed:

- If it affects the overall construction of the fighter (body/spirit/soul) and his integrity.
- If it regresses certain capacities of the individual in favour of the enhancement of others.
- If it is irreversible without the consent of the individual and society, and subject to the express agreement of the medical world and the armies.
- If it induces any undesirable effects on the return to civilian life.
- If it is transmissible to others in any way.⁸

The field is vast, and this article is intended as a first essay listing some recommendations for a more precise framework of techniques to enhance the fighter's performance, and their uses. Such a framework is strongly desired, based on medical, legal and ethical aspects, because some foreign armies have already launched numerous exploratory studies and it is highly likely that they will be using some of these techniques on their soldiers in the near future.

⁷ See Jeanne Andrade page 114

⁸ Exchanges with Cyriaque Naut, ENS, 2018.

CONCLUSION

The creation by the French Minister of National Defence, Florence Parly, on January 10, 2020, of a defence ethics committee will make it possible to examine the issues surrounding the enhancement because, according to the minister, “*ethics is the very foundation of the military’s raison d’être. It is the compass that remains when the law disappears*”. And the first subject she asks to explore is the *enhanced soldier* and the impact of developments that concern the improvement of the physical or mental capacities of our combatants.

Let us hope that Europe can, through its positions, become a world reference on this ethical frame of reference, which will have to be deemed acceptable by our armies and by society as a whole.

CLOSING REMARKS

CAN THERE BE A EUROPEAN ETHICAL CONSENSUS ON ENHANCING SOLDIER PERFORMANCE ?

*Air Commodore (Ret) John Thomas,
President of the International Society for Military Ethics in Europe, Euro-ISME.*

IS the enhancement of military personnel - especially by using invasive means - a moral obligation or a moral abomination? We heard earlier from Dr Fischer that at the time of Louis XIV life expectancy in France was 25 years. Half of all children died before the age of ten; that was then regarded as the natural order of things.

Life expectancy in France is now 82 years and we see this as normal. This new normal has been achieved by a variety of improvements, for example to sanitation, nutrition, education and the homes we all live in. But advances in medicine have also played a huge part. Some of these advances involve invasive techniques, including surgery and prophylactic and therapeutic drug treatments. We do not normally object to these treatments and very few of us would wish to go back to a time when life expectancy was 25 years.

The main reason why we do not object to these medical treatments is because they are fundamentally therapeutic; they are designed to prevent or treat illness or injury. In essence, the question we have been considering today is whether we can apply the same moral template to invasive technologies that are designed to improve the chances of survival (and of success) of military personnel, when these technologies have little or no therapeutic purpose.

When the CREC organised their first symposium on “*The Enhanced Soldier*” on the 15th of January 2019, the day was divided into 3 blocks:

- The military and scientific context for enhancement.
- The military view of enhancement.
- The search for an appropriate ethical framework.

Although this was a logical way to sequence the discussion, it turned out to be an artificial way to try to compartmentalise overlapping themes. As the day progressed, a succession of eminent medical doctors, military personnel, lawyers, scientists and others made their interventions. As they did so, it became very clear that it was not just pure science, the law or biomechanics that was influencing their thinking. Many presenters spoke eloquently about the ethical issues which their work was raising and pointed out that these

implications extended well beyond the individual, into both the wider armed forces and even society as a whole.

The discussions that day made it very clear that a fuller exploration of the ethical issues raised by enhanced soldier programmes was necessary. Today's colloquium is the result. The fact that so many thoughtful and perceptive interventions have been made fully vindicates the decision to hold this symposium. Euro-ISME is delighted and honoured to have been closely associated with its organisation and to have been able to contribute to it.

Gen Thiébault told us earlier that in his view the advances in enhanced soldier technologies are nothing short of a revolution. There are many who would agree with that view. But his use of the word *revolution* should alert us to both the possibilities and the pitfalls of what is happening. Revolutions are by their very nature events which overturn the existing order. They are hard to control, and it can be impossible to predict their outcomes – history is full of examples of his.

To take a military example; it was confidently predicted that the invention of the machine gun would revolutionise warfare – by reducing the number of casualties in battle. In reality, the reverse proved to be the case and millions of those killed in the First World War were cut down by machine gun fire. To try make sense of revolutions while they are happening requires experts to take a step back and exercise wisdom as well as technical knowledge. That is why events such as this symposium are so important to advance understanding and provoke action.

To turn now to the question which I was invited to answer “*Can there be a European ethical consensus on enhancing soldier performance?*”:

Let me say first of all that I appreciate Gérard's sense of irony in inviting a Brit to speak about any sort of European consensus. But, leaving Brexit aside, we all know that Europe and the EU are not synonymous with each other, and that, in any event, science, morality and the human body and mind recognise no such political frontiers. We must therefore look at this subject in the broadest possible context.

Can there be a European ethical consensus? Yes of course there can be such a thing, in the sense that it is theoretically possible. Whether we start from the Hippocratic Oath, the Geneva Conventions, international or domestic law, it should be possible to devise an ethical consensus that

protects both the individual and the legitimate scientific and military needs of researchers and governments.

However, there are likely to be some large obstacles on the road to a workable and valuable ethical consensus. Let me draw on an example from Euro-ISME's and the CREC's own experience to illustrate what I mean.

About seven years ago, Euro-ISME and CREC began a collaboration to see whether it would be possible to develop a European code of conduct for military personnel. The project proved to be a valuable tool for encouraging cadets at Saint-Cyr to think deeply and imaginatively about what military ethics means to contemporary military personnel. They sought to identify those values, virtues and norms of behaviour that are indispensable and therefore of such universal applicability that their adoption would be uncontentious.

However, it quickly became clear that this was not going to be a simple exercise. All European armed forces already have codes of conduct and these are deeply rooted in each nation's history and military traditions. Trying to merge all these codes together into a meaningful single code, in a way that was more than an exercise in reaching the lowest common denominator, has proved to be difficult.

That difficulty was further complicated first by the discovery that many of the key words, such as *patrie*, *honour*, *human dignity* and *duty* mean slightly different things to different nations. The British fight for their monarch, the French and Germans for their respective Republics. The second complication was that in many countries each armed service (Navy, Army, Air Force) has a separate code of conduct. While discussions continue, no definitive European code has yet been devised.

I did say earlier that the EU and Europe were not synonymous with each other. However, I think that if any organisation would be thinking about the ethics of advanced military research, such as the Enhanced Soldier, it would be the EU and the European Defence Agency in particular. I therefore contacted to their Research Technology and Innovation Directorate to ask, in the light of this conference, if they have looked into the ethical aspects of soldier enhancement, especially in the case of invasive techniques and, in particular, whether they have the intention to develop an EU code of practice for the development and use of such techniques.

The reply I received from the EDA was firstly that they are not involved in any project using invasive soldier enhancement techniques and are addressing exclusively external enhancements. They are paying close attention to the possible ethical impacts of such enhancements and they do address ethical arrangements during their projects. As for invasive techniques, the EDA is aware of developments by other entities and is maintaining a watch on the trends, opportunities, obstacles and impacts of alternative technologies and invasive techniques in this field.

The EDA has said that a code of practice for the development and use of invasive techniques could be a positive tool for setting a framework for R&D activities in this field. However, the development of such a code has not been requested by member states and there is therefore no formal position on this topic.

Some might argue that this is too passive a position, given the potential implications of Enhanced Soldier research.

This does not really surprise me, because of the issues we discovered with something as relatively straightforward as a generalised European code of conduct. With enhanced soldier programmes there will also be substantive and legitimate issues of commercial sensitivity, and military secrecy to be taken into account. I have also observed a general unwillingness of commercial companies and many governmental agencies to engage in public consideration of ethical issues, apparently for fear of inviting criticism of their own work or products.

So if we believe that a European consensus would be beneficial, it seems to me that there are 2 possible ways to proceed in the short term.

The first, which applies particularly to anyone here who works for a governmental agency in an EU country is to press EU governments to ask the EDA to look at establishing a code of practice. The EDA has already said that this could be a useful tool, so the door is already half open.

The second option is open to all of us. We cannot expect the majority of scientists, business managers, elected politicians or any other group of specialists involved in Enhanced Soldier research to press for ethical codes or consensus on enhanced soldier development. They will not have the training, the time, the experience or perhaps even the inclination to engage constructively with the problem. So it is up to us to agitate, to campaign and to speak out if we think it is necessary.

Many of you will be familiar with the OODA loop which was developed by the military and is now a widely used tool in business and elsewhere. For those who are not familiar with the acronym, OODA stands for a decision making cycle identified as Observe, Orientate, Decide, Act. From a military perspective the idea is get inside the enemy's decision cycle, or to put it even more simply, to think and act faster than he can.

Science and technology are now developing so quickly that the OODA loop of ethicists and lawyers is frequently too slow to keep pace, and not just in respect of soldier enhancement. I firmly believe that the importance and relevance of military ethics has never been greater than it is today, as the nature of conflict evolves to invade previously untouched areas such as cyber warfare, space warfare and information warfare. But, as ethicists, we risk being left behind.

And here it is worth reminding ourselves that the primary purpose of military ethics is not to provide a vehicle for academic or a philosophical analysis – important though these are to improve our understanding and in helping to form policy. The real reason why we engage in this work is because we care about human dignity – the dignity of those in the armed forces who act on our behalf, the dignity of innocent people caught up in conflict and the dignity of our adversaries. Speaking out against actions which demean or erode that dignity is not always easy. But we have to guard against a willingness to acquiesce to the unacceptable.

The key mission of Euro-ISME is to promote the study and practice of military ethics, in part through helping to organise events such as this. We certainly see part of that aim extending into the upstream areas of research and development, as well being involved in what I will call the downstream areas of military training and conduct both during and after conflict. That is why we were so pleased to be invited to participate in the conference in partnership with CREC Saint-Cyr. We have already held an international conference into the potential of emerging technologies on military ethics and we see this conference as a continuation of that reflection.

I think I can safely say that you all believe that ethical boundaries for enhanced soldier research are essential. So, make a noise, make sure your views are known, be controversial, and make sure that the debate gets the public attention it deserves. Military ethics is not always a simple and straightforward subject, so those who are not expert in the field

will often happily ignore it in favour of an analysis of statistically quantifiable data. Make sure that they do pay attention to the ethics of what they are doing from the outset of their work. Earlier speakers have underlined that there are still more questions than answers in the field of enhancement. This means that for us now is the moment of greatest opportunity. Ethics has to be integrated from the beginning, not added as a token paragraph at the end. The time of greatest potential influence is when policies are still being debated and decided. Once they become set in stone it can be difficult or impossible to change them.

Finally, as the closing speaker, it would be wrong of me not to thank the whole of the CREC Saint-Cyr team and in particular Gérard de Boisboissel for organising such a valuable day, for attracting such high quality speakers and for such impeccable organisational skills. This has been an important conference which deserves to be a springboard for even wider and deeper consideration of these issues, which have the potential to affect many aspects of the health and wellbeing of our armed forces and wider society.

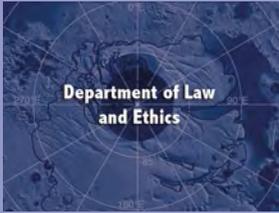
This conference has made an excellent contribution to that process, but, as I have just mentioned, this conference should not be an end in itself.

Thank you for your attention and I hope that many of you will find your way to Berlin next year 2021 to help Euro-ISME consider the ethical realities of urban warfare in the 21st century.

SAINT-CYR MILITARY ACADEMY RESEARCH CENTRE (CREC Saint-Cyr)

THE Saint-Cyr Military Academy Research Centre functions as a hub for interdisciplinary work on Defence and security issues faced by Armed Forces in general and Land Forces in particular. In a changing and complex world, it contributes to educate cadets to be effective combat leaders, reasonable decision-makers and critical thinkers. It supports teachings, research and enriched educational experiences. The Research Centre aims to enhance knowledge, to stimulate doctrinal debates and to improve their diffusion through graduate and post-graduate courses or through scientific events organized in collaboration with academic institutions and industrial companies.

Research Departments



The Department of Law and Ethics contributes to an academic program that delivers cadets a master's degree. Its main fields of research in ethics are decision-making processes, challenges in the use of Artificial Intelligence for Defence, the enhanced soldier and invisible wounds. In the field of law and Justice, researchers and lawyers develop knowledge on military legal studies: legal responsibility, fight against terrorism, military criminal law, military justice, legal history and comparative law.



The European Defence and Security department organizes its work around contemporary security and Defence issues, using a multidisciplinary approach while referencing institutional structures such as EU, NATO, OSCE, etc. Its main areas of research focus on Europeans and the war, the borders and peripheries of Europe and military cooperation in Europe.



The Mutation of Conflicts department (formerly called "global action and land forces") aims to understand the changes in contemporary conflicts and to analyse, from the angle of the human, social and political sciences, the consequences for the action of land forces. Its main areas of research notably address cyberdefense and cybersecurity, irregular warfare, as well as robotisation of the battlefield.



The "Defence Science and Technology" department is composed of three laboratories (Electronics, IT and applied mathematics, Mechanics) and focuses its researches on high-speed radio transmission, electromagnetic propagation, artificial intelligence, action planning, software engineering, cryptography, numerical simulation, ballistic studies and the theory of partial differential equations. Since 2017, the department benefits from a partnership with SAFRAN in the field of the enhanced soldier with an engineering and technology approach.

THIS publication contains the enriched proceedings of a symposium held on October 16th 2019 at the école militaire in Paris. The symposium was organized by the Research Centre of the French Military Academy of Saint Cyr-Coëtquidan and the International Society for Military Ethics in Europe (Euro-ISME).

It brings together contributions from several experts on the ethical issues raised by possible enhancements in soldier performance, particularly in respect of new technologies that have a direct effect on the human body, such as pharmacology, implants and even surgical anthropotechnics. All these new invasive techniques pose difficult moral problems of both applied ethics – such as: which forms of enhancements are permissible in view of the laws of war – and also fundamental ethics – such as respecting the moral and physical integrity of the soldiers who are being enhanced.

These enhancements are emerging within a new individual-centric social context. This creates a tension between the individual's free will to be able to decide for himself (or herself), and the requirements to comply with the demands of the military unit to which he belongs. That tension and paradox are replicated at an organisational level, where the armed forces respect the individual but, because of the exceptional nature of the commitment required, ask him to risk his life in the service of the collective good.

This publication aims to situate the question at a European level, in order to take advantage of a collective and inter-European reflection on this revolution in a human-centric technological approach that operates directly on the human body and mind. It establishes a preliminary basis for a European consensus that may emerge, in the long term, on the ethical approach to increasing.

CENTRE DE **R**ECHERCHE
DES **E**COLES DE
SAINT-CYR **C**OËTQUIDAN



EURO **I**SME
International Society for Military Ethics in Europe