Introduction

> Since the beginning of history, we also have wanted to become more than human, to become Homo superior. From the godlike command of Gilgamesh, to the lofty ambitions of Icarus, to the preternatural strength of Beowulf, to the mythical skills of Shaolin monks, and to various shamans and shapeshifters throughout the world's cultural history, we have dreamt – and still dream – of transforming ourselves to overcome our all-too-human limitations.
>
> Fritz Allhoff et al., 2010

When most people think of super soldiers, they usually refer to comic book characters, such as Captain America and Iron Man, or to fictional book and movie heroes like Jason Bourne. These fictional soldiers are the result of the military's desire to create the perfect combatant with superhuman physical features (increased endurance, focus, and pain threshold) or state of mind (elimination of fear, stress, or fatigue). While these examples relate to contemporary fictional characters, we must acknowledge that the desire to transform soldiers into super combatants is not a mere fantasy. On the contrary, it has always been an explicit objective of the military institution. History provides us with numerous examples of the various attempts made by different countries in this regard. Of course, some examples are more grotesque than others, such as the use of paranormal techniques to practise mind reading, remote viewing, and other tactics that were promoted by Lieutenant Colonel John Channon, who – as reported in Jon Ronson's book *The Men Who Stare at Goats* (2004) – wanted to create the 'First Earth Battalion' as a way to develop non-destructive methods of conflict resolution. However, many other historical instances were more down to earth than this far-fetched example, such as the spear and shield of the Greek hoplite or the armour worn by medieval knights. Alongside these mechanical technologies, armies have also resorted to various forms of chemical intervention, such as improved techniques of fighting that are not restricted to better weapons or equipment, but include drugs or medicines that affect the cognitive capacities of combatants. For example, Homer's *Odyssey* refers to the use of opium by the Greeks as a way to reduce the grief and sorrow associated with the loss of comrades as well as to combat stress and other forms of war trauma (Kamienski, 2016, p. 32). Inca warriors were known for using coca leaves to enable them to fight fatigue and to increase their resistance to pain (Kamienski,

2016, p. 46), while the Zulu warriors used traditional plants with psychotropic effects when they fought against the British in the nineteenth century. As described by Lukasz Kamienski, the impact of such chemical enhancements was enormous:

> The Zulus fought with fanaticism, dedication, and fury. Armed and fortified by their shaman doctors with potent intoxicants, they went into battle utterly without fear. … Even when injured they did not stop fighting because their bodies were rendered insensitive to pain through the use of powerful anesthetizing plant remedies. The Zulu warriors seemed immune to the enemy rifle fire, so they readily launched almost suicidal massed charges and incredibly easily retained their combat effectiveness. (Kamienski, 2016, p. 86)

It is also well known that many soldiers who fought in the Second World War had very easy access to hard drugs. Such was the case with the Finns who between 1939 and 1940 used massive quantities of heroin, morphine, and opium during their fight against the Soviet invaders (Kamienski, 2016, pp. 132–140), who, for their part, resorted to 'trench cocktail', a mixture of vodka and cocaine. However, the most famous example undoubtedly remains that of the Nazis, who patented Pervitin (the ancestor of crystal meth) and distributed it in industrial quantities to members of the *Wehrmacht* after observing its propensity to induce increased vigilance, resistance to fatigue, and a sense of invincibility. For the Nazis, this drug was seen as a necessary tool in their quest to enlarge their vital space. Its main supporter, Professor Otto Ranke, who chaired the Berlin Institute of Physiology, believed that Germany had one enemy that was more powerful than the Russians, the French, and the British combined: its soldiers' tiredness. However, this strange and elusive enemy was considered a contingency that could be overcome through the help of this little pill, which contributed to the initial successes of the German army. Indeed, the 35 million tablets ordered by the *Wehrmacht* before the campaign in France are now considered to have been one of the factors that contributed to the rapid victory of Germany over the Anglo-French troops in the spring of 1940 (Ohler, 2016). In fact, as Peter Steinkamp, a historian of medicine, notes, 'the *Blitzkrieg* was only possible because of methamphetamine. In fact, it was founded on the use of this drug.'[1] The effects of Pervitin also caught the German High Command off guard, leading to the fabrication of the myth of Erwin Rommel as one of the fastest tank commanders of the war. Fuelled by Pervitin, the future legendary 'Desert Fox' knew no limits. Indeed, even his corps commander, General Hermann Hoth, was unable to reach him as his orders always arrived when Rommel was already leading his men further into the enemy's territory (Ohler, 2016, p. 88): a situation that led Rommel's 7th *Panzerdivision* to be renamed the *Gespensterdivision* (Ghost Division).

In 1944, the Nazis developed a more powerful drug called D-IX, a composite of oxycodone, cocaine, and methamphetamine that was intended for special submarine commandos who had to stay awake during an entire mission of up to four days (Paterson, 2006). The Allies responded with their own field tests on the effects of amphetamines on soldiers' performance and allowed their soldiers to use Benzedrine, a mixture of amphetamines developed in the 1930s that increased

soldiers' confidence and alertness, though to a lesser degree than Pervitin. During the course of the war, 140 million tablets were supplied to Great Britain and to the US armed forces. The use of amphetamines did not stop with the end of the Second World War. These drugs were also widely used by both sides during the Korean War and in other subsequent South East Asian conflicts; as reported by a member of the US Air Force, these pills were available 'like candy' during the Vietnam War (Cornum, Caldwell and Cornum, 1997). Nowadays, the use of dextroamphetamine (known as a 'go-pill') remains standard during fatigue-inducing mission profiles, such as night-time bombing missions.

To a large extent, while some of these drugs are still used today, they nonetheless belong to a bygone era. Indeed, the current research devoted to increasing the physical capabilities of soldiers sounds much more like attempts to transform members of the military into comic book superheroes. The development of an exoskeleton by the Defense Advanced Research Projects Agency (DARPA), which has been responsible for the technical innovations of the US Army, is a clear example of this type of innovation. According to DARPA, this exoskeleton will allow a soldier to carry 45 kg of equipment while reducing his metabolic consumption by 25 per cent, and it should be operational in 2018.[2] The French army is making similar strides: the Directorate General of Armaments (DGA) introduced the Hercule exoskeleton in 2011 to enable soldiers to carry loads of 100 kg with little or no effort.[3] DARPA has also admitted that it is trying to develop a technology called Z-Man that will enable soldiers to climb walls in a manner similar to a gecko.[4] During a demonstration in 2014, an individual weighing 100 kg was able to climb a glass wall eight metres high while effortlessly carrying a load of 25 kg thanks to a simple pair of gloves.[5]

However, military research is not solely limited to increasing the physical capabilities of soldiers through devices that are extrinsic to the human body. It is also actively involved in developing technologies and drugs with the goal of altering – sometimes permanently – the internal physical faculties of individuals as well as their cognitive abilities. Alongside ancient forms of neuropharmacology, new ways – which are sometimes as far-fetched as the one of John Channon – are being studied in order to reach this goal. Numerous armies are now aiming to increase combatants' cognition and their capacities to learn and train as well as developing human–machine interfaces to ameliorate their psychological and physical weaknesses. In many respects, these science-fiction-esque developments raised the prospect of a 'Human Enhancement Revolution' (Savulescu and Bostrom, 2009; Allhoff et al., 2010). In fact, several reports mention research that is consistent with this approach, which has been described by the bioethicist Jonathan Moreno as 'the fastest-growing area of science' (Hanlon, 2011). We need only to think of research designed to erase certain events from the memory of soldiers to prevent post-traumatic stress disorder (Lehrer, 2012), or whose objective is to change the cellular and genetic structure to enable them to run longer distances, to survive longer without food, or to be able to consume foods that are not normally digestible (such as grass) (Shachtman, 2007), to erase pain with the help of a vaccine, or to develop ways to stop bleeding with the wave of a wand (Knefel, 2016). Although

this quest might seem unrealistic, it is nonetheless part of DARPA's mandate, which is, according to one of its high-ranking officials, 'about trying to do those things, which are thought to be impossible, and finding ways to make them happen' (Moreno, 2012, p. 26). For its part, the British Ministry of Defence has also launched a series of similar initiatives. For instance, a consultation paper published in 2010 by the Secretary of State for Defence states:

> Knowledge about the human brain is rapidly increasing including: understanding pharmacological effects to enhance performance and using brain activity to control systems. As such, it offers significant opportunities for defence and security in understanding adversaries' behaviours, training and improving human performance on the battlefield or in human-based security situations such as guarding or search. (Secretary of State for Defence, 2010, p. 24)

Consequently, the British government has recently started to provide funding in various areas, such as robust and fieldable techniques for neurological imaging, bio-electronics integration, and programmes aiming to exploit the subconscious (Royal Society, 2012, p. 7).

Thus we are probably about to enter a new paradigm as the wars of tomorrow run the risk of being carried out by 'super soldiers' with physical and cognitive capabilities that currently belong to the world of science fiction and comic books. This possibility, which is becoming increasingly real and inevitable but surprisingly remains neglected by ethicists, opens the door to a series of fundamental questions: are the motives behind the development of these technologies by the military-industrial complex noble or are they simply a way to sacrifice soldiers' health for the sake of military efficiency? Are all these enhancement technologies morally problematic? If not, by what criteria might we be able to sort the ones that are acceptable from the ones that are not? Will these innovations breach the moral principles of 'Just War'? What are the possible legal implications of the use of these technologies and this medical research? What should the ethical parameters of military research be? These are the burning issues into which this book will delve, because technological discoveries that do not take into account their consequences on humankind ruin the human soul (Rabelais, 2006). In order to avoid the potential consequences of these types of capacity-increasing technology, there is a need to understand them strictly through the lens of ethics. After all, if ethicists remain so very silent about this hubristic technological trend, human societies are at risk of downfall if they do not pay attention to the dangers associated with a willingness to go beyond their natural limitations.

However, one mistake would be to fall into the trap of arguing strictly in favour or against these new developments in warfare, as if it were self-evident that this question could be solved in binary terms. When analysed from an ethical viewpoint, the development and use of capacity-increasing technologies in the military is far more complex than it first appears because it presents us with a significant moral dilemma. On the one hand, enhancing soldiers' capacities can be interpreted as a moral obligation on the part of the military; on the other hand, such technologies may also end up contravening fundamental moral principles of warfare. Therefore,

any analysis on this question needs to be nuanced. While it is necessary to be critical of such military enhancement, it would be a mistake to condemn these studies as being entirely evil and inadmissible.

This nuanced evaluation is largely dependent on an interaction between four moral premises. On the one hand, like all other professional organizations, the military (1) has a moral duty to protect its members' lives and health as much as possible by allowing them to fulfil their duties with minimal risks. In return (2), these technologies should be morally acceptable only insofar as they respect a Kantian deontological ethics, which implies that the military has a universal non-contingent moral imperative to never perform an act that would result in using its members as pawns or tools; in addition, (3) they must not run counter to the principles of Just War Theory or (4) alter the modern principle of equality between human beings. The reader should be aware that this ethical stance will be central throughout this book.

This study will be divided into five chapters. First and foremost, the investigation of the ethical character of military research cannot be performed without a conceptual clarification of the various studies conducted by the military-industrial complex. More specifically, it is important to distinguish between methods aiming to restore the physical capabilities of soldiers from those looking to increase them. Although capacity-restoring technologies are not exempt from certain questions, those raised by capacity-increasing technologies are far more problematic from an ethical perspective, precisely because the latter tend to provide unnatural advantages to their beneficiaries: a situation that contradicts a moral pillar of our modern societies. There therefore is a need to understand the moral implications of this inequality in the military world and to determine whether the inequality inherent to the use of capacity-increasing technologies is immoral. As it will be argued, despite the fact that soldiers benefiting from capacity-increasing technologies will undoubtedly have an important edge over their enemies who cannot enjoy such methods, this advantage does not challenge in any way the nature of the ethical principles surrounding the morality of warfare, which do not see military asymmetry as a morally perverse situation to be avoided and condemned.

The second chapter will highlight the inherent moral necessity of these technologies as a corollary of the military's obligation to protect its members and as a potential way to increase the morality of warfare. In fact, their development is intimately linked with this desire on the part of the military institution to respect its duty of care towards its members. Secondly, it will also argue that capacity-increasing technologies can play a significant role in the enhancement of morality in warfare. Indeed, despite the best intentions and means deployed by the military institution, soldiers very often remain the weakest link when it comes to respect for the laws of war. Recent history has shown that warfare causes psychological trauma that can contribute to transforming the best-trained combatants into murderous agents unable to distinguish between legitimate and illegitimate targets. In this sense, we cannot ignore the possibility that certain capacity-increasing technologies might play a vital role in respect for the moral rules of war by thwarting this killing instinct.

However, despite the moral obligation to use capacity-increasing technologies, their development and use should also be evaluated under the light of the Kantian deontological notion that presupposes that such technologies should never treat soldiers as instruments and should not have a negative impact on the moral rules of warfare. For this reason the third chapter will oppose the intrinsic moral value of capacity-increasing techniques with these moral imperatives. Indeed, these research efforts pave the way for a crucial threat that cannot be ignored, namely, to harm soldiers' health, to deprive them of their obligation to disobey illegal and immoral orders, and to negatively affect the moral principles that address the fair termination phase of a war. As it will be argued, the use of technologies and medicines by members of the military is not only potentially dangerous to their physical integrity, but can also harm their moral agency. This latter possibility could create a situation in which certain soldiers would avoid the legal consequences of potential crimes they might commit. Through the use of very contemporary examples, this implication of capacity-increasing technologies will show that this possibility is not merely a hypothetical fantasy but a troubling reality that must be fully considered.

To prevent such a threat from being realized, the aforementioned risk will be followed by a discussion of the ways to chart the world of military research and its inherent problems. At first glance, it seems that the criteria that are used for civilian research should simply be applied to the military sphere. However, such a possibility turns out to be more problematic than it first appears, especially with regard to the notion of consent, which cannot be applied in the same way within the military as it would be in civilian research. If we seriously take into account the particularities of the military, it is important to reflect on the standards that should determine the ethical acceptability of capacity-increasing techniques and the boundaries that states should not cross in their quest to transform fiction into reality.

After discussing the current types of capacity-increasing technologies (both mechanical and chemical interventions), this book will conclude with a discussion of what is obviously a forthcoming way of enhancing warfighters' capacities: genetic manipulation. Specifically, some military studies are suggesting the prospect of transhumanism as a tangible reality.[6] This fear is animated by the fact that enhancement techniques might eventually increase soldiers' physical or cognitive faculties permanently through gene modification. Despite the fact that there are moral grounds justifying transhumanism, the use of gene therapy in the military faces significant ethical challenges that must be addressed, namely, the fourth moral premise presented earlier. Indeed, permanent capacity-increasing technologies that soldiers might end up acquiring during their employment in the armed forces may significantly alter the foundations of equality between human beings – a risk that cannot be ignored.

While it is true that many of us are afraid of technological progress, the fact remains that, just as when we face any other challenging question, unnuanced judgement based on fear should never prevail. Some social questions, such as this one about super soldiers, must not be discussed from a Manichaean perspective.

The best course of action is to rely on an impartial analysis organized around moral principles in order to sort the wheat from the chaff. It is hoped that this discussion will allow the reader to have a better and a more balanced understanding of the moral reasons that can justify the development and use of enhancement techniques within the military as well as the limits that such techniques should not exceed.

Notes

1 'Pervitin, la pilule de Goering', Arte Documentary, 2015, www.youtube.com/watch?v=1BHxWrZYlSI (last accessed 27 September 2017).
2 www.darpa.mil/Our_Work/BTO/Programs/Warrior_Web.aspx (last accessed 27 September 2017).
3 www.defense.gouv.fr/dga/mediatheque/videos/l-exosquelette-hercule (last accessed 27 September 2017).
4 www.darpa.mil/program/z-man (last accessed 27 September 2017).
5 /www.darpa.mil/news-events/2014–06–05 (last accessed 27 September 2017).
6 Many reports have suggested that some high-level athletes may already be using gene-doping, even though there have yet to be any confirmed cases of athletes genetically enhancing their bodies (Nilner, 2016; Friedman, 2014). This possibility looks credible at first sight, as leading scientists studying gene therapy claim to have been contacted by numerous athletes and coaches (Franks, 2014).

References

Allhoff, Fritz et al. 2010. 'Ethics on Human Enhancement: 25 Questions and Answers', *Studies in Ethics, Law and Technology*, Vol. 4, No. 1, pp. 1–39.

Cornum, Rhonda, John Caldwell, and Kory Cornum. 1997. 'Stimulant Use in Extended Flight Operations', *Airpower Journal*, Spring, pp. 53–58.

Franks, Tim. 2014. 'Gene Doping: Sport's Biggest Battle?', BBC, 12 January. www.bbc.com/news/magazine-25687002 (last accessed 27 September 2017).

Friedman, Lauren F. 2014. 'A Powerful and Undetectable New Kind of Doping may be Happening at the Olympics', *Business Insider*, 19 February.

Hanlon, Michael. 2011. '"Super Soldiers": The Quest for the Ultimate Human Killing Machine', *The Independent*, 17 November.

Kamienski, Lukasz. 2016. *Shooting Up: A Short History of Drugs and War*. Oxford: Oxford University Press.

Knefel, John. 2016. 'How the Pentagon is Building the Enhanced Super Soldiers of Tomorrow'. www.inverse.com/article/9988–how-the-pentagon-is-building-the-enhanced-super-soldiers-of-tomorrow (last accessed 27 September 2017).

Lehrer, Jonah. 2012. 'The Forgetting Pill Erases Painful Memories Forever', *Wired*, 17 February.

Moreno, Jonathan. 2012. *Mind Wars: Brain Science and the Military in the 21st Century*. New York: Bellevue Literary Press.

Nilner, Eric. 2016. 'Olympic Drug Cops will Scan for Genetically Modified Athletes', *Wired*, 28 July.

Ohler, Norman. 2016. *L'extase totale: le III^e Reich, les Allemands et la drogue*. Paris: La Découverte.

Paterson, Lawrence. 2006. *Weapons of Desperation: German Frogmen and Midget Submarines of World War II*. London: Chatham Publishing.

Rabelais, François. 2006. *Pantagruel*. Paris: Hachette.

Royal Society. 2012. *Brain Waves Module 3: Neuroscience, Conflict and Security*, February. London: The Royal Society Science Policy Centre.

Savulescu, Julian and Nick Bostrom. 2009. *Human Enhancement*. Oxford: Oxford University Press.

Secretary of State for Defence. 2010. *Equipment, Support, and Technology for UK Defence and Security: A Consultation Paper*, Cm 7989.

Shachtman, Noah. 2007. 'Kill Proof, Animal-esque Soldiers: DARPA Goal', *Wired*, 7 August.