

2016

Soldier enhancement: ethical risks and opportunities

Matthew Beard

The University of Notre Dame Australia, matthew.beard@nd.edu.au

Jai Galliot

Sandra Lynch

The University of Notre Dame Australia, sandra.lynch@nd.edu.au

Follow this and additional works at: https://researchonline.nd.edu.au/phil_article



Part of the [Ethics and Political Philosophy Commons](#)

This article was originally published as:

Beard, M., Galliot, J., & Lynch, S. (2016). Soldier enhancement: ethical risks and opportunities. *Australian Army Journal*, 13 (1), 5-20.

Original article available here:

https://www.army.gov.au/sites/g/files/net1846/f/aaj_2016_1.pdf

This article is posted on ResearchOnline@ND at
https://researchonline.nd.edu.au/phil_article/43. For more
information, please contact researchonline@nd.edu.au.



This article published by The Department of Defence in the *Australian Army Journal*.

Beard, M., Galliot, J., and Lynch, S. (2016) Soldier Enhancement: Ethical Risks and Opportunities. *Australian Army Journal*, 13(1), 5-20. Retrieved from <http://www.army.gov.au/~media/Army/Our%20future/Publications/AAJ/Current%20Edition/AAJVol131BeardSoldier%20Enhancement.pdf>

Permission granted by the Commonwealth for inclusion in ResearchOnline@ND

Soldier Enhancement: Ethical Risks and Opportunities

Matthew Beard, Jai Galliot and Sandra Lynch

Abstract

Over the past decade, interest in human enhancement has waxed and waned. The initial surge of interest and funding, driven by the US Army's desire for a 'Future Force Warrior' has partly given way to the challenges of meeting operational demands abroad. However the ethical opportunities provided by soldier enhancement demand that investigation of its possibilities continue. Benefits include enhanced decision-making, improved force capability, reduced force size and lower casualty rates.

These benefits — and enhancement itself — carry concomitant risks, including morale issues due to tension between enhanced and unenhanced soldiers, the issues of enhanced veterans and ownership of enhanced bodies, challenges to the army's core values and personal identity issues. A range of measures should be designed to highlight the opportunities offered by enhancement while also minimising the potential risks. This includes providing advice on which areas the army ought to demonstrate restraint in research for ethical reasons.

Introduction

Modern military research and weapons development are marked by the ongoing pursuit of a dehumanised battlespace replete with robots, drones and other unmanned systems. While there are a number of reasons for this, one is certainly the desire to remove the 'human element' from combat: emotion, error and the physical limitations of human combatants (including mortality) and the risk of overwhelming decision-making capacities. However, a rival school of thought is beginning to emerge that notes the continuing importance of the human element in combat and aims to *improve* human combatants rather than replace them. This is the field of military human enhancement.

Enhancement is defined as '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'.¹ This article will explore some of the ethical opportunities provided by the enhancement of soldiers in the Australian Army, focusing on areas of moral concern. Its purpose in doing so is to ensure decision-makers developing official army policy on these matters consider and understand all the relevant ethical issues.

Military human enhancement: ethical opportunities

It is important to distinguish between the different types of opportunities that might be provided by military human enhancement. Not every advantage offered by enhancement is ethical in nature. This is not to say that these advantages are unethical; rather, it is to suggest that the advantages they offer are functional, strategic, pragmatic or otherwise not specifically concerned with whether an action is inherently good or bad, which is the domain of ethics.

In some cases, military advantages may also be ethical advantages (for instance, a soldier who can stay alert for extended periods may be in a position to make better ethical judgements due to a lack of fatigue), but these second and third-order consequences of enhancement are beyond the domain of this discussion. The analysis that follows will address two major advantages presented by military human enhancement.

1. *Decreased combat force size*

One ethical benefit of the human enhancement of soldiers is the possibility that, as the capabilities of individual combatants increase, the demand for large numbers of combatants in order to wage war will — all other things being equal — decrease.² This, in turn, will generate decreased numbers of combat forces over time.

The diminished size of military forces around the world has a tangible ethical consequence — reduced rates of casualties. Although the death of any combatant is tragic, if the military enhancement of some soldiers means that fewer combatants are killed overall, the net gain in terms of human lives spared improves the ability of a military force to adhere to moral norms.

The reason that this is an ethical advantage is because the morality of war has traditionally insisted that military conflicts are only morally acceptable when the anticipated benefits of conflict outweigh the concomitant harms. The most obvious example of this occurs in just war theory, a moral framework for war that originated over 2000 years ago in which proportionality is a crucial moral principle both *ad bellum* (before combat) and *in bello* (during combat).³ The most obvious harm in war is the widespread loss of life to both combatants and non-combatants; these deaths need to be weighed against any anticipated benefits and shown to be acceptable costs before a war can be considered justified.⁴ Hence, if the anticipated combatant deaths were fewer, this would increase the possibility of achieving proportionate conflict.

This is particularly significant because of the importance of popular and political support for war in Australia and the West, and the increasing intolerance of civilians and military decision-makers alike to even minimal casualties. This view may make it difficult for even morally justified military engagements to be undertaken. However, if enhanced military personnel are more physically adept, psychologically resilient, and more likely to survive, this may empower the military to engage in wars that are morally necessary, but which have been previously regarded as politically untenable due to civilian resistance to the possibility of military casualties.⁵

The same principles that make enhancement appealing due to the potentially reduced casualty rate also explain why human enhancement may provide second-order ethical opportunities. Although the most substantial and dramatic consequences of war involve the loss of human life, the

material damage to property and infrastructure is also significant and must affect judgements of proportionality. If human enhancement offers the possibility for smaller sized forces than are presently required to effectively wage war, a beneficial side-effect of this may be the reduced size of the theatre of war. This, in turn, may result in a reduction in the extent of damage or destruction to civilian infrastructure during conflict.

1.1 *Resort to war*

To maximise these advantages, however, it will be crucial for the army to recommit to other values present in the *ad bellum* doctrine, such as just cause, right intention and last resort, lest the promise of reduced casualty rates become a force multiplier by lowering the threshold for war. If a major objection to the use of force is the anticipated casualties and destruction of infrastructure, and reduced force sizes decrease the risk of these, then military human enhancement may undermine the proportionality barrier to implementing military force.

This may not be an insurmountable problem because proportionality is not the only condition by which the use of force is legitimated. Equally important are conditions such as the justice of the cause, the intentions behind the use of force, and the requirement that force be used only as a reasonable last resort. However, although these conditions are integral aspects of just war theory, the moral framework that has informed most reflection on the use of force both in Western armed forces and international law, they may not receive the same attention in practice. When military force is contextualised within a particular political climate, it may be that only those conditions that have the highest public profile will receive due attention — in this case, proportionality. However, if the army is to retain its moral authority both within Australia and in the global community, it will need to retain its deep and abiding commitment to conscientious moral regulation of the use of force, even if the risk of casualties is diminished by human enhancement.

1.2 *Staggered force reduction*

Furthermore, although it is evident that there are ethical advantages that may emerge from combat force reduction, the actual reduction in force size needs to be implemented slowly and carefully to ensure that the ethical advantages gained by the army do not impose burdens on the broader community or the Department of Veterans' Affairs. A large-scale force reduction over a short period of time risks leaving a far greater population of

veterans facing re-integration issues than the Department of Veterans' Affairs could reasonably hope to manage in an efficient manner. With processing difficulties in the early stages of discharge already a factor in the number of veterans either unemployed or homeless, the failure to patiently and gradually reduce force sizes in line with the existing rate of retirement from the army is likely to lead to a whole new category of ethical difficulties.

2. *Enhanced decision-making*

One of the more interesting areas of human enhancement in the military concerns the ability to use particular drugs to change a soldier's neural functioning in order to enhance capability. Much of this already takes place; for instance, in the United States (US) Air Force pilots are provided with modafinil, a drug that enhances alertness and focus and allows a person to function for up to 60 hours without sleep.⁶ If advances in psychopharmacology can be used to alter a person's level of alertness, and there is an immense market for using similar drugs to alter mood, then similar kinds of intervention may improve decision-making in a way that produces ethically desirable outcomes. While it is beyond the scope of this discussion to discuss the viability or extent to which these interventions will become reality, this article will outline some general ethical opportunities for continuing research in this vein, as well as potential pitfalls that must be addressed carefully.⁷

2.1 *Protection of non-combatants*

Military ethics includes a range of principles that govern how combat is undertaken and what is justifiable during armed conflict. Arguably the most important of these norms is discrimination or non-combatant immunity. This condition — also enshrined in international law — requires combatants to avoid intentionally targeting those who are not involved in conflict and, by extension, requires those combatants to take reasonable risks to ensure that non-combatants are not harmed as a side-effect of permissible military operations.

At first glance, it may be unclear how enhancement offers the possibility of improved adherence in this area, as army personnel are already aware of and committed to protecting non-combatants, with their own lives if necessary. The opportunities presented by enhancement are not aimed at improving the moral character of soldiers, but rather at their ability to comprehend complex situations and reach ethical judgements quickly, as

well as their ability to control emotional responses that may make ethical judgements more difficult. In this case, the enhancement is actually to neural processing, but with second-order ethical advantages. For instance, enhanced soldiers might be more readily able to determine whether a momentary glimpse of movement during a firefight is a non-combatant running for cover, an ally, or an enemy combatant looking to flank their position. In this case, improved situational processing may lead to better consequences for non-combatants in conflict.

Another case in which human enhancement may have an explicitly ethical effect is in restricting the strength or experience of ‘counter-moral emotions’ in soldiers. Although extremely well trained and motivated, soldiers are still prone to occasionally experiencing emotions that lead them to act in ways they otherwise would not. Thomas Douglas explores this possibility, writing that:

Enhancement might consist in the attenuation of counter-moral emotions: emotions that interfere with moral reasoning, sympathy, and all other plausible candidates for ‘morally good motives’ ... Biomedical moral enhancement might sometimes consist in the biomedical attenuation of these emotions.⁸

For example, in 2005 US soldiers responded to the death of a member of their company from a roadside bomb by killing 24 Iraqi civilians in the nearby town of Haditha. Military philosopher Nancy Sherman contends that ‘the events of Haditha [should be seen] through the lens of traditional revenge and honour. The Haditha rampage took the form of a reprisal raid, inspired by the US brigade experiencing the killing of one of their own.’⁹

It is plausible to assume that the visceral reaction to seeing the death of a person who is not merely a colleague but also a brother or sister-in-arms would result in overpowering feelings of hatred, diminished empathy or aggression that ideally would not be in the psychological make-up of military professionals. Jonathan Shay describes these situations as ‘berserk states’, ‘in which abuse after abuse is committed’.¹⁰ To Shay,

The berserker is figuratively — sometimes literally — blind to everything but his destructive aim. He cannot see the distinction between civilian and combatant or even the distinction between comrade and enemy.

Berserk states are, Shay suggests, uncommon but not unheard of in complex military environments. They tend to result in a soldier losing all sense of vulnerability and propriety and entering into a state of ‘reckless frenzy’. They are also, in a sense, natural responses — ‘when a soldier is trapped, surrounded, or overrun and facing certain death, the berserk state has apparent survival value’ and, because of this, it is difficult to predict who will be susceptible to the berserk state, or when it might occur.

In this case, any form of biomedical intervention that might suppress the berserk response, or other forms of counter-moral emotion, would have obvious ethical advantages for the army. On the reduction of aggression as a moral enhancement (or, at least, a human enhancement with morally desirable outcomes), Douglas notes that,

If I am present when one person attacks another on the street, impulsive aggression may be exactly what is required of me. But, on many other occasions, impulsive aggression seems like a very bad motive to have ... [Therefore] a reduction in violent aggression would qualify as a moral enhancement.¹¹

It then seems reasonable that if a biomedical intervention were able to restrict impulsive aggression in cases of elevated adrenaline or when experiencing trauma, such an enhancement might have ethical benefits for the treatment of non-combatants by reducing the prevalence of ‘berserk states’ and might be ethically defensible.

2.2 Decision-making and the emotions

However, despite the possible advantages provided by human moral enhancements to decision-making and emotion regulation, there are several reasons to be cautious before embarking on research, development and implementation in this area. First, the presumption that underlies this enhancement approach is that the emotions are, at least occasionally, pathological in nature and therefore a distraction to rational decision-making. However, this school of thought, which finds its strongest intellectual ally in the work of Immanuel Kant, is only one philosophical account of rationality.¹² Other accounts see the emotions as inseparable from the way that human beings evaluate events and the world around them, such that to dull or repress emotion would not *enhance* decision-making, but detract from it.

For example, Sherman argues that ‘emotions ... are complexes that include evaluations and affects, and that in some cases, though not all, lead to desires to act’.¹³ If so, simply to repress the emotions *may* restrict unethical behaviour, but it may also restrict ethical behaviour motivated by the appropriate emotions. In Douglas’s earlier example, an ‘enhanced’ person whose impulse for aggression was suppressed would be less likely to move in defence of a victim of unjust attack. As such, the army will need to work closely with philosophers, psychologists, and behaviouralists to determine precisely what role the emotions have in ethical and unethical behaviour in order to understand when, or if, it is appropriate ever to suppress them.

2.3 Military enhancement, autonomy and consent

A third question that the army would need to clearly address and then communicate to existing personnel and new recruits alike is whether undertaking enhancements that affect emotional responses will be mandatory or voluntary. There are merits to each position. The primary concern with mandatory enhancement in the broader ethical literature surrounds individual freedom. As Michael Selgelid explains, ‘compulsory bioenhancements remove the freedom to choose whether or not to be morally enhanced’.¹⁴ This is particularly troubling in a medical context in the West where respect for patient autonomy is among the most crucial principles of biomedical ethics.

However, Selgelid continues, there are also concerns over voluntary moral enhancement:

*A reason to worry about reliance on voluntary moral bioenhancement, in any case, is that those most likely to commit heinous acts with catastrophic consequences are probably not especially likely to volunteer for moral enhancement.*¹⁵

Furthermore, he adds:

*Freedom is not the only thing that matters morally. We sometimes rightly infringe on people’s freedoms in order to promote achievement of other societal goals such as utility (ie, aggregate well-being).*¹⁶

This latter argument is particularly interesting in a military context, where soldiers forego particular rights — including particular medical rights — to improve the ability of armed forces to defend the nation. Soldiers commit,

Patrick Mileham argues, to a relationship of ‘unlimited liability’ when they enlist,¹⁷ and in doing so waive particular rights including, as Michael Gross states, ‘their autonomy, privacy, right to informed consent, and right to refuse particular treatments’.¹⁸ As such, there is precedent for the army to make human enhancement a compulsory medical intervention if it is deemed necessary, a determination which the army ought to invest considerable time and resources in making.

Military enhancements: ethical risks

1. Challenges to core army values

The Australian Army lists four values — courage, initiative, respect and teamwork — as ‘the bedrock to everything [it does]’.¹⁹ These institutional values form part of what Shannon E. French calls ‘the warrior code of honour’.²⁰ Embodying these values, and the virtues by which they are expressed, represents what it means to be an Australian soldier. For many soldiers, their profession occupies a large element of their self-identity. However, as French explains, warrior identity is defined in part by the narrative tradition of the warrior community. As such, there is a real risk that enhanced personnel will challenge the army’s core values to such an extent that they will contest what it means to be an Australian soldier. In so doing, they may challenge, undermine or redefine core army values.

Courage is one of the most frequent virtues mentioned in connection with military life. Christian Enemark is not alone in arguing that ‘physical courage is the most important military virtue’.²¹ However, as Enemark notes, military conceptions of courage are frequently predicated on the notion of war as a contest. Warfighters whose risk of injury or death is severely restricted or eradicated (Enemark focuses on unmanned aerial vehicle pilots) are not courageous warriors but ‘post-heroic’ soldiers. The very ability of these soldiers to be heroes vis-à-vis courage is eliminated.²² Enemark’s discussion of physical courage is significant because the army’s own account of courage as a value includes reference to both physical and moral courage.

Of course, the discussions diverge insofar as enhanced soldiers *do* still encounter risk in their operations; they are not entirely removed from danger in the same way as drone pilots. However, as enhanced personnel are likely to feel less vulnerable and enjoy real physical advantages over many

opponents, their presence still undermines an account of war as a contest. As such, an intrinsic aspect of warrior identity and honour is diminished. Enhanced warfighters may risk feeling shamed for taking what might be seen as an 'unfair advantage' in combat; on the other hand, the importance of physical courage as a core value for the army may also be diminished as more enhanced soldiers engage in less evenly contested combat situations.

There are two ways in which the army can minimise the risks posed to courage as a core value. First, it can emphasise that a major motivation in seeking human enhancement is not to gain a tactical advantage over unenhanced enemies, but to provide Australian soldiers a level playing field in a contest against enhanced opponents. In this way, criticisms based on the war-as-contest view will have no basis. Furthermore, courage-based criticisms could be rebuffed if the army were to move away from a conception of courage as derived from war as a contest. If the army were to consider all forms of courage as *moral* courage, it could begin to account for courage as the ability to do what is right, despite the difficulties involved, without risking the conflation of courage with the experience of physical risk.²³

The values of respect and teamwork also risk being challenged or undermined by the inclusion of enhanced soldiers. As French's work suggests, warrior communities rely heavily on honour, both moral and practical, which is afforded based on how well a person fulfils the demands of being a warrior. Ideally, enhanced soldiers would better fulfil those requirements than their unenhanced peers. This risks developing a culture of resentment, disdain and disconnection between enhanced and unenhanced soldiers that is detrimental to respect and teamwork within the army. One way of overcoming this may be to avoid making divisions on the basis of enhancement status and instead utilise blended divisions to encourage social cohesion and cooperation.

2. Legal difficulties

The use of enhanced warfighters prompts new legal difficulties that warrant close attention by the army and collaboration with military and international lawyers to ensure army policy does not undermine or violate the law of armed conflict (LOAC). Perhaps the chief challenge to LOAC concerns the legal status of enhanced warfighters. There is some debate as to whether the enhanced warfighter might be classified as a weapon under international

law, and therefore be subject not only to LOAC as a human agent, but also to weapons review subject to Article 36 of the Geneva Conventions.²⁴ This question is important for purposes of legal governance, but also gives rise to another pressing concern, namely the question of how to assign moral responsibility in cases of enhanced warfighters.

If a weapon is deployed in violation of international law, intuition suggests that the person wielding it will be held responsible. The weapon is not a moral agent, which is why it is assigned a separate moral and legal status from the combatant. However, this analogy may not extend to enhanced warfighters, who are simultaneously weapon and wielder. Legal difficulties may arise in future if soldiers who violate LOAC blame their enhancements for these violations. If warfighters are also classified as weapons, there are real difficulties in assigning moral or legal culpability to their actions.

Perhaps the most obvious way of addressing this difficulty is to avoid use of enhancements that might lead to a warfighter being assigned 'weapon' status. How (or if) this is possible will require further research, but one possibility would be to ensure physical enhancements are accompanied by neurological and, where possible, moral enhancements. However, it will also be critical to ensure that all warfighters and commanding officers are fully aware of their moral and legal status under international law prior to the deployment of any enhanced personnel, and that any issues of moral responsibility are resolved, disclosed and accepted by involved parties (medical scientists, officers, soldiers, engineers, etc.) prior to the implementation of any such technologies.

3. *Treatment of enhanced veterans*

The final area of ethical concern regarding enhanced personnel is how to deal with discharge when their service is complete. This involves two major concerns. The first is how enhanced personnel will be able to adapt to day-to-day civilian life outside the military. As many authors have noted, veterans already face difficulties re-engaging with civilian society and risk being 'exiled' in various ways.²⁵ If these personnel are also equipped with enhanced physical or cognitive abilities, the dissonance between war and peacetime (itself a source of psychological distress) is likely to deepen.²⁶

A second difficulty arises if enhanced personnel seek further employment in other force-deploying professions such as police officers, security staff or private mercenaries. This employment path is not uncommon, but it

provokes serious ethical and governance issues as many of the ethical justifications for enhancement in a military context will not be applicable in these other professions. However, to prohibit enhanced veterans from seeking employment in these fields may provoke psychological episodes, violate anti-discrimination employment law and, in extreme cases, lead to criminal activity by enhanced veterans.

It is not immediately clear how to overcome these difficulties apart from providing extensive psychological and family support for enhanced personnel and perhaps providing them ongoing gainful employment within the military where possible. In this the army will need to work closely with the Department of Veterans' Affairs to monitor the well-being and activity of enhanced warfighters.

A final issue concerning the treatment of enhanced veterans relates to the ownership and control of the military technology that now resides within the body of these veterans. Military interest requires that this technology be closely controlled and guarded to avoid its use or re-purpose for unethical reasons. However to do this in cases where human beings *are* the technology may risk violating their autonomy and failing to respect them as fully rights-bearing citizens in the post-war context. It may be that the army requires all warfighters to consent to prolonged control over their activities and bodies prior to receiving enhancements. But, as Nicholas Evans and Jonathan Moreno note, 'enhancement might well turn out to be forever. Whether a warfighter is able to consent to this type of relationship — whether they should be *able* to do so — should be a serious question in future works on the subject.'²⁷

Conclusion

Military enhancement provides a range of opportunities for the army to pursue not only military, but ethical goals. These enhancements may also provide increased adherence to the ethical principles that govern armed conflict. However, this also gives rise to a range of ethical challenges, several of which do not attract easy answers. This study highlights some ethical baselines that decision-makers should treat as inviolable. It also reveals some factors that decision-makers would be wise to consider before reaching a conclusion on the extent to which enhancement is a

viable option. This article recommends that armies not pursue human enhancement before considering the following:

1. Development of institutional measures to ensure respect for the autonomy of soldiers in the experimental and implementation stages. Doctors and medical scientists must provide sufficient information concerning health risks, and officers and lawyers must ensure that soldiers understand the moral and legal implications of enhancement. Only once soldiers demonstrate an understanding of these risks can they be considered acceptable candidates for enhancement.
2. Recommitment to the morality and laws of war, in particular, to conditions restricting the use of force to situations where it is necessary, justified and proportionate.
3. Liaison with lawyers, philosophers and other experts to resolve issues of ownership concerning enhancement, in particular, how these apply to veterans whose services have concluded.
4. Engagement with lawyers and philosophers to resolve questions of moral and legal responsibility for enhanced soldiers, engineers, scientists, officers and other stakeholders. The army must ensure these groups are aware of, and consent to, their responsibilities.
5. Obtaining guidance from psychologists, behaviouralists and philosophers to ensure that suppressing or enhancing particular emotions will not undermine important moral or psychological processes.
6. Engagement with the Department of Veterans' Affairs to provide re-integration and post-war support for both enhanced and unenhanced veterans.

THE AUTHORS:

Dr Matthew Beard is a military ethicist and philosopher. He is an Adjunct Lecturer in the School of Humanities and Social Sciences at UNSW Canberra, and writes publicly on matters of moral philosophy and ethics. Matthew was awarded his PhD from the University of Notre Dame Australia for a thesis entitled 'War Rights and Military Virtues: A Philosophical Reappraisal of Just War Theory,' and was the inaugural recipient of the

Morris Research Scholarship from Notre Dame. He has discussed subjects including military ethics, moral injury and PTSD, cyberwar, torture, and medical ethics amongst others in book chapters, scholarly articles, radio interviews, public opinion pieces, and at academic conferences both domestically and internationally.

Dr Jai Galliot is a Postdoctoral Research Fellow in Indo-Pacific Defence at the University of New South Wales, Kensington. His research examines the ethical, legal and strategic challenges associated with the employment of drones, cyber systems and soldier augmentation technologies. He is author of *Military Robots: Mapping the Moral Landscape* and editor of numerous books, including *Super Soldiers: The Ethical, Legal and Social Implications*, *Commercial Space Exploration: Ethics, Policy and Government* and *Ethics and Intelligence Collection: Technology and the Future of Spying*. He has performed contract research for a number of government organisations and spoken on defence and strategic studies for ABC Television, BBC World Service, Triple M, and The Wire. He has also written for *The Sydney Morning Herald* and *The Canberra Times*. Prior to entering academia, he served as a commissioned officer in the Royal Australian Navy.

Professor Sandra Lynch is Director of the Institute for Ethics and Society and Professor of Philosophy, University of Notre Dame Australia (Sydney campus). Dr. Lynch is a moral philosopher, with expertise in applied and professional ethics, ethics and values education, the constitution of the self, friendship, critical thinking, and the intersection of philosophy and literature. Her most recent work has been focussed on responding to the need to deepen students' active engagement in ethical discourse and to enrich their studies by including a focus on the demands of acting on one's values in complex workplace and social settings. Her research into best practice in the teaching of ethics is underpinned by a commitment to ensuring that our students develop the confidence and competence to contribute to the flourishing of their professions and of the societies of which they are part.

ENDNOTES

- 1 Eric Juengst, 'The Meaning of Enhancement' in E. Parens (ed.), *Enhancing Human Traits: Ethical and Social Implications*, Georgetown University Press, Washington, 1998, cited in Patrick Lin, Keith Abney, Max Mehlman and Jai Galliot, 'Super Soldiers (Part 1): What is Military Medical Enhancement?' in Steven John Thompson (ed.), *Global Issues and Ethical Considerations in Human Enhancement Technologies*, IGI Global, Hershey, PA, 2014.

- 2 Notably, one factor that would need to be equal is the lack of enhanced personnel on the opposing side. Decreased force sizes rely on force asymmetry for success. In the case of symmetrically enhanced enemies, this advantage will be reduced.
- 3 For an introductory discussion of just war theory, see Nicholas Fotion, *War and Ethics: A New Just War Theory*, Continuum, London, 2007 and Brian Orend, *The Morality of War*, Broadview Press, Toronto, 2006.
- 4 On proportionality, see Michael Quinlan, 'Justifying War', *Australian Journal of International Affairs*, Vol. 58, No. 1, 2004, pp. 7–15.
- 5 Another political deterrent is high non-combatant casualties, which enhancement may also help to address as discussed later.
- 6 Jonathan D. Moreno, 'Mind Wars: Brain Science and the Military', *Monash Bioethics Review*, Issue 31, No. 2, 2013, p. 90.
- 7 For a detailed outline of the current technology and research history of military human enhancement, see Lin, Abney, Mehlman and Galliot, 'Super Soldiers (Part 1)'.
- 8 Thomas Douglas, 'Moral Enhancement via Direct Emotion Modulation: A Reply to John Harris', *Bioethics*, Issue 27, No. 3, 2013, p. 161.
- 9 Nancy Sherman, *The Untold War: Inside the Hearts and Minds of Our Soldiers*, W.W. Norton, New York, 2010, p. 76.
- 10 Jonathan Shay, *Achilles in Vietnam: Combat Trauma and the Undoing of Character*, Simon & Shuster, New York, 1995.
- 11 Thomas Douglas, 'Moral Enhancement', *Journal of Applied Philosophy*, Issue 25, No. 3, 2008, p. 231.
- 12 Immanuel Kant, *Groundwork of the Metaphysics of Morals*, Mary Gregor (trans.), Cambridge University Press, Cambridge, 1997, p. 399.
- 13 Nancy Sherman, *Making a Necessity of Virtue: Aristotle and Kant on Virtue*, Cambridge University Press, Cambridge, 1997, p. 57.
- 14 Michael J. Selgelid, 'Freedom and Moral Enhancement', *Journal of Medical Ethics*, Issue 40, No. 4, 2014, p. 215.
- 15 Ibid.
- 16 Ibid.
- 17 Patrick Mileham, 'Unlimited Liability and the Military Covenant', *Journal of Military Ethics*, Issue 9, No. 1, 2010, pp. 23–40.
- 18 Michael Gross, 'Military Medical Ethics: A Review of the Literature and a Call to Arms', *Cambridge Quarterly of Healthcare Ethics*, Vol. 22, 2013, p. 92.
- 19 Australian Army, 'Our Values', <http://www.army.gov.au/Our-people/Our-values>
- 20 Shannon E. French, *The Code of the Warrior: Exploring Warrior Values Past and Present*, Rowman & Littlefield, Lanham, 2003, pp. 1–19.
- 21 Christian Enemark, *Armed Drones and the Ethics of War: Military Virtue in a Post-heroic Age*, Routledge, London, 2014, p. 79; Peter Olsthoorn, 'Courage in the Military: Physical and Moral', *Journal of Military Ethics*, Issue 6, No. 4, 2007, pp. 270–79.
- 22 C.f. [rephrase] Enemark, *Armed Drones and the Ethics of War*, pp. 79–84.

- 23 For an extended discussion of this account of courage, see Matthew Beard, *War Rights and Military Virtue: A Philosophical Re-appraisal of Just War Theory*, doctoral thesis submitted to the University of Notre Dame, Australia, 2015, pp. 297–308.
- 24 C.f. [rephrase] Patrick Lin, Shannon Vallor, Max Mehlman and Jay Gaillot, 'Super Soldiers (Part 2): The Ethical, Legal, and Operational Implications' in Thompson (ed.), *Global Issues and Ethical Considerations in Human Enhancement Technologies*.
- 25 C.f. [rephrase] Sherman, *The Untold War*; Jonathan Shay, *Odysseus in America: Combat Trauma and the Trials of Homecoming*, Scribner, Sydney, 2002; Nolen Gertz, *The Philosophy of War and Exile: From the Humanity of War to the Inhumanity of Peace*, Palgrave MacMillan, Hampshire, 2014; Matthew Beard, 'Conceptual Distinctions Between Types of Moral Injuries and Different Ways of Seeing Them' in Tom Frame (ed.), *Unseen Wounds: The Personal Costs of Modern Warfare*, UNSW Press, Sydney, 2015.
- 26 C.f. [rephrase] Brett T. Litz et al., 'Moral Injury and Moral Repair in War Veterans: A Preliminary Model and Intervention Strategy', *Clinical Psychology Review*, Vol. 29, 2009, pp. 695–706.
- 27 Nicholas G. Evans and Jonathan D. Moreno, 'Yesterday's War; Tomorrow's Technology: Peer Commentary on "Ethical, legal, social and policy issues in the use of genomic technologies by the US military"', *Journal of Law and the Biosciences*, Advance Access Publication, 2014, pp. 1–6.