

Soldier Enhancement Ethics and the Lessons of World War I

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World War I is sometimes described as either the last of the Napoleonic wars or the first of the modern ones. In truth, it was both. While it was largely fought by the kinds of mass formations perfected by Napoleon Bonaparte 100 years earlier, it was also characterized by innovations such as the tank, airplane, flamethrowers, poison gas, and hydrophones, to name only a few, that gave rise to what we now call “modern warfare.”¹

One innovation often overlooked is the use of drugs to enhance soldier performance in combat. Of course, soldiers—as well as the governments that employ them—have long sought to enhance their ability to destroy the enemy and survive. Ancient Greek hoplites, for instance, would consume large quantities of wine before battle to overcome fear and pain and then later might add an opiate to that wine to ease the physical and psychological suffering resulting from the battle just fought. Moreover, European armies had used coca plants for military purposes on an ad hoc and experimental basis as early as the 1820s.

World War I, however, was the first time armies on both sides employed the drug on a mass scale to improve soldier effectiveness. As Lukasz Kamienski observes in his book *Shooting Up: A Short History of Drugs and War*, never before did the military—on both sides of the trenches—consume

such large amounts of cocaine to enhance performance.² At the same time, the drug was being introduced on a mass scale into the societies where the soldiers came from with such deleterious effects that governments passed laws restricting their use.³ Thus, World War I provides an excellent lens from which to understand the ethics of enhancements for both military and civil purposes.

The scale of drug use in World War I demonstrated that the logic of enhancement ethics for military purposes is quite different than the logic of enhancement ethics in civil society. In civil society, it is easier to bring into account moral concerns associated with freedom and autonomy, health and safety, social disruption, and human dignity. The demands of combat, on the other hand, that require soldiers to take risks and make sacrifices turn the logic of enhancement ethics around and raise new concerns regarding coercion, inequality, veterans care, and civil-military relations.

To understand what those concerns entail, we must clearly define, in ethical terms, what enhancements are and discuss how they have been applied. With this definition and history in mind, we then compare the logics of civilian and military enhancement ethics to demonstrate how military enhancements raise additional moral concerns not present in the civil context.

Defining Enhancement

Before discussing the ethics of enhancements, it is important first to be clear about what we mean. Not everything that improves soldier performance counts as an enhancement, and not every improvement in soldier performance counts as being enhanced, as there is a difference between optimization and enhancement. *Optimization* is the realization of a potential one has; *enhancement*, on the other hand, is creating a whole new potential, whether giving one capabilities that one does not already have or improving a capability one has beyond what counts as normal human function.

Of course, what counts as normal is somewhat relative to the individual. For example, the world record for the 1-mile run is 3 minutes, 43

seconds.⁴ Most people, however, cannot run nearly that fast for a variety of reasons having to do with pain levels, ability to oxygenate, and the motivation and interest to do the necessary workouts. Any drug or other medical intervention that enabled one to overcome those barriers to maximize how fast one could run, had those barriers not been there, would count as optimization. Similarly, medical interventions intended to restore functions one had previously possessed, such as artificial limbs, would also count as an optimization, rather than an enhancement. This point does not suggest that medical interventions to optimize human performance do not entail ethical concerns; it is just that these are not the concerns under discussion here.

On the other hand, an intervention that allowed one to beat the world record would probably count as an enhancement, as it would give one a capability beyond what counts as normal assuming one's natural physiology would not have permitted achieving that record, regardless of how much effort one put into it. The point here is that for every individual, there is a range of normal functioning, and any interventions that exceed that range would count as an enhancement.

Certainly not everything that enables one to exceed human performance counts as an enhancement. Mechanical aids, such as a car or motorcycle, would easily allow one to beat the mile record; however, since they do not require any changes in one's own physiology, they would not count as an enhancement. Even an exoskeleton, like some of those being developed today for military purposes, would not count as an enhancement, at least for the purposes of this discussion, to the extent they do not require a change in one's physiology. Thus, what distinguishes an enhancement is the presence of a medical or biological intervention. An exoskeleton that one simply steps into is no more morally worrisome than a tank. It is not that technologies, like tanks, do not raise ethical concerns, it is just that, again, those are not the concerns under discussion here.

An exoskeleton that requires a chip implanted into one's brain in order to effectively use it, on the other hand, does raise new concerns.⁵ These concerns arise because those kinds of interventions typically come at a cost

and because the human body, as a complex adaptive system, responds to these interventions in ways that are difficult to predict. Since these costs and uncertainties are not associated with mechanical aids or driven by a desire to restore normal human functioning, they pose a different set of ethical challenges. Given these considerations, the definition of *enhancement* employed here is any *medical or biological intervention* to the body intended to improve a capability beyond the range of optimal human functioning or provide one that did not otherwise exist.

In the military context, it is also worth distinguishing between *offensive* and *defensive* measures. Since the best defense is a good offense, in some sense all measures may be considered defensive; however, there is a difference between measures intended to protect soldiers from the effects of enemy weapons and those that increase soldier lethality. The former reduce risk to soldiers, but because they are defensive in nature, do not expose the soldier to additional risk. The latter, on the other hand, make it more likely soldiers will be exposed to the enemy because they would be, by virtue of the enhancement, better able to manage those risks than non-enhanced soldiers. For example, the pyridostigmine bromide provided to U.S. Soldiers during the first Gulf War to protect against the effects of nerve gas would be defensive since its intent was simply to prevent the particular effect of a particular weapon.⁶ On the other hand, drugs intended to improve physical and cognitive endurance like cocaine and Pervitin, which were used by the German army in World War II, would count as offensive since the intended effect was to enhance soldiers' lethality.

Performance-Enhancing Drugs in World War I and Beyond

While a number of psychoactive and other performance-enhancing drugs were under study and available to the public, cocaine probably had the most widespread use in improving human performance during World War I. Cocaine was introduced into European and, to a lesser extent, American armies in the late 1800s as researchers noticed the effect it had on not only

endurance but also appetite suppression. Thus in the beginning, the overall military utility of the drug was in its ability to ease the burden of sustaining troops rather than its ability to increase their lethality. As a result, cocaine supplies increased and the price dropped, making it available in significant quantities to the public.⁷

There are no reliable records regarding the full scope of cocaine use by European militaries in the war. German and French pilots used the drug to extend their endurance on long flights as well as to enhance their abilities to survive a duel. On a much more massive scale on the ground, soldiers were often given the drug prior to assaults. The British, for example, had routinely provided rum to soldiers prior to departing the trenches, into which they had mixed cocaine, often without the soldiers' knowledge. Not only did the drug improve endurance, but it also reduced the sense of risk while leaving one largely in control of one's actions. Further driving this use were primarily three factors: mass mobilizations required to fight the war, the severe conditions on the battlefield, and the absence of controls on the drug since the full range of its effects were not well understood. The result of this use was mass addiction by soldiers as well as the wider introduction of the drug into society, which had its own negative effects.⁸

Ironically, European militaries were well aware of the negative effects of cocaine addiction and sought to restrict its use by soldiers. For example, Britain passed the Defence of the Realm Act of 1914 to establish a number of regulatory schemes making the unauthorized sale or use of cocaine by soldiers punishable by prison. Such regulations, however, did not prevent soldiers from bringing their addictions home with them and seeking alternate sources for the drug. As a result, black markets developed and cocaine use became associated with "sex, hedonism, moral decay, and enemy subversion."⁹ It is the last association that especially raised concerns about cocaine as it was increasingly portrayed as an "unfair" tool of war employed to undermine society, despite the fact that almost all cocaine produced at the time came from the Netherlands, which was neutral at the

time. So while the war increased the scope and scale of cocaine use in the military and civil society, it also drove efforts to regulate and control its production and use.¹⁰

Unfortunately, these lessons did not stick. As one researcher observes, if cocaine was the drug of choice in World War I, amphetamines were the drug of choice in World War II.¹¹ Much like cocaine, amphetamines were relatively available to the public, but the demands of war drove up both production and use.¹² In fact, the success of Blitzkrieg owes more to 35 million methamphetamine tablets distributed to the German army prior to the invasion of France than it does to the innovation in warfare it represented.

To succeed, German General Heinz Guderian had to get his army of German tanks through the Ardennes forest in less than 3 days and take the city of Sedan. Otherwise, reinforcing French and British units would arrive, and he would be both outgunned and outnumbered. At normal rates of march, however, the drive would take at least 5 days. To overcome this obstacle, the German army ordered increased production of the drug Pervitin, itself a variant of crystal methamphetamine, that had been used on a smaller scale but to good effect in the invasion of Poland. As a result, the Germans broke through to Sedan in time to beat the reinforcing British and French forces, and thus force France's surrender a few weeks later.¹³

Use of this drug also came with its own downsides and contributed to Germany's defeat as much as it did to its success. Excessive Pervitin use caused circulatory and cognitive disorders and eventually degraded the performance of the German army.¹⁴ In some cases, it caused soldiers to become so jittery that they imagined enemies who were not there. One SS (Schutzstaffel) unit was easily overrun by Russian conscripts because after days of continuous Pervitin use, the soldiers had fired all their ammunition in response to the slightest noise,¹⁵ so when the Russians attacked they were unable to resist.¹⁶ Even before the invasion of France, Otto Friedrich Ranke himself, who not only introduced methamphetamine during World War II but also took Pervitin on a regular basis, had expressed concern about its side effects and insisted that its use be moderated and monitored.¹⁷ The

fact that his concerns were rarely adhered to emphasizes the moral force “military necessity” can have on overriding more humanitarian concerns, even those directed at one’s own people.

Amphetamines continued to be used in militaries after World War II, often with negative effects. In Vietnam, for example, use of this drug led to increased addiction as well as increased incidences of friendly fire instances and indiscriminate use of force against civilians.¹⁸ In Afghanistan, U.S. F-16 pilots dropped a 500-pound bomb on Canadian soldiers, killing several. They accounted for the mistake by stating they were jittery from taking Dexedrine in order to remain alert during their 10-hour-long mission.¹⁹

Today, of course, medical technology can alter the human body and mind in ways that increase capacities well above the normal range or provide entirely new ones in ways medical professionals at the turn of the 20th century could not imagine. Take, for example, Defense Advanced Research Projects Agency efforts to allow humans to control robotic systems through a neural interface that connects directly to the brain, even to the point of allowing the human to “feel” what the robot touches.²⁰ Though currently this research has mostly been applied to helping amputees control robotic prostheses, this technology could conceivably enable soldiers to control robotic weapons systems remotely, thus limiting their exposure to risk.

However, just as in the past, these enhancements often have side effects are that are poorly understood and may cause permanent harm to the soldier as well as the society those soldiers defend. However, the lessons of World War I can provide some insights into the appropriate norms associated with the introduction of enhancement technologies so that the moral harms to soldier and society may be avoided.

Civil vs. Military Enhancement

Patrick Lin and Fritz Allhoff argue that the ethics of human enhancement are informed by five overlapping categories of issues: freedom and autonomy; health and safety; fairness and equity; social disruption; and human dignity.²¹

Ethics of Enhancement in Civil Society

In applying these issues to human enhancement in civil society, the authors note that the *prima facie* freedom to choose how one lives one's life suggests there should be few restrictions on the kinds of enhancements persons should be allowed to accept. However, if unrestricted, the exercise of that freedom raises additional concerns. The first is health and safety. Not only can the physical effect of enhancements negatively affect the individual who receives them, but it can also place a burden on society when those effects are more than the individual can bear. Further constraining any "right" to pursue enhancements are the concepts of fairness and equity. Fairness arises out of the concern that anyone who possesses an enhancement has an advantage relative to those who do not, which can lead to greater, permanent inequality over time. If the wealthy are typically the ones who obtain enhancements first, and these enhancements make them even better able to obtain more wealth, then inequality over time will not only increase, but also become entrenched. This concern of equity naturally segues into the concern regarding social disruption. From the perspective of civil society, inequality can drive unrest, side effects can drive up medical costs, and enhanced, especially new capabilities can affect human behavior in unexpected ways.²² The authors are also concerned about enhancements' effects on human dignity. To the extent they make life too easy, they may hinder the kind of moral development that allows us to realize human potential. If one can take a pill or implant a chip that makes one smarter, kinder, or even-tempered, what moral value is there to attaining these conditions?

Ethics of Enhancement in the Military

The conditions under which enhancements are employed in a military context operate under a different logic than enhancements considered in the context of civil society. In civil society, the purpose of an enhancement is to enhance quality of life, so it makes little sense to tolerate much in the way of suffering or other costs, either for the individual or society. In the military context, the purpose of enhancements is to increase lethality and

survivability; therefore, depending on the quality of the enhancement, it may make sense to tolerate a great deal of suffering as well as high costs to society. This difference in logic suggests norms associated with military enhancements will be different than in civil contexts.

Coercion. In the military context, respecting freedom and autonomy is less concerned with whether one should be prohibited from receiving an enhancement as much as whether one may be *forced* to receive one. To the extent the enhancement represents the best response to an enemy advantage, military necessity will place a great deal of pressure on commanders to offer them and soldiers to accept.

In this context, concerns regarding autonomy are probably the most difficult to work through in military contexts. In civil society, civilians are largely free to walk away from any enhancement. All that is morally required on a would-be provider is that any recipient is given as much information as possible regarding the treatment. Informed consent is a cornerstone of medical ethics. However, as the story of stimulant use in the German army suggests, it may not be entirely relevant when it comes to military enhancements. As one German bomber pilot who participated in the Battle of Britain stated, “One wouldn’t abstain from Pervitin because of a little health scare. Who cares when you are doomed to come down at any moment anyway!”²³

Offering such an enhancement forces the soldier to choose between an increased likelihood of survival, but with possible long-term and severe side effects, on one hand and an increased likelihood of death or serious injury on the other. Depending on how much soldiers perceive how receiving an enhancement affects the likelihood of these possible outcomes, they have few good reasons not to accept it: as long as the side effects are not lethal or significantly debilitating, suffering them will always “make sense.” Placing soldiers in such a situation, where they have to choose between the possibilities of death, or merely suffering, in effect robs them, to some degree at least, of their autonomy. Constraining their choices to outcomes they would not otherwise choose is very much like Marlon Brando making them an offer they cannot refuse in *The Godfather*. This is a form of coercion.

The question, then, is when, if ever, would it be permissible to override a soldier's autonomy and offer, much less mandate, an enhancement? This point is where the distinction between defensive and offensive enhancements can shed some light.

Defensive. In general, it is fair to act without someone's consent when no one is worse off and at least some are better off. As Isaak Applbaum notes, "If a general principle sometimes is to a person's advantage and never is to that person's disadvantage (at least relative to the alternatives available), then actors who are guided by that principle can be understood to act for the sake of that person."²⁴ The nerve antidote given in the Persian Gulf War is a good example. To the extent everyone who received the pill had an equal chance of exposure to Sarin gas and a more or less equal chance—at least given what could be known at the time—of experiencing side effects, then no one was worse off than any of the others. To the extent some would be exposed to Sarin, and it is worth noting that never happened, then at least some would be better off. Given those conditions, then it was probably justified to override individual consent and implement the measure.

This rationale, in fact, was a factor in the Food and Drug Administration (FDA) decision to grant the Department of a Defense (DOD) a waiver to administer it to troops in the Gulf without their consent because "withholding treatment would be contrary to the best interests of military personnel and there is no available satisfactory alternative therapy." While the decision was legally challenged in court, the court upheld it.²⁵ However, part of the reason the FDA granted the waiver was based on an agreement by DOD to follow up with individual Servicemembers, ensure the use was recorded in their records, and report any adverse effects. To date these requirements have not been completely fulfilled.²⁶ The point is that while it may be permissible to take some risk when providing defensive enhancements, governments should take extra steps to mitigate those risks.

Offensive. This notion of fairness, however, does not seem to work as well with offensive enhancements. Given the logic of military necessity, it just makes sense to commit one's most survivable and lethal systems to

battle since they stand the best chance to defeat the enemy. Thus, it seems reasonable to expect that those who have offensive enhancements will more likely be committed to direct combat than those who do not. While it is possible that these enhancements will offset some of that risk, statistically speaking, repeated exposure to danger ensures at some point one will be harmed. By accepting offensive enhancements, therefore, enhanced soldiers could be worse off than those who do not accept them. Not only are they likely to experience increased risk, but they will also have to deal with whatever side effects the enhancements entail.

Offensive enhancements may not ever be permitted. Recall that the horns of this dilemma rest on the assumption that soldiers who refuse the enhancement will be committed to battle anyway and experience the same risks as soldiers who did accept it. The way out then is to alleviate the conditions that compromised the soldiers' autonomy in the first place. Doing so requires meeting three conditions: soldiers must have the option to consent to the enhancement; their consent must be informed; and if they do not consent, they will not be required to accept as much risk as enhanced soldiers and what risk they are compelled to take is more or less in line with other non-enhanced soldiers. When it comes to offensive enhancements, enhanced soldiers must be *genuine* volunteers.

Inequality. Concerns regarding inequality map onto both concerns regarding health and safety and fairness and equity. Regarding the former, one should consider not only the negative physiological effects on the individual soldier who receives it but also the safety of those who do not, as the latter are less capable than their enhanced comrade of handling the rigors of combat and thus surviving.

Regarding fairness and equity, this differential in capability introduces additional inequities as the military crafts policies regarding how enhanced and non-enhanced soldiers are treated. It might seem unfair to provide some soldiers enhancements while denying it to others. But to the extent those enhancements make the soldier more lethal, as discussed, they also make it more likely enhanced soldiers will see combat and thus be exposed

to more risk. Thus, in the military context, inequality can accrue to the enhanced rather than the non-enhanced. So again, what matters may not be who *gets* to receive an enhancement as much as it is who *must* receive one.

Veterans Care. Moreover, one also has to consider the impact on society, which depends on its military for security and which must also care for these veterans after the war is over. This means caring for those who experience side effects and finding a role for enhanced individuals after they have left the military. So to the extent enhancements introduce additional inequities into civil society or impose burdens associated with medical treatment and integration, enhancements have potentially destabilizing and costly effects.

Civil-Military Relations. Furthermore, how society treats its enhanced soldiers is a special concern for human dignity, but not just because of the potentially debilitating and isolating effects enhancements can cause. While these concerns are important, enhancements may also affect how society regards and rewards military service. Society rewards its soldiers precisely because they expose themselves to risks and hardships so that the rest of society does not have to. However, to the extent soldiers employ cognitive-enhancements that control fear, for example, or physical enhancements to eliminate the source of fear, such as neural implants that allow soldiers to control weapons remotely, such regard and rewards will seem misplaced. If one does not experience fear, it makes no sense to reward one for displays of courage.²⁷ While enhancing soldier survivability and lethality always makes *moral* sense, enhancing it to the point of near-invulnerability (or even the perception of invulnerability) will profoundly alter the warrior identity. Soldiers who experience neither risk nor sacrifice are not really soldiers as we conceive of them now and are likely better thought of as technicians than warriors.²⁸ This is not necessarily a bad thing, but it is something that militaries intent on employing enhancements should be prepared for.

Moral Effect

The effect of any new technology acquisition must be morally permissible. To the extent an enhancement contributes to violating some other

moral norm, it is impermissible. In Vietnam, improper use of drugs led to increased addiction as well as increased incidences of friendly fire instances and indiscriminate use of force against civilians.²⁹ If that were a necessary effect of the drug, its use would not be permitted.

In this context, however, it is first important to differentiate between appropriate use and abuse. To the extent amphetamine use necessarily entails, or at least makes highly likely, the employment of indiscriminate and disproportionate force, amphetamine use would not be morally permissible. On the other hand, to the extent that properly regulated use provides some benefit and avoids bad effects, then the issue lies not with the enhancement itself but with how it is applied by recipients or the medical professionals who prescribe them. The moral requirement is to ensure that use is regulated so that the immoral effect does not occur.

A Necessity

Given a permissible effect, any enhancement must also be necessary. In this context, military necessity is not just about what it takes to defeat a particular enemy. As Michael Walzer notes, it also includes reducing the lives, time, and money it takes to do so.³⁰ So military necessity is not just about what works, but also about what works best. Under this definition, any enhancement could be necessary as long as it provided some military advantage *and* there was no less costly means to obtain that advantage.

This understanding is fine as far as it goes, but it does not go far enough. Given that enhancements can have negative effects on one's own soldiers, it is not enough that it provides an advantage; it must also avoid a disadvantage. If one is likely to achieve victory without enhancement, then it makes little sense to take the physical and moral risks associated with providing them. If, on the other hand, providing enhancements is the only way of offsetting an enemy advantage, then they may be considered necessary. This point, however, does not suggest military leaders should not pursue technological—or any other kind of—overmatch against an enemy. However, given the potential, and possibly unforeseen consequences, of at

least some enhancements, if one can win a war without them, in general, one should.

Proportionality

No account of military ethics would be complete without proportionality, which requires that any good attained by the enhancement must be proportional to the harm caused, whether that good or harm accrues to the enhanced soldier, the military objective, or society.³¹ From the soldier's perspective, the benefit is increased survivability, the cost is whatever negative side effects he or she may have to live with (or die from), and how that will affect his or her quality of life. From the military's perspective, the good achieved is the increased lethality or other capability the enhancement represents, while the costs are the loss of a soldier once any side effects make it impossible to serve as well as any compensation or healthcare costs the negative effects may entail. For society, the benefits are the increased security a more capable military represents, while the costs include not only the costs of dealing with the side effects but also the cost of integrating the enhanced soldier back into society.³²

This account of benefits and costs is not meant to be inclusive. But it does illustrate the incommensurability of many of these goods and harms. How much "extra" security for society, for example, is worth what kind of side effects for the soldier? Given that medical and compensation costs can be incurred for years, what dollar amount exceeds the military advantage achieved or, perhaps more importantly, the disadvantage avoided, when adversaries pursue and implement the same enhancements?

These concerns do not entail proportionality and cannot apply here. Proportionality applications always suffer from concerns regarding difficulties associated with quantification and comparing incommensurate goods. As one researcher notes, "Proportionality turns out to be a hard criterion to apply, for there is no ready way to establish an independent or stable view of the values against which the destruction of war is to be measured."³³ The same can be said of the suffering potentially caused by enhancements.

Moreover, Brian Orend suggests that while proportionality will never provide a precise account of relative benefits and costs, it sets prudence and utility as limiting conditions on the pursuit of goods like increased security.³⁴ This point simply suggests enhancements can be both morally permissible and necessary, but still not worth it. While it may be difficult to determine whether a particular enhancement is proportional, it is much easier to establish whether it is disproportionate. We know, for example, without the need for precise quantification, that threatening divorce over a disagreement about what to have for dinner is disproportionate without having to commit to what would be a proportionate response.³⁵ We can make similar judgments about enhancements.

Conclusion

World War I transformed not only the character of war, but also the characters of the societies that fought it. Had it not been for the war, technologies such as the airplane and automobile, which were present before the war, would probably not have entered society as rapidly and forcefully as they did. The same is true for medical technologies, including those intended to enhance human performance.

In this context, the lesson of World War I is that human enhancement, even apart from war, is morally problematic. In the civil context, where enhancements are typically intended to enhance quality of life, they still raise concerns about autonomy, equality, safety, social stability, and human dignity. The logic of enhancements in civil society, however, suggests little reason to bear much risk or cost in their acquisition. If the purpose of an enhancement is to improve quality of life, then it makes little sense to tolerate much suffering for oneself or society. The logic of military applications, on the other hand, amplifies these concerns and turns some on their heads. Because the purpose of military enhancements is to increase lethality and survivability, it does make sense to accept a fair amount of inequality, suffering, social disruption, and isolation. As a result, policies regarding the norms of enhancement acquisition are going to look different in civil and military contexts.

Taken together, the real risk of enhancements may be in how their application will affect the soldier and thus the military profession's relationship with the larger society it serves. Changing the nature of the soldier changes the military, and changes in the military can have profound impacts on society. The point here is not to avoid enhancements. The rapid pace of technological development, especially in the context of international competition, assures that enhancements will be a part of future military acquisitions. The point is that policies regarding the ethics of enhancements will also constantly evolve, and thus policymakers will require constant attention to the moral categories associated with their development and implementation.



Notes

¹ Eric Sass, “12 Technological Enhancements of World War I,” *Mental Floss*, April 30, 2017, available at <<http://mentalfloss.com/article/31882/12-technological-advancements-world-war-i>>.

² Lukasz Kamienski, *Shooting Up: A Short History of Drugs and War* (Oxford: Oxford University Press, 2016), 96.

³ *Ibid.*, 102.

⁴ “1 Mile World Record 3:43:13 Hicham el Guerrouj,” YouTube, available at <www.youtube.com/watch?v=Ji0yK7fV5Rk>.

⁵ Patrick Lin, Maxwell Mehlman, and Keith Abney, *Enhanced Warfighters: Risk, Ethics, Policy*, Case Research Paper Series in Legal Studies Working Paper 2013-2 (Cleveland, OH: Case Western University, January 2013), 17.

⁶ Ross M. Boyce, “Waiver of Consent: The Use of Pyridostigmine Bromide in the Persian Gulf War,” *Journal of Military Ethics* 8, no. 1 (2009), 1–18. See also Lin, Mehlman, and Abney, *Enhanced Warfighters*, 14–15. These authors argue that vaccines are better thought of as “therapy” and thus not enhancements since they seek to prevent diseased conditions; however, they acknowledge this distinction may not apply in all contexts. Since pyridostigmine bromide use was not simply to prevent a diseased condition but also to enable Soldiers to operate in an otherwise hostile environment, I consider it as an enhancement for this discussion. See also Lin et al., 48, for their discussion on pyridostigmine bromide use in the Persian Gulf War.

⁷ Kamienski, *Shooting Up*, 93–95.

⁸ *Ibid.*, 96–97.

⁹ *Ibid.*, 101.

¹⁰ *Ibid.*, 101–103.

¹¹ *Ibid.*, 103.

¹² Norman Ohler, *Blitzed: Drugs in Nazi Germany*, trans. Shaun Whiteside (New York: Allen Lane, 2015), chapters 1, 2.

¹³ *Ibid.*, 67–88.

¹⁴ *Ibid.*, 36. See also Andreas Ulrich, “The Nazi Death Machine: Hitler’s Drugged Soldiers,” *Der Spiegel*, May 6, 2005, available at <www.spiegel.de/international/the-nazi-death-machine-hitler-s-drugged-soldiers-a-354606.html>.

¹⁵ Kamienski, *Shooting Up*, Kindle ed., retrieved from Amazon.com, location number 2902.

¹⁶ Kamienski, *Shooting Up*, 111.

¹⁷ Ohler, *Blitzed*, 71.

¹⁸ Kamienski, *Shooting Up*, 189.

¹⁹ Lin, Mehlman, and Abney, *Enhanced Warfighters*, 5–6.

²⁰ Defense Advanced Research Projects Agency, “DARPA Helps Paralyzed Man Feel Again Using a Brain-Controlled Robotic Arm,” October 13, 2016, available at <www.darpa.mil/news-events/2016-10-13>. I owe this example to Jason Westbrook.

²¹ Fritz Allhoff and Patrick Lin, “The Ethics of Human Enhancement: A Symposium,” *Nanoethics* 2 (2008), 256.

²² Kamienski, *Shooting Up*, xxiii. As Kamienski notes, “Psychiatrists agree that even if the effects of a given mind-expanding substance were well-known, we cannot fully predict human reactions.”

²³ Ohler, *Blitzed*, 114.

²⁴ Arthur Isaak Applbau, *Ethics for Adversaries: The Morality of Roles in Public and Professional Life* (Princeton: Princeton University Press, 1999), 151.

²⁵ Lin, Mehlman, and Abney, *Enhanced Warfighters*, 37.

²⁶ Efthimios Parasidis, “Human Enhancement and Experimental Research in the Military,” *Connecticut Law Review* 44, no. 4 (April 2012), 1125–1126.

²⁷ Aristotle, *Nicomachean Ethics*, trans. Terence Irwin (Indianapolis: Hackett Publishing Company, 1985), 71–76.

²⁸ Nick Bostrom, “Dignity and Enhancement,” in *Human Dignity and Bioethics: Essays Commissioned by the President’s Council on Bioethics*, ed. Adam Schulman and Thomas W. Merrill (Washington, DC: The President’s Council on Bioethics, March 2008), available at <https://bioethicsarchive.georgetown.edu/pcebe/reports/human_dignity/chapter8.html>. In this article, Bostrom argues that one can acquire virtues by means of an enhancement as long as accepting the enhancement is a function of one’s authentic self. For example, consider two people, one who was born with a calm temperament and one who was not, but has acquired it through disciplined control of her emotions. In this case, we should think the person who has acquired the disposition through choice rather than birth more authentically possesses the virtue. By extension, then, traits one acquires by virtue of enhancement, as long as the enhancement is one’s choice and one chooses it in order to acquire the trait, is more *authentically* one’s own than traits one has acquired by birth. Thus, enhancements may not always have the corrosive effect on human dignity as some suggest. However, to the extent that possessing a trait depends on an ability to control one’s response to an emotion, like fear, then one can only display the trait when the relevant emotion is present. So enhancements

that eliminate or mask relevant emotions would preclude acquisition of the trait. Bostrom does note that the effects of enhancements on human dignity in general are complex and inconsistent. For example, enhancing one's empathy can undermine one's composure if one becomes overwhelmed by the suffering one perceives. While it may be conceivable that enhancements can aid one in the acquisition of a virtue like courage, it is not clear that doing so would always entail a positive contribution to one's dignity.

²⁹ Kamienski, *Shooting Up*, 188.

³⁰ Michael Walzer, *Just and Unjust Wars: A Moral Argument with Historical Illustrations* (New York: Basic Books, 2015), 144.

³¹ Lin, Mehlman, and Abney, *Enhanced Warfighters*, 67.

³² *Ibid.*, 4.

³³ Walzer, *Just and Unjust Wars*, 129.

³⁴ Brian Orend, *The Morality of War* (Ontario: Broadview Press, 2006), 60.

³⁵ *Ibid.*, 60.