



(Photo courtesy of Army News Service)

A soldier aims an XM-25 weapon system at Aberdeen Test Center, Md. It features an array of sights, sensors, and lasers housed in a target acquisition fire control unit on top, an oversized magazine behind the trigger mechanism, and a short, ominous barrel wrapped by a recoil-dampening sleeve.

Ethics and the Enhanced Soldier of the Near Future

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We live in a world of rapidly advancing, revolutionary technologies that are not just reshaping our world and wars, but also creating a host of ethical questions that must be dealt with. But in trying to answer them, we must also explore why exactly it is so hard to have effective discussions about ethics, technology, and war in the first place?

—P.W. Singer

The super soldier is on the way—maybe not tomorrow, but soon. As technological inventions are changing our society, so will technology ripple through our battlefields and soldier ethics. Soldier enhancement possibilities are often discussed, but less so are the ethical challenges of the new technologies.

In the near future, science and technology will offer many startling choices to enhance or equip the soldier. Like any innovation in warfare, the Army must discuss the ethics of enhancing soldiers.

Planning must begin on how to incorporate the enhanced soldier into the Army. A comprehensive planning effort could prevent the unintended repercussions of technology implemented without consideration for ethics, concepts, and doctrine. The Army must come to terms not only with creating—or fighting against—enhanced soldiers but also with understanding the unforeseen ethical challenges and the second- and third-order effects of such warfare.

At the very basic level, all items soldiers carry and use could be considered enhancements to aid them in battle. In 480 BCE at the battle of Thermopylae, the Spartans' enhancements were in the form of their shields, spears, and swords. At the Battle of Agincourt in 1415, English King Henry V and his forces had their enhancements: English knights rode atop warhorses and wore armor plate while the English bowmen fired arrows with the long bow.

Today, U.S. soldiers carry enhancements of body armor, weapons, radios, and batteries that weigh in excess of 75 pounds. However, the way of exterior enhancement soon will be augmented with technologies yet to be developed.

The soldier of the future likely will be enhanced through

neuroscience, biotechnology, nanotechnology, genetics, and drugs. According to Patrick Lin, writing in *The Atlantic* about the ethics of enhancing soldiers, “Soldier enhancements, through biological or technological augmentation of human capabilities, reduce warfighter risk by providing tactical advantages over the enemy.”¹ Lin describes efforts to develop a “super-soldier” who can perform more like a machine.



(U.S. Air Force photo by Daren Reehl)

The Future Soldier exhibit shows the futuristic personal combat vehicle being designed by Program Executive Office Soldier to increase strength, endurance, and load capacity.

Why Are Ethics Important to the Enhanced Soldier?

A 2010 report prepared for United States Army Aeromedical Research Laboratory about the appropriateness of cognition-enhancing drugs for troops says that the Army has tested modanafil and caffeine (to promote wakefulness) for use in military operations and that Army policy already approves some drugs for cognition enhancement.² The report's authors expect that more drugs will be considered for enhancing warfighters. However, the authors barely mention the ethical concerns of using drugs such as modanafil for enhancement rather than for their intended therapeutic purposes. Moreover, their review of the literature and issues on ethics is based on about six sources and takes up about one page of a 50-page report.

A definition of enhancement. According to the *Oxford Dictionaries Online*, *enhancement* is “an increase or improvement in quality, value, or extent.”³ One working definition of an enhancement as it might apply to warfighters, according to Lin, is that “an enhancement is a medical or biological intervention to the body designed to improve performance, appearance, or capability besides what is necessary to achieve, sustain, or restore health.”⁴

Dangers of enhancement to soldiers. The risks that accompany enhancement are not new. Throughout history, armies have used risky enhancements such as addictive drugs to improve soldiers' performance in combat. For example, high-dose caffeine, modanafil, and amphetamines all have been shown to be highly effective in temporarily reversing mental performance degradation in sleep-deprived soldiers.

Even in the early days of Western civilization, our mythology idealized the super soldier. The story of the nearly invulnerable Achilles in the battle for Troy, which originated circa 850 BCE, is still told today. The search for the enhanced Achilles occurred during World War II, accompanied by ethical problems as well.

The Enhanced Soldier in World War II

The U.S. military and other armies during World War II gave amphetamines to soldiers to prevent what was called “battle fatigue.”⁵ Armies used

amphetamines “to combat fatigue, depression, and to enhance endurance performance.”⁶

German Wehrmacht. One of the first large-scale attempts to enhance soldiers involved the German Wehrmacht.⁷ Andreas Ulrich describes how the German military provided a stimulant called Pervitin to soldiers in combat.⁸ Pervitin, a methamphetamine, was generally viewed as a proven drug to be used when soldiers were likely to be subjected to extreme stress. Ulrich reports that a memorandum for German navy medical officers stated,

Every medical officer must be aware that Pervitin is a highly differentiated and powerful stimulant, a tool that enables him, at any time, to actively and effectively help certain individuals within his range of influence achieve above-average performance.⁹

Ulrich also reports,

between April and July of 1940, more than 35 million tablets of Pervitin and Isophan (a slightly modified version) were shipped to the German army and air force. Some of the tablets, each containing three milligrams of active substance, were sent to the Wehrmacht's medical divisions under the code name *OBM*, and then distributed directly to the troops. The packages were labeled “Stimulant,” and the instructions recommended a dose of one to two tablets “only as needed, to maintain sleeplessness.”¹⁰

Ulrich states that although Pervitin had begun to be available only by prescription by the end of 1939, it still was consumed in enormous amounts.¹¹ Serious health damage resulted, including fatal heart attacks in some German soldiers. Therefore, in June 1941, Pervitin was designated as subject to the opium law. After that, illicit consumption and illegal sale of Pervitin were punished as a crime. Medical officers had to follow strict orders concerning the use of Pervitin and its distribution to soldiers.¹²

Eventually, the German medical officers were told about the danger of addiction to amphetamines, and use declined. However, this does not mean there were no more problems with Pervitin. Officers and common soldiers were punished for misusing it or remained addicted, some even years after the war had ended.¹³

United States Army. The U.S. Army also became interested in amphetamines and caffeine for soldier enhancement. Some of the earliest evaluations were conducted at the Harvard Fatigue Laboratory and involved caffeine comparisons with the amphetamine called Benzedrine. This interest was stimulated by the use of methamphetamine by the Germans during the early years of the Blitzkrieg.

Harris R. Lieberman, Jessica Cail, and Karl E. Friedl report that the U.S. Army issued Benzedrine to servicemen during the war, mainly as 5-mg tablets, though inhalers were also available.¹⁴ The Army continued to use amphetamines even after other countries such as Germany and the United Kingdom were beginning to recognize problems from unrestricted use of the drugs.¹⁵ Studies published after the war noted concerns about impaired judgment and willingness to continue nonproductive or dangerous performance. Studies also found that amphetamine, as opposed to caffeine and modanafil, increased risk-taking while prolonged wakefulness increasingly impaired judgment.¹⁶

Withdrawal symptoms of amphetamine consisted primarily of mental fatigue, mental depression, and increased appetite. Symptoms lasted for days with occasional use and for weeks or months with chronic use, with severity dependent on the length of time and the amount of amphetamine used. Withdrawal symptoms also included anxiety, agitation, excessive sleep, vivid or lucid dreams, and thoughts of suicide.¹⁷

So what was the ethical problem of giving amphetamines to combat soldiers in World War II? With the eventual understanding of their effects, under what combat conditions did the short-term benefits of being alert and awake overrule the ethical issue of possible amphetamine addiction? Similar conundrums

already complicate consideration of future potential enhancements.

The Ethical Problem

With the possibilities of several types of enhancements to the warrior in the near future, what are some possible future ethical challenges? According to William D. Casebeer, “ethical questions are normative questions. They deal with what we ought to do, what is permitted in good and right thought and conduct, and what kind of people we ought to be.”¹⁸

The *Oxford Dictionaries Online* define *ethics* “as moral principles that govern a person’s or group’s behavior.”¹⁹ Combat ethics define the allowable actions in warfare. The *Department of Defense Dictionary of Military and Association Terms* has neither a definition of ethics, combat ethics, nor enhancement.²⁰

Ethics are not new to the soldier in combat. The Geneva Conventions and other treaties aid in defining what is ethical and not ethical in combat. What is new is the coming onslaught of technologies that will bring ethical questions about enhanced soldiers in combat operations.

New ethical challenges are arising from the technological developments in stem cells, genetics, neurosciences, robotics, and information technology. Lawrence Hinman of the Center for Ethics in Science and Technology, University of San Diego, reports that “these developments have created ethical vacuums, situations in which our technology has outstripped our ethical framework.”²¹ This statement, although made in 2008, remains true. In fact, current military references to enhanced soldiers are very limited.

Enhanced Warrior War Story—1993

Many Somali men, particularly the young men who cruised around Mog[adishu] on “technicals,” vehicles with .50-caliber machine guns bolted in back, were addicted to *khat*, a mild amphetamine that looks like watercress. Mid-afternoon was the height of the daily cycle. Most started chewing at about noon, and by late afternoon were wired, jumpy, and raring to go.

—Mark Bowden, *Black Hawk Down* (New York: Atlantic Monthly Press, 1999), 21.

Enhanced Warrior War Story—2003

During Operation Iraqi Freedom, B-2 stealth bomber pilots flew non-stop combat missions from Whiteman AFB (Air Force Base), Missouri, averaging 35.3 hours per sortie. Missions to Afghanistan reached a maximum sortie length of 44 hours. Each crew of two pilots used fatigue countermeasures consisting of preflight zolpidem and in-flight use of napping, caffeine, or dextroamphetamine.

—David N. Kenagy et al., “Dextroamphetamine Use During B-2 Combat Missions,” *Aviation, Space, and Environmental Medicine*, Volume 75, Number 5, May 2004.

Patrick Lin states,

Our ability to “upgrade” the bodies of soldiers through drugs, implants, and exoskeletons may be upending the ethical norms of war as we’ve understood them We want our warfighters to be made stronger, more aware, more durable, and more maneuverable in different environments Once ethical and safety issues are resolved, militaries will need to attend to the impact of human enhancements on their operations In changing human biology, we also may be changing the assumptions behind existing laws of war and even human ethics.²²

Edmund G. Howe, director of the medical ethics program at the Uniformed Services University, writes in a 2010 book on bio-inspired innovation that new methods in biotechnology, nanoscience, and neurobiology raise ethical questions because of how they can change the human body.²³ Howe says that even though innovations support accomplishing missions, consideration of their use must account for ethics. He believes that before new technologies are used in military operations—which should be the priority of use—U.S. forces need to set ethical boundaries.

The Department of Defense discusses soldier enhancement in the 2011 *Force Health Protection Concept of Operations (CONOPS)*.²⁴ This document states that human performance optimization “will improve the ability of the future joint force to complete essential tasks.”²⁵ While not clear on the means, it states that human performance optimization “will extend physical and mental endurance and enhance physiological and psychological resilience to reduce injury and illness.”²⁶

The document also lists functions that human performance optimization eventually will affect. It forecasts the ability to manage warfighter fatigue; enhance sensory, cognitive, and motor capabilities; enhance learning, communications, and decision making; and enhance physiological capability and resilience.²⁷ However, no discussion of ethics is given.

In the near future, enhanced soldiers will face many ethical challenges. Do enhanced fighters have to give their consent for any type of enhancement? If so, how much consent? Can a warfighter refuse enhancement based on ethical grounds such as religious beliefs? Are there limits to who should be enhanced? How does enhancement affect a person’s self-image? Must the soldier disclose enhanced status to fellow soldiers? Can service members keep their enhancements after leaving the service? What are the consequences when enhanced soldiers return to civilian life? What are the side effects and unintended consequences of enhancement? What are the long-term effects on the mental, emotional, and physical health of the enhanced soldier? What are the long-term health consequences of permanent enhancements, such as bionic parts or a neural implant?

Because some enhancements may be experimental or pose long-term health risks, should military enhancements be reversible?²⁸ If they become irreversible, could some enhancements—regardless of immediate benefits for the military mission—eventually violate the basic rights of soldiers by inhibiting their prospects for leading a normal life following their service?

Under what conditions will a soldier be ordered or asked to accept a risky or unproven enhancement such as an experimental vaccine? Will genetic

engineering, neurobiological augmentation, and specialization prevent demobilizing soldiers at the end of conflict? How will enhanced soldiers affect their unit's tactical performance? What additional challenges will be created for their units?

Tactical-Level Ethical Factors with Second- and Third-Order Effects

What are some of the effects that enhanced soldiers may bring to tactical operations? As an example, will enhanced and unenhanced soldiers serve in the same units? Will enhanced soldiers be in their own elite units? How will their employment affect unit cohesion and morale? How will training standards be governed with enhanced and normal soldiers? Could a normal officer lead enhanced enlisted soldiers effectively?

Would enhanced soldiers rush into riskier situations when their normal counterparts would not? As both an investment and potential benefit to the individual warfighters, should enhanced soldiers be treated differently from the unenhanced, such as on length of service and promotion requirements? Would preferential treatment to any particular group lower overall troop morale?

If an enhanced soldier's behavior goes out of control and violates the laws of war, who is at fault? Who is responsible? Is it the soldier, the combat leader, or the medical team that created him? Do the laws of war need to be modified to account for enhanced soldiers? Will enemy forces be reluctant to take our enhanced soldiers as prisoners? Will enhanced soldiers be targets for capture to reverse engineer biological or neural implants?

In combat, will enhanced soldiers be tasked with more dangerous missions than others? Will they be the permanent point man on patrol? Will normal soldiers shun the enhanced soldiers whose personalities have been modified? For instance, new

approaches may prevent soldiers from experiencing combat fatigue. Medication may reduce physiological responses to stress, such as heart palpitations, trembling, and sweating. Such medication could result in soldiers having less than normal fear during combat.

If two soldiers are wounded, one normal and one enhanced, will the enhanced soldier receive priority based on the value of the enhancements and the probability of survival? Will combat medics need additional training to treat enhanced soldiers?

What are the ethics of fighting an enemy enhanced soldier? Will the Geneva Conventions and the other conventions apply? What if an enhanced enemy soldier carries a biological threat in his bloodstream? What type of enemy prisoner of war facilities



(Photo courtesy of DARPA Staff)

An exoskeleton in development at the Defense Advanced Research Projects Agency.

will be needed to confine the enemy enhanced prisoner of war? How will friendly forces know their enemies are enhanced? How will medical units treat enemy prisoners of war during their drug withdrawal? Will our medical units sustain ongoing drug treatments for enemy prisoners of war? How will facilities safely deactivate neural implants or bionic or biological weapons in enemy enhanced prisoners of war?

What are the ethics of fighting an enemy enhanced soldier who does not feel pain? Will the only way to stop that soldier in battle be to cause severe trauma or death? Questions such as these concerning the enhanced soldier and combat ethics seem to garner little discussion within current military concepts and doctrine.

Examples of Technology Innovation Without Ethical Discussion, Sharing, and Planning

Two recent examples illustrate technological innovations can go wrong when implemented without ethical discussion, sharing, and planning. These two examples are drone strikes and National Security Agency (NSA) privacy violations.

Drone strikes demonstrate the complexity of technology, policy, war, and ethics. Drones provide U.S. forces with persistent presence through long-range strikes at little or no risk to our operators. Our enemies, neutral nations, and allies see a different view. From the international view, the use of U.S. drones shows a disregard for other nations' sovereignty, airspace, and boundaries. In covering the Middle East, Afghanistan, and Pakistan, foreign news media depict individuals who speak of the psychological terror from the daily presence of drones overhead.

Foreign news sources share stories of people constantly wondering which patterns of behavior drone controllers find suspicious. People are concerned that drones make decisions about who will live and

die, how much civilian death is acceptable, and how a "militant" will be defined.²⁹

The next area is the NSA, which used software programs to intercept Internet use and emails, in the United States and abroad. The NSA has used various technological means to spy on U.S. and foreign citizens, foreign heads of state (including the chancellor of Germany), and foreign companies.³⁰ These software programs involved unauthorized surveillance of Americans or other persons in the United States, contrary to statute and executive order. Additionally, NSA may have targeted allies overseas with these same surveillance programs.

Both drone strikes and NSA spying demonstrate the problem of technology implementation without careful ethical considerations. Both programs have lacked the oversight of integrating technology, law, and ethical decision making. Both cases illustrate the problem of technology implementation without careful discussion, sharing, and planning. Technology can make it easy to kill or to ignore the rule of law.

Conclusion

The discussion of ethics for the enhanced soldier is lacking in Army concepts and doctrine. One of the challenges of the advance of science and technologies will be the ability of Army combat ethics to stay ahead of the enhanced soldier. Like any innovation in warfare, the combat ethics of the enhanced soldier must be discussed. Standards must be established and shared. Comprehensive planning must begin for how to incorporate the enhanced soldier into the Army.

Technological advancements are coming that may radically change not only the face of combat but also the ethical world of combat. Let us hope the enhanced soldier will come on the scene guided by our ethics and not by technology alone. Friedrich Nietzsche warns: "He who fights with monsters should be careful lest he thereby become a monster."³¹ ■

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Notes

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