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REGULATING THE USE OF MILITARY HUMAN ENHANCEMENTS THAT CAN CAUSE SIDE EFFECTS UNDER THE LAW OF ARMED CONFLICT: TOWARDS A METHOD-BASED APPROACH

YANG LIU*

The development of human enhancement (HE) technology has rendered its military potential increasingly noticed by major military powers. It can be expected that “enhanced warfighters” or “super soldiers” will be used on the battleground in the foreseeable future, which can give rise to many legal issues. This paper aims to contribute to the discussion from a unique perspective and will answer one specific question: whether under the law of armed conflict (LOAC) military HE’s side-effects can be considered in evaluating the legality of their military use on the battleground. This paper proposes a method-based approach, under which employing military HE will be a prohibited method of warfare if (1) it is meant to make an effective contribution to a military operation, and (2) its normal or expected use will inevitably lead to the suffering of enhanced soldiers caused by side effects of such HE that is disproportionate to its military effectiveness.

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I. INTRODUCTION

The development of human enhancement (HE) technology has rendered its military potential increasingly noticed by major military powers.¹ It can be expected that “enhanced warfighters” or “super soldiers” will be used on the battleground in the foreseeable future, which can give rise to many legal issues.²

My research on military HE aims to contribute to the discussion from a unique perspective and will answer one specific question: whether under the law of armed conflict (LOAC), military HE’s side-effects can be considered in evaluating the legality of their military use on the battleground. This issue has not been discussed by legal scholars, but it is both important and legally challenging. Whereas HE used to be designed and employed simply for the purpose of “preserving the fighting force,” many states have begun exploring their potential for improving the performance of warfighters.³ For example, some military researchers have been focusing on technologies that will enable warfighters “who can operate for days without sleep or food, lift superhuman loads, learn faster and even communicate telepathically.”⁴ The use of such HE designed for performance enhancement might incur severe side effects to enhanced warfighters, and thus addressing this problem is of high importance.⁵ The issue is also legally challenging because previously there were

¹ See *DARPA and the Brain Initiative*, DARPA, <https://perma.cc/DV7J-NKYK>; see also Yusef Paolo Rabiah, *From bionweapons to super soldiers: how the UK is joining the genomic technology arms race*, THE CONVERSATION (Apr. 29, 2021, 11:32 AM)(discussing the U.K.), <https://perma.cc/3UQ3-NBG7>; Thom Poole, *The myth and reality of the super soldier*, BBC NEWS (Feb. 8, 2021)(discussing China), <https://perma.cc/J5DF-GCCC>; *France to start research into ‘enhanced soldiers’*, BBC NEWS (Dec. 9, 2020)(discussing France), <https://www.bbc.com/news/world-europe-55243014>; Eric Tegler, *Russia and China’s ‘Enhanced Human Operations’ Terrify the Pentagon*, POPULAR MECH. (Dec. 16, 2015)(discussing Russia and China), <https://perma.cc/59LN-Z9DA>.

² See generally Heather A. Harrison Dinniss & Jann K. Kleffner, *Soldier 2.0: Military Human Enhancement and International Law*, 92 INT’L L. STUD. 432 (2016); PHILIP ANDREW TARASKA, HOW CAN THE USE OF HUMAN ENHANCEMENT (HE) TECHNOLOGIES IN THE MILITARY BE ETHICALLY ASSESSED? (May 2017) (Ph.D Dissertation, Duquesne University).

³ See, e.g., Efthimios Parasidis, *Human Enhancement and Experimental Research in The Military*, 44 CONN. L. REV. 1117 (2012).

⁴ Maxwell J. Mehlman et al., *Enhanced Warfighters: A Policy Framework*, 7 MIL. MED. ETHICS FOR THE 21ST CENTURY 113, 113 (Michael L. Gross & Don Carrick ed., 2013).

⁵ See, e.g., Adam Henschke, *‘Supersoldiers’: Ethical concerns in human enhancement technologies*, HUMANITARIAN L. & POL’Y (July 3, 2017), <https://perma.cc/Q9QX-NF9Y>.

no comparable military technologies of nature capable of systematically inflicting injuries upon one's own warfighters. Historically, there were several instances where states used narcotics drugs with severe side-effects like methamphetamine to improve the performance of their warfighters.⁶

Unfortunately, these activities have never been considered by scholars from a LOAC perspective. Military HE development will have a substantially greater impact on the battlefield. However, addressing side-effects will unavoidably become a topic that LOAC scholars must deal with.

This paper is organized into two parts. The first part will examine two possible frameworks for regulating military HE. It will conclude that the method-based approach that focuses on the strategic and tactical decisions to employ HE on the battleground should be preferred over a means-based approach that focuses on the instrumental level. Whereas both approaches are plausible, the means-based approach is flawed because treating military HE or enhanced warfighters as a weapon or a means of warfare will render it impossible to examine HE's side effects. To better cover the use of HE under the method-based approach, this section will discuss the definition of "methods of warfare" and concludes that a tactical or strategic decision to enhance warfighters will constitute a "method of warfare" as long as such a decision can make an effective contribution to a military operation.

The second part will take a step further and consider whether, under the method-based approach, it is legally required to consider HE's side effects when reviewing the legality of the decision to employ them. This paper's answer is affirmative, and it concludes that Additional Protocol I to the Geneva Conventions (hereinafter API) Article 35(2)'s prohibition of methods of warfare causing "superfluous injury and unnecessary suffering" requires such considerations under

⁶ See generally Barbara McCarthy, *A brief history of war and drugs: From Vikings to Nazis*, ALJAZEERA (Nov. 25, 2016), <https://perma.cc/L7ME-PJMA>.

both the positivist approach and the contextualist approach.⁷ Therefore, under this paper's proposed approach, employing military HE will be a prohibited method of warfare if (1) it is meant to make an effective contribution to a military operation, and (2) its normal or expected use will inevitably lead to the suffering of enhanced soldiers caused by side effects of such HE that is disproportionate to its military effectiveness.

This paper will adopt Heather A. Harrison Dinniss and Jann K. Kleffner's definition of human enhancement which states:

The process of endowing an individual with an ability that goes beyond the typical level or statistically normal range of functioning for humans generally (or the personal unenhanced capabilities of a particular individual), where the ability is either integrated into the body or is so closely worn or connected that it confers an advantage similar to an internal or organic enhancement that transforms the person.⁸

Recent scholarships have shown an interest in classifying different kinds of human enhancements into different subcategories. For example, some scholars focused on the underlying technologies and classified human enhancements into biochemical enhancements, cybernetic enhancements, and prosthetic enhancements.⁹ Some other scholars would instead focus on the utility and classify human enhancements into cognitive enhancements, physical enhancements, emotive enhancements, and moral enhancements.¹⁰ For the purpose of this paper, however, it is not necessary to dig into these complex subcategories of human enhancement. Instead, this paper's discussion will focus on the meta-level and address all human enhancement technologies that might cause side effects to enhanced warfighters.

⁷ Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts art. 35(2), June 8, 1977, 1125 U.N.T.S. 3 [hereinafter API].

⁸ Dinniss & Kleffner, *supra* note 2, at 434; *see also* Patrick Lin, *Ethical Blowback from Emerging Technologies*, 9 J. OF MIL. ETHICS 313, 317-18 (2010); Norman Daniels, *Normal Functioning and the Treatment-Enhancement Distinction*, 9 CAMBRIDGE QUARTERLY OF HEALTHCARE ETHICS 309 (2000).

⁹ *See, e.g.*, Dinniss & Kleffner, *supra* note 2, at 434.

¹⁰ *See, e.g.*, TARASKA, *supra* note 2, at 152-60.

II. On Two Approaches of Regulating Military HE Under LOAC

Under LOAC, the use of military technologies on the battleground can be regulated through the method-based approach and/or the means-based approach, as Article 36 of API imposes an affirmative obligation on states to conduct a legal review before adopting new means and methods of warfare.¹¹ This section will analyze these two options in turn and will conclude that both approaches are plausible in regulating the use of military HE, but a means-based approach has more limitations. Besides, since a means-based approach will not enable the consideration of side-effects of military HE to enhanced warfighters, this paper argues that a method-based approach should be preferred. This section will conclude by considering and rebutting two possible counterarguments. It will argue that adopting the method-based approach is also preferable compared to signing a new means-specific treaty, and the existence of potentially relevant human rights laws does not eliminate the need for a LOAC framework addressing the side-effects of military HE.

A. The Method-Based Approach

The method-based approach is rooted in Article 35 of API, which restricts states' rights to choose methods as well as means of warfare.¹² Specifically, it prohibits methods and means of warfare that are "of a nature to cause superfluous injury or unnecessary suffering."¹³ The term "methods of warfare," however, was left undefined. Since this term is rather new in LOAC,¹⁴ there

¹¹ API, art. 36 (noting this obligation also binds states that are not a party to API, and it is regarded by ICRC as a customary international law); *see also* INT'L COMM. OF THE RED CROSS, A GUIDE TO THE LEGAL REVIEW OF NEW WEAPONS, MEANS AND METHODS OF WARFARE: MEASURES TO IMPLEMENT ARTICLE 36 OF ADDITIONAL PROTOCOL I OF 1977 4 (2006); *see generally*, Michael W. Meier, *Lethal Autonomous Weapons Systems (Laws): Conducting A Comprehensive Weapons Review*, 30 TEMPLE INT'L & COMP. L.J. 119 (2016).

¹² API, art. 35(1).

¹³ API, art. 35(2).

¹⁴ MARCO SASSÒLI, ET AL., HOW DOES LAW PROTECT IN WAR? CASES, DOCUMENTS AND TEACHING MATERIALS ON CONTEMPORARY PRACTICE IN INTERNATIONAL HUMANITARIAN LAW 280 (3d ed. 2011).

is currently no commonly agreed definition of it.¹⁵ This section will examine the meaning of “methods of warfare” and will conclude that regulating military HE under the method-based approach is plausible.

First, some scholars argue that the term “methods of warfare” means only ways or manners in which weapons are used.¹⁶ ICRC used to advocate for this view by noticing that API “refers alternatively” to “methods of warfare” and “methods of attack.”¹⁷ Under this reading, military HE should not be regulated under the method-based approach because a legal review of means would encompass and eliminate the need for a method review.¹⁸ This approach, however, is too narrow to be plausible. Requiring a close nexus to weapons will render many military tactics like siege operations to be disqualified as methods of warfare, which conflicts with most scholars’ and practitioners’ interpretations.¹⁹ Besides, although the term “methods of attack” is used in API, it only appears once in Article 57, which has a limited reach.²⁰ Article 57 is titled “Precautions in Attack” and addresses the implication of the principle of precautions.²¹ The precautions principle supplements the principle of distinction and functions as a safeguard to protect civilians during a “direct attack.”²² The use of the term “methods of attack” in Article 57 is therefore precise and reasonable. In fact, the avoidance of using the term “methods of warfare” in Article 57 illustrates that it is intended to bear a broader meaning than “methods of attack” and thus should not be interpreted as merely the ways and manners in which weapons are used.

¹⁵ See, e.g., Ernest Harper, *A Call for a Definition of Method of Warfare in Relation to the Chemical Weapons Convention*, 48 NAVAL L. REV. 132-33 (2001).

¹⁶ See Rain Liivoja & Luke Chircop, *Are Enhanced Warfighters Weapons, Means, Or Methods of Warfare?*, 94 INT’L L. STUD. 161, 181-82 (2018).

¹⁷ INT’L COMM. OF THE RED CROSS, A GUIDE TO THE LEGAL REVIEW OF NEW WEAPONS, MEANS AND METHODS OF WARFARE 3 n.1 (2006); see also Isabelle Daoust, et al., *New Wars, New Weapons? The Obligation of states to Assess the Legality of Means and Methods of Warfare*, 84 INT’L REV. OF THE RED CROSS 345, 351-52 (2002).

¹⁸ Liivoja & Chircop, *supra* note 16, at 184.

¹⁹ See WILLIAM H. BOOTHBY, WEAPONS AND THE LAW OF ARMED CONFLICT 5 (2d ed. 2016).

²⁰ API, art. 57(2)(a)(ii).

²¹ API, art. 57.

²² See Francis Grimal & Michael J. Pollard, *The Duty to Take Precautions in Hostilities, and the Disobeying of Orders: Should Robots Refuse?*, 44 FORDHAM INT’L L.J. 671, 679-80 (2021).

A slightly broader and more popular approach defines methods of warfare as “attacks and other activities designed to adversely affect the enemy’s military operations or military capacity.”²³ This approach focuses on the tactical level and requires a very direct link between a method of warfare and a particular military attack.²⁴ Therefore, as Rain Liivoja and Luke Chircop explained, activities like “digging trenches or tunnels” or “training warfighters” do not qualify as methods of warfare, and therefore are not required to be reviewed, although they can serve clearly identifiable and important military value and can adversely affect the enemy.²⁵ Under Liivoja and Chircop’s reading, the use of military HE can be regarded as a method of warfare only when “[a] particular tactic depended for its success on the enhancement of warfighters.”²⁶ Clearly, very few military HE can be covered under this reading. This paper declines to adopt this approach for two main reasons.

First, this approach, at least according to Liivoja and Chircop’s interpretation, draws a line between military activities that are directly offensive and those that are not. In practice, however, such a line cannot be clearly drawn in a non-arbitrary manner. In fact, it can be expected that future innovations in military strategies and military technologies will further blur such a line and will give some non-offensive tactics the potential to be even more deleterious than traditional offense operations. A clear example is camouflage. Camouflage, at least when used defensively, does not count as a method of warfare under this approach. Previously, the defensive use of camouflage did not cause severe problems.²⁷ Camouflage is traditionally regarded not as a kind of perfidy and is thus

²³ See, e.g., PROGRAM ON HUMANITARIAN POLICY AND CONFLICT RESEARCH, MANUAL ON INTERNATIONAL LAW APPLICABLE TO AIR AND MISSILE WARFARE A.1(v). (noting “methods of warfare” mean attacks and other activities designed to adversely affect the enemy’s military operations or military capacity, as distinct from the means of warfare used during military operations, such as weapons. In military terms, methods of warfare consist of the various general categories of operations, such as bombing, as well as the specific tactics used for attack, such as high altitude bombing.”).

²⁴ See Dinniss & Kleffner, *supra* note 2, at 437.

²⁵ Liivoja & Chircop, *supra* note 16, at 183.

²⁶ *Id.* at 184.

²⁷ See generally Guy Hartcup, *Camouflage: A History of Concealment and Deception in War* (1980).

legal under LOAC.²⁸ However, new technologies have made this conclusion increasingly suspicious.²⁹ For example, BAE Systems is developing the so-called ADAPTIV camouflage system, which will allow military equipment to blend into surrounding environments and become invisible to enemy eyes.³⁰ A similar system that aims to cloak military personnel is also under development by a Canadian company.³¹ The use of such technologies, especially in urban environments, even for non-offensive purposes, will unavoidably raise complicated legal issues,³² which necessitates to classify it as a new method of warfare for an ex-ante Article 36 legal review.

Second, besides workability concerns, this approach is also underinclusive. On the one hand, this under-inclusiveness renders it incompatible with a holistic reading of API. A clear example is Article 54, which prohibits “starvation of civilians” as “a method of warfare.”³³ Starving civilians, however, can seldomly, if ever directly jeopardize “the enemy’s military operations or military capacity,” and thus it does not qualify as a method of warfare under this approach. On the other hand, this definition also conflicts with many states’ practices. For example, New Zealand regards declaring or threatening the denial of quarters as a method of warfare.³⁴ This reading is consistent with the ICRC’s approach.³⁵ Although the use of such threats can sometimes be closely integrated into a specific military operation and work on the tactics level, e.g., in a specific psychological operation, it is more often and more likely to operate on a strategic level and will not cause a more direct negative influence on the enemy than digging tunnels or training warfighters.

²⁸ API, art. 37(2); see also Kevin Jon Heller, *Disguising A Military Object As A Civilian Object: Prohibited Perfidy or Permissible Ruse of War?*, 91 INT’L L. STUD. 517, 521-25 (2015).

²⁹ See Eric Talbot Jensen, *The Future of The Law of Armed Conflict: Ostriches, Butterflies, And Nanobots*, 35 Mich. J. Int’l L. 253, 310 (2014).

³⁰ ADAPTIV - Cloak of Invisibility, BAE SYSTEMS, <https://www.baesystems.com/en-us/feature/adativ-cloak-of-invisibility>.

³¹ Guy Cramer, *Quantum Stealth; The Invisible Military Becomes a Reality*, HYPERSTEALTH, <https://www.hyperstealth.com/Quantum-Stealth/> (last visited Dec. 1, 2022).

³² See Jensen, *supra* note 29, at 310-11.

³³ API, art. 54.

³⁴ New Zealand Defense Force, 4 Manual of Armed Forces Law 8.8.11 (2017), <https://www.onlinelibrary.ihl.org/wp-content/uploads/2021/05/NZ-Manual-Law-of-Armed-Conflict.pdf>.

³⁵ SASSOLI, ET AL., *supra* note 14, at 281.

Therefore, the interpretation of “method of warfare” should not be limited to weapons or tactics. Instead, it should also cover the strategic level. The need to incorporate strategies into the definition of “methods of warfare” has already been noticed by many scholars. For example, Marco Sassòli, Antoine Bouvier, and Anne Quintin defined “methods of warfare” as “any specific, tactical or strategic, ways of conducting hostilities that are . . . intended to overwhelm and weaken the adversary.”³⁶ This definition, however, still presumes a close nexus between a method of warfare and the direct negative influence upon the enemy’s military capacity by requiring a method of warfare to be able to “weaken the adversary.” Therefore, it faces some very similar problems as the previous approach. For example, it is ambiguous whether the use of body shields or camouflage can fit into this definition.

Thus, this paper will slightly change the above definition and will define “methods of warfare” as “any specific, tactical or strategic, ways of conducting hostilities that are intended to *make an effective contribution* to military operations.” This paper proposes this new definition of “methods of warfare” for four reasons. First and foremost, under this approach, most, if not all, military HE that are designed to enhance warfighters’ performance will be covered since employing them on the battleground can effectively contribute to one’s military operations. Thus, adopting this “methods of warfare” definition will provide a feasible method-based framework for regulating military HE.

Second, the “effective contribution” test is not invented by this paper and is borrowed from Article 52 of API.³⁷ Whereas there have been few discussions on issues relating to methods of warfare, Article 52, which concerns the prohibition of targeting civilian objects,³⁸ has attracted a

³⁶ *Id.* at 280.

³⁷ API, art. 52.

³⁸ API, art. 52.

large amount of attention from scholars and practitioners and provoked a robust discussion.³⁹ Thus, appealing to this “effective contribution” standard can ground the rather new term “method of warfare” in a relatively rich legal tradition.

Third, adopting the “methods of warfare” definition is normatively sound, as it reflects reciprocity and balance of duties. To be sure, the text of Article 52 does not concern the review of military tactics and strategies, nevertheless, a closer examination will illustrate the close nexus between Article 52 and Article 36. Article 52 restricts lawful targets to military objectives, and it defines military objectives as “those objects which by their nature, location, purpose or use make an *effective contribution* to military action.”⁴⁰ What is noteworthy here is the “by purpose” standard, which concerns future use, and the “by use” standard, which concerns present use.⁴¹ The impact of these two tests is that, during an armed conflict, one party will constantly conduct legal reviews of the other party’s tactics and strategies to determine the targetability of their objects. For example, if one party adopts a strategy of funding their military operations with revenues of their oil and gas industry, the other party may want to conduct a legal analysis considering whether this strategy renders their oil and gas infrastructure capable of making effective military contributions and whether attacking such infrastructure can serve a definitive military advantage. What Article 52 imposes on each party here is surely a duty, as targeting non-military objects can be a war crime, but besides that, it is also a right – a right to attack otherwise non-military objects and to punish the enemy for conducting hostilities. Thus, as a matter of reciprocity, since the effective contribution test is the standard in deciding whether the one party to an armed conflict’s ways of conducting hostilities grants a right to the other party, it seems reasonable that the latter party should apply the

³⁹ See, e.g., Emily Chertoff & Zachary Manfredi, *Deadly Ambiguity: IHL’s Prohibition on Targeting Civilian Objects and the Risks of Decentered Interpretation*, 53 TEX. INT’L L.J. 239 (2018).

⁴⁰ API, art. 52.

⁴¹ See, e.g., Claude Pilloud et al., Int’l Comm. of the Red Cross, Commentary of 1987 to API (Yves Sandoz et al. eds., 1987).

same standard in evaluating our own ways of conducting hostilities. In the context of Article 36, thus, the requirement is to conduct a legal review, as a method of warfare, of new tactics and strategies that can effectively contribute to military operations.

Finally, this paper's definition will not lead to overinclusive problems. Scholars advocating for a narrower approach often caution that an overbroad definition will require a state to review "everything the armed forces do in an organized manner" and therefore is impractical.⁴² The effective contribution standard will not be subject to similar criticisms since the test has been applied on the battleground for a long time. Further, it is unlikely that requiring an Article 36 legal review of new methods of warfare that can effectively contribute to military operations would be more burdensome than Article 52's implied requirement of reviewing the enemy's military operations in deciding whether their use or intended use of civil objects can effectively contribute to their military operations.

B. The Means-Based Approach

Whereas the method-based approach considers the military tactics and strategies, the means-based approach focuses on the instrument used in warfare, such as weapons or weapon systems. Several kinds of weapons are *per se* prohibited by specific arms-control treaties.⁴³ Other means of warfare are covered by the general prohibitions of Article 35 of API.⁴⁴

i. Arms-Control Treaties

Although there are many arms-control treaties, they generally are not the proper place to look when analyzing the legality of emerging military technologies. However, several scholars have

⁴² See, e.g., Liivoja & Chircop, *supra* note 16, at 183.

⁴³ See Burrus M. Carnahan & Marjorie Robertson, *The Protocol on "Blinding Laser Weapons": A New Direction for International Humanitarian Law*, 90 AM. J. INT'L L. 484 (1996) (reporting that laser weapons that are designed to cause permanent blinding are *per se* banned by the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects (CCW)).

⁴⁴ API, art. 35.

argued or implied that it is plausible to regulate biological HE technologies under the Biological Weapons Convention (BWC).⁴⁵

The BWC was negotiated during the Cold War era. However, it is not just a trade-off and escalation-control instrument between the U.S. and the former Soviet Union. Instead, it was also meant to lock in the strategic advantages over states with less developed weapon technologies.⁴⁶ As a result, to enable a quick negotiation, BWC was specifically drafted with ambiguous language,⁴⁷ which further complicates its implication for cutting-edge technologies.

Article I of BWC prohibits the development, production, acquisition, and the use for hostile purposes of “biological agents” that “have no justification for prophylactic, protective or other peaceful purposes.”⁴⁸ Since the term “biological agents” was left undefined, in advocating for a means-based approach, Patrick Lin argued that it is possible to regard enhanced warfighters as biological weapons because they are biological in nature and are “a military's best and oldest weapon[s].”⁴⁹ However, this reading is implausible. It conflicts with the ordinary meaning of “biological agents” in the military context, the contextual reading of Article I, and the purpose of BWC, all of which limit the scope of “biological agents” to microorganisms.⁵⁰ Besides, political and policy considerations also counsel against this reading because it will (1) legalize the use of animals on the battleground, which is inconsistent with the practice of states;⁵¹ and (2) blur the line between human beings and biological weapons, which can hardly gain the general support of the international

⁴⁵ See, e.g., Lara Wynn, *The Non-Fiction of Captain America: A Legal Analysis of the Potential and Perils of Genetic Engineering in Modern Warfare*, 5 J. BIOSECURITY BIOSAFETY & BIODEFENSE L. 109, 120-21 (2014).

⁴⁶ Susan Wright, *Introduction: In Search of a New Paradigm of Biological Disarmament*, in BIOLOGICAL WARFARE AND DISARMAMENT: NEW PROBLEMS/NEW PERSPECTIVES 313-23 (Susan Wright ed., 2002).

⁴⁷ Jack M. Beard, *The Shortcomings of Indeterminacy in Arms Control Regimes: The Case of the Biological Weapons Convention*, 101 AM. J. INT'L L. 271, 280-81 (2007).

⁴⁸ Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, art.1, 10 Apr. 1972, 26 U. S.T. 583, 1015 U.N.T.S. 163.

⁴⁹ PATRICK LIN ET AL., ENHANCED WARFIGHTERS: RISK, ETHICS, AND POLICY 28-35 (GREENWALL FOUND., WORKING PAPER 1.0.0, 2013); see also Patrick Lin, *Could Human Enhancement Turn Soldiers into Weapons that Violate International Law? Yes*, THE ATLANTIC (Jan. 4, 2013), <https://perma.cc/2GJ7-QT2H>;

⁵⁰ Liivoja & Chircop, *supra* note 16, at 167-70 (2018).

⁵¹ *Id.*

community and can cause severe legal problems.⁵² For example, whereas LOAC prohibits “the use of POWs in military work,” it does not prohibit the use of captured weapons.⁵³

An alternative way to regulate military HE under the BWC is to regard certain military HE themselves as biological agents.⁵⁴ Although this reading is plausible, since military HE does not directly harm enemy soldiers, it seems that none of them will be prohibited by Article I.⁵⁵ Even if Article I can be expansively read, this approach is practically problematic because military HE can basically always serve some safety, self-defense, or other “protective” purposes, which will render them exempt from Article I’s prohibition.⁵⁶

ii. Article 35 of API

Article 35 covers weapons as well as weapon systems.⁵⁷ We have discussed the problems associated with regulating bio-enhancements or bio-enhanced soldiers as biological weapons under BWC. Apparently, regulating enhancements generally and enhanced soldiers as weapons under Article 35 would give rise to similar problems.⁵⁸

Rain Liivoja and Luke Chircop argued that a means-based approach is possible because the relationship between enhanced warfighters and enhancements is similar to that between weapon platforms and weapons.⁵⁹ This approach is plausible but subject to severe limitations because “[p]rima facie, a weapon system cannot exist unless it includes a weapon.”⁶⁰ Therefore, this approach can only cover a very limited number of military HE. For example, although some prosthetic

⁵² See Wynn, *supra* note 45, at 121-22.

⁵³ Amanda McAllister, *Cybernetic Enhancement of Soldiers: Conserving Hors De Combat Protections for Combatants Under the Third Geneva Convention*, 7 J.L. & CYBER WARFARE 67, 92 (2019).

⁵⁴ Lin, *supra* note 49.

⁵⁵ Liivoja & Chircop, *supra* note 16, at 171-72.

⁵⁶ See Wynn, *supra* note 45, at 122.

⁵⁷ See, e.g., FRANÇOISE BOUCHET-SAULNIER, *THE PRACTICAL GUIDE TO HUMANITARIAN LAW* 444 (Laura Brav & Camille Michel eds. & trans., 3d ed. 2014).

⁵⁸ See, e.g., Liivoja & Chircop, *supra* note 16, at 176-78.

⁵⁹ *Id.* at 179-80.

⁶⁰ *Id.* at 179 (citing Michael N. Schmitt, *War, Technology, and the Law of Armed Conflict*, 82 INT’L L. STUD. 137, 142 (2006)).

enhancements and cybernetic enhancements might qualify as weapons, most bio-enhancements would not be covered.

C. Discussion

The above discussion indicates that regulating military HE under the current LOAC framework is challenging but nevertheless plausible. On one end, the method-based approach will require an expansive reading of “methods of warfare.” On the other end, the means-based approach has more limitations and can only cover some but not all kinds of military HE. A close comparison of these two approaches, however, will indicate that a method-based approach is more ideal. Unlike traditional weapons and weapon systems, the use of HE can possibly cause side effects to enhanced warfighters. But it is unlikely that such injuries can be considered under the means-based approach, which focuses on regulating enhanced warfighters as merely instruments used to inflict injuries on the enemy. In contrast, adopting the method-based approach and focusing on the tactics and strategies “allow[s] legal advisers to always keep in mind the ultimate objective of LOAC--to reduce unnecessary human suffering in war.”⁶¹

To be sure, one might argue that a means-based approach is plausible because states can negotiate a new means-specific treaty and directly prohibit HE that causes substantial suffering to enhanced warfighters. Nevertheless, on the one hand, considering the hostile political climate, it is unlikely that such a treaty can be easily negotiated in the foreseeable future. On the other hand, compared to arms control treaties, the method-based approach allows “much greater flexibility.”⁶² Whereas arms control treaties focus on the instruments and to ban certain enhancements completely, yet leave others unregulated, the method-based approach enables the consideration of

⁶¹ Benjamin Kastan, *The Chemical Weapons Convention and Riot Control Agents: Advantages of a “Methods” Approach to Arms Control*, 22 DUKE J. COMPAR. & INT’L L. 267, 285 (2012).

⁶² *Id.* at 285.

particular circumstances under which enhancements are used. On one end, some military HE might have relatively modest side effects and it is unlikely that there will be a global consensus for a complete ban. Nevertheless, when they are used to pursue a military objective in which military value is disproportionately low compared to their side effects, LOAC principles of humanity and proportionality are clearly violated. On the other end, some military HE might have severe side effects and an arms control treaty might issue a complete ban against them. Nevertheless, few military technologies are developed without being used, and such a treaty might not be faithfully followed. As some scholars observed, contextualism is especially needed “with regard to the methods and means of warfare” and is heavily reflected in the ICJ’s jurisprudence, which held that even nuclear weapons might be legally used under certain extreme circumstances, like when they are necessary to preserve the survival of a state.⁶³ Overall, thus, the more flexible method-based approach will provide a better balance of military necessity with human suffering and is, therefore, better than the means-specific treaty approach.

The second possible counterargument is that LOAC does not have to address side effects issues at all because it is enough to regulate side effects under the International Human Rights Law (IHRL), which focuses more heavily on the relationship between a state and its own citizens. In fact, there are already several IHRL treaties and declarations, like the UNESCO’s Universal Declaration on the Human Genome and Human Rights, that has some potential implications for the regulation of HE technologies.⁶⁴ However, none of the existing IHRL can be applied directly to the regulation of HE technologies and all of these treaties and declarations have their own restrictions.⁶⁵ Besides,

⁶³ James D. Fry, *Contextualized Legal Reviews for the Methods and Means of Warfare: Cave Combat and International Humanitarian Law*, 44 COLUM. J. TRANSNAT’L L. 453, 457, 461-62 (2006).

⁶⁴ See Morial Shah, *Genetic Warfare: Super Humans and The Law*, 12 SCI. & INTELL. PROP. L. REV. 1, 17-18 (2019).

⁶⁵ See *id.* at 18; see also Scott J. Schweikart, *Global Regulation of Germline Genome Editing: Ethical Considerations and Application of International Human Rights Law*, 43 LOY. L.A. INT’L & COMPAR. L. REV. 279, 288-95 (2020).

this paper argues that IHRL is normatively not the proper instrument to regulate the use of military HE on the battleground.

To begin with, IHRL has its own problems and restrictions. IHRL relies heavily on declarations (like the UNESCO declarations), which are non-binding in nature.⁶⁶ Also, binding IHRL treaties are constantly violated.⁶⁷ In fact, we are in an era where the “conceptual, doctrinal, and institutional aspects of the human rights enforcement architecture are all fading.”⁶⁸ There are several reasons why IHRL is no longer in its “Golden Age.” For example, the U.N. is ineffective in enforcing IHRL, and human rights themselves are also in “global decline.”⁶⁹ The current political climate surely also makes international consensus on human rights issues less likely.⁷⁰ Besides these exogenous factors, the decline of IHRL is also rooted in its inherent conflict with the principle of sovereignty.⁷¹ Originally, international law emerged solely to regulate the relationships between different sovereign states.⁷² Core functions of it were to enable “orderly [international] relations” and to serve “the common aims of members of the international community.”⁷³ IHRL, however, provides the ability to “transform” such logic and legitimize international law based upon individual rights.⁷⁴ Therefore, under IHRL, sovereignty itself must be justified upon the undertaking of the responsibility to protect basic human rights.⁷⁵ No matter whether this transformation is normatively sound, with the rise of nationalism in recent decades,⁷⁶ it is hard to imagine that IHRL will be

⁶⁶ Scott J. Schweikart, *supra* note 65, at 293.

⁶⁷ See generally David L. Cingranelli, et al., *The CIRI Human Rights Dataset, Version 2014.04.14.*, HARVARD DATAVERSE (Apr. 14, 2014), <https://perma.cc/VP8F-8FCV>.

⁶⁸ Ingrid Wuerth, *International Law in the Post-Human Rights Era*, 96 TEX. L. REV. 279, 281 (2017).

⁶⁹ *Id.* at 281, 349.

⁷⁰ See, e.g., Eric Posner, *The case against human rights*, THE GUARDIAN (Dec. 4, 2014, 1:00 AM), <https://www.theguardian.com/news/2014/dec/04/-sp-case-against-human-rights>.

⁷¹ Wuerth, *supra* note 68, at 281.

⁷² See Prosper Weil, *Towards Relative Normativity in International Law?*, 77 AM. J. INT'L L. 413, 418 (1983)

⁷³ *Id.*

⁷⁴ Wuerth, *supra* note 68, at 285.

⁷⁵ See Anne Peters, *Humanity as the A and Ω of Sovereignty*, 20 EUR. J. INT'L L. 513 (2009).

⁷⁶ See, e.g., Anna Presnall, *The Rising Trend of Nationalism and Its Implications on Human Rights*, UAB INST. FOR HUM. RTS. BLOG (Oct. 21, 2020), <https://perma.cc/E2G3-RDXG>.

faithfully followed in a war, especially between two sovereign states. In contrast, since the jurisprudence underlining LOAC is largely based upon a “Westphalian model of state sovereignty,” it can apparently be more acceptable to most if not all states notwithstanding their ideological differences.⁷⁷ Besides, one of the most important cornerstones of LOAC is the principle of reciprocity, which is a precondition of its effective operation.⁷⁸ The principle of reciprocity benefits all parties to an armed conflict by requiring any obligations under LOAC to be “fairly applied to all parties.”⁷⁹ Therefore, it is more pragmatical to regulate the use of military HE that can cause severe side effects under the LOAC framework.

Besides, even if the retreat of IHRL can be reversed and all states will be willing to show due respect to IHRL, applying it to the battleground setting is nevertheless still problematic for four reasons. First, IHRL cannot remain in full force when applying to members of the military, especially during wartime.⁸⁰ As the European Court of Human Rights (ECtHR) observed, “the particular characteristics of military life and its effects on the situation of individual members of the armed forces” must be considered in applying IHRL.⁸¹ ECtHR precedents have clearly illustrated the difficulty of applying even the most fundamental human rights law – the right to life – to the military context.⁸² Thus, it is unrealistic to expect that IHRL can effectively address complex issues relating to the use of military HE with side effects on the battleground. Second, as a practical matter, soldiers and commanders are generally only interested in and trained to abide by LOAC.⁸³ Without enough training and expertise on IHRL, it is also unrealistic to expect IHRL to be faithfully followed on the

⁷⁷ Eric Talbot Jensen, *Future War, Future Law*, 22 MINN. J. INT'L L. 282, 297 (2013) (citing PHILIP C. BOBBITT, *THE SHIELD OF ACHILLES: WAR, PEACE, AND THE COURSE OF HISTORY* 75-143, 501-538 (2002)).

⁷⁸ See Sean Watts, *Reciprocity and The Law of War*, 50 HARV. INT'L L.J. 365, 368, 386-417 (2009).

⁷⁹ Trevor A. Keck, *Not All Civilians Are Created Equal: The Principle of Distinction, the Question of Direct Participation in Hostilities and Evolving Restraints on the Use of Force in Warfare*, 211 MIL. L. REV. 115, 132 (2012).

⁸⁰ Dinniss & Kleffner, *supra* note 2, at 452-55.

⁸¹ *Id.* at 453 (citing *Engel and Others v. Netherlands*, 22 Eur. Ct. H.R. (ser. A) (1976)).

⁸² See PETER J. ROWE, *THE IMPACT OF HUMAN RIGHTS LAW ON ARMED FORCES* 33-34 (2006).

⁸³ See *id.* at 114-15.

battleground. Third, LOAC might preempt the application of IHRL because it is *lex specialis*. The principle of *lex specialis* provides that “whenever two or more norms deal with the same subject matter, priority should be given to the norm that is more specific.”⁸⁴ Relying upon this principle, some scholars have argued that LOAC will categorically exclude IHRL’s application during an armed conflict.⁸⁵ This approach has been adopted by several countries including the U.S., at least during the George W. Bush Administration.⁸⁶ Although many scholars rejected this approach and argued that preemption can only occur where LOAC and IHRL “present contradictory resolutions against unchanged given settings,”⁸⁷ the principle of *lex specialis* nonetheless casts a shadow over the plausibility of regulating the use of military HE solely under IHRL. Last but not least, IHRL is generally not considered in Article 36 reviews. Article 36 reviews provide an additional layer to safeguard against misuse of means and methods of warfare. Considering the potential consequence of employing a prohibited means or method of warfare or employing an otherwise legal means or method of warfare in a prohibited way can be draconian. It is unreasonable to give up such an additional safeguard and address the side effects of military HE through mere IHRL.

⁸⁴ Ashika Singh, *The United States, the Torture Convention, and Lex Specialis: The Quest for A Coherent Approach to the Cat in Armed Conflict*, 47 COLUM. HUM. RTS. L. REV. 134, 141 (2016) (quoting CONCLUSIONS OF THE WORK OF THE STUDY GROUP ON THE FRAGMENTATION OF INTERNATIONAL LAW: DIFFICULTIES ARISING FROM THE DIVERSIFICATION AND EXPANSION OF INTERNATIONAL LAW, ¶8 (2006),

http://legal.un.org/ilc/documentation/english/a_cn4_1682.pdf.)

⁸⁵ See, e.g., Michael J. Dennis, *Application of Human Rights Treaties Extraterritorially to Detention of Combatants and Security Internees: Fuzzy Thinking All Around?*, 12 ILSA J. OF INT’L & COMPAR. L. 459, 472-80 (2006).

⁸⁶ See, e.g., Robert M. Chesney, *Who May Be Held? Military Detention Through the Habeas Lens*, 52 B.C.L. REV. 769, 787 (2011).

⁸⁷ See, e.g., Laura M. Olson, *Practical Challenges of Implementing the Complementarity Between International Humanitarian and Human Rights Law—Demonstrated by the Procedural Regulation of Internment in Non-International Armed Conflict*, 40 CASE W. RES. J. INT’L L. 437 (2009).

III. ON THE MEANING OF “SUPERFLUOUS INJURY OR UNNECESSARY SUFFERING” UNDER ARTICLE 35(2)

The previous section concludes that the method-based approach is better because it makes it *possible* to consider the side-effects of military HE to enhanced warfighters. This section will further consider whether it is legally *required* to consider such injuries under the current LOAC framework.

In an Article 36 review of a new method of warfare, five factors shall be considered: (1) whether it is of a nature to cause “superfluous injury or unnecessary suffering” in violation of Article 35(2); (2) whether it can lead to “widespread, long-term, and severe damage to the natural environment”; (3) whether it is indiscriminate in nature; (4) whether it is specifically prohibited by treaty or customary law; and (5) whether future developments in the LOAC will likely render it illegal.⁸⁸

The first and fifth factors can be relevant to military HE. However, this paper will not rely on the fifth factor as that amounts to begging the question because there have been few discussions in the international community relating to the regulation of using military HE with side effects under LOAC. Thus, this article will focus on the first factor only. After considering both the positivist approach and the contextualist approach, this section concludes that it is both plausible and preferable to read Article 35(2)’s prohibition of “superfluous injury and unnecessary suffering,”⁸⁹ a term that currently has no agreed international definition,⁹⁰ as requiring the consideration of military HE’s side effects when reviewing the legality of using them as a method of warfare.

⁸⁸ See WILLIAM H. BOOTHBY, WEAPONS AND THE LAW OF ARMED CONFLICT 347-48 (2016) (stating that the U.S. Department of Defense’s current review process is a three-prong test and does not contain the second and the fifth factor); see also OFF. OF GEN. COUNSEL, U.S. DEP’T OF DEF., DEP’T OF DEF. LAW OF WAR MANUAL, § 6.2.2 (2016) [herein after DOD LAW OF WAR MANUAL] (noting that the Boothby’s five-prong test has been regarded as more “comprehensive” and are supported by many scholars and practitioners) see, e.g., Meier, *supra* note 11, at 126-27.

⁸⁹ API, art. 35(2).

⁹⁰ See Meier, *supra* note 11, at 128.

A. The Positivist Approach

Positivists are “rule oriented and textual.”⁹¹ They reject “any nexus between laws and morality” and view international law as simply static rules that sovereign states create and govern.⁹² Since the late 19th century, positivism became the “principal jurisprudential technique of the discipline of international law.”⁹³ Before World War II, an “idealistic” positivist approach predominated and greatly influenced jurisprudence of international law, when scholars believed that “procedural obligations” were enough for a peaceful international order.⁹⁴ After World War II, a hard-core political realism, exemplified by Hans Morgenthau’s 1948 book *Politics Among Nations*,⁹⁵ briefly replaced positivism.⁹⁶ These scholars shared a pessimistic view and denounced international law as simply a “balance of power politics.”⁹⁷ Although these hard-core realists continued to influence international law jurisprudence, positivism quickly regained its popularity.⁹⁸ This is especially the case with respect to the law of war, as Hans Kelsen famously argued in his 1952 book *Principles of International Law* that *bellum justum* must be “presupposed as part of positive international law.”⁹⁹

To interpret Article 35(2) under a positivist approach, we shall refer to the Vienna Convention on the Law of Treaties (VCLT) because Articles 31 and 32 of the VCLT lay out the

⁹¹ Michael N. Schmitt, *The Resort to Force in International Law: Reflections on Positivist and Contextual Approaches*, 37 A.F. L. REV. 105-06 (1994).

⁹² David D. Jividen, *Rediscovering International Law Through Dialogue Rather Than Diatribe: Reflections on an International Legal Conference in the Aftermath of Operation Iraqi Freedom*, 27 HARV. J.L. & PUB. POL’Y 691, 693 (2004).

⁹³ Antony Anghie, *Finding the Peripheries: Sovereignty and Colonialism in Nineteenth-Century International Law*, 40 HARV. INT’L L.J. 1-2 (1999).

⁹⁴ Josef Kunz, *The Swing of the Pendulum: From Overestimation to Underestimation of International Law*, 44 AM. J. INT’L L. 135-37 (1950).

⁹⁵ HANS J. MORGENTHAU, *POLITICS AMONG NATIONS* (New York: Alfred A. Knoph, Inc., 1948).

⁹⁶ Kunz, *supra* note 94, at 138-40.

⁹⁷ Michael N. Schmitt, *New Haven Revisited: Law, Policy and The Pursuit of World Order*, 1 USAFA J. LEG. STU. 185, 187 (1990).

⁹⁸ *See id.* at 186-88.

⁹⁹ HANS KELSEN, *PRINCIPLES OF INTERNATIONAL LAW* 59 (1952).

positive legal rules for interpreting international treaties.¹⁰⁰ Although some states including the U.S. have not ratified the VCLT,¹⁰¹ Articles 31 and 32 have been viewed as customary international law.¹⁰² Therefore, a positivist will faithfully follow these two provisions. Under Article 31, a treaty shall be interpreted in accordance with “the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose.”¹⁰³ Besides, subsequent agreements, subsequent practices, and relevant international law rules shall also be considered.¹⁰⁴ If the meaning still cannot be unambiguously ascertained, Article 32 provides that “supplementary means of interpretation, including the preparatory work of the treaty and the circumstances of its conclusion” shall also be considered.¹⁰⁵

i. Ordinary Meaning

The plain text of Article 35(2) reads “[i]t is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.”¹⁰⁶ At the outset, the term “superfluous injury or unnecessary suffering” is unqualified. According to the “general-terms canon,” general terms should be interpreted in accordance with their general meaning (*generalia verba sunt generaliter intelligenda*).¹⁰⁷ Therefore, “superfluous injury or unnecessary suffering” should be prohibited no matter upon whom it is inflicted. Otherwise, “ad hoc exceptions” must be recognized, which conflicts with “the presumed point of using general

¹⁰⁰ Vienna Convention on the Law of Treaties, arts. 31-32, May 23, 1969, 1155 U.N.T.S. 331 [hereinafter VCLT].

¹⁰¹ See Vienna Convention on the Law of Treaties, U.S. Dep't of State, <https://2009-2017.state.gov/s/l/treaty/faqs/70139.htm>.

¹⁰² See, e.g., Case Concerning the Arbitral Award of 31 July 1989 (Guinea-Bissau v. Senegal), Summary of the Judgment, I.C.J. 220-24 (Nov. 12, 1991).

¹⁰³ *Id.* art. 31(1).

¹⁰⁴ *Id.* art. 31(3).

¹⁰⁵ *Id.* art. 32.

¹⁰⁶ API, art. 35(2).

¹⁰⁷ ANTONIN SCALIA & BRYAN A. GARNER, *READING LAW: THE INTERPRETATION OF LEGAL TEXTS* 101, 103 (2012).

words.”¹⁰⁸ Accordingly, the plain meaning supports the conclusion that side-effects of HE need also to be considered.

To be sure, it might not be a common practice to apply textual canons in interpreting international law. Nevertheless, the general-terms canon is a “semantic canon.”¹⁰⁹ Semantic canons are “generalizations about how the English language is conventionally used and understood.”¹¹⁰ Therefore, the use of semantic canons “can therefore be understood simply as a form of textual analysis” and thus the use of such canons is proper no matter the underline source of law to be interpreted.¹¹¹

ii. Subsequent Practice

After API was drafted, many states incorporated Article 35(2) into their military manuals and legislation.¹¹² The API provides a general prohibition of methods of warfare that cause superfluous injury or unnecessary suffering.¹¹³ Unfortunately, no examples or further explanations were given by these states.¹¹⁴ Therefore, subsequent states’ practice is not particularly helpful for the discussion. Certainly, several states, including the U.S., discussed the definition of unnecessary suffering and superfluous injury in their war manuals.¹¹⁵ Such practices have made it clear that a means or method of warfare is not *per se* illegal under Article 35(2) merely because it can cause severe injury or suffering.¹¹⁶ Instead, the correct inquiry is whether the “normal or expected” use of such a means or

¹⁰⁸ *Id.*

¹⁰⁹ *Id.*

¹¹⁰ JOHN F. MANNING & MATTHEW C. STEPHENSON, LEGISLATION AND REGULATION: CASES AND MATERIALS 202 (2d ed. 2013).

¹¹¹ *Id.*; but see Richard A. Posner, *Statutory Interpretation –in the Classroom and in the Courtroom*, 50 U. CHI. L. REV. 800, 806, 816 (1983) (criticizing canons as “[v]acuous and inconsistent” and “plain wrong.”).

¹¹² Int’l Comm. of the Red Cross, *Rule 70. Weapons of a Nature to Cause Superfluous Injury or Unnecessary Suffering*, CUSTOMARY IHL DATABASE, https://ihl-databases.icrc.org/customary-ihl/eng/docindex/v1_rul_rule70#refFn_3460CD3C_00036.

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ DoD Law of War Manual, *supra* note 88, § 6.6.

¹¹⁶ See Meier, *supra* note 11, at 128.

method of warfare would “inevitably” cause injury or suffering manifestly disproportionate to its military value.¹¹⁷ However, such discussions are limited to the review of traditional kinetic weapons, as the discussions both fail to provide a detailed examination of the review of methods of warfare, and fail to provide a definite answer as to whether side effects of military HE to enhanced warfighters can be considered to evaluate whether a means or method of warfare can cause superfluous injury or unnecessary suffering.¹¹⁸

Similarly, although the ICJ has written opinions on the meaning of unnecessary suffering and superfluous injury,¹¹⁹ it did not make it clear whether injuries to a state’s own soldiers shall be considered. However, since the ICJ has clearly recognized that Article 35(2) is derived from the “principles and humanity” and prohibits incurring harm that is “greater than that unavoidable to achieve legitimate military objectives,” the interpretation proposed by this paper should not conflict with the ICJ’s approach.¹²⁰

iii. Relevant Rules of International Law – The Martens Clause

Article 31(3)(c) of VCLT requires the consideration of “any relevant rules of international law applicable in the relations between the parties.”¹²¹ The most relevant rule here is the so-called Martens Clause, which first appeared in the Preamble to the 1899 Hague Conference and was then codified in Article 1 of API.¹²² The plain text of the Martens Clause provides that “[i]n cases not covered by [API] or by other international agreements, civilians and combatants remain under the

¹¹⁷ See W. Hays Parks, *Means and Methods of Warfare*, 38 GEO. WASH. INT’LL. REV. 511, 517 n.25 (2006).

¹¹⁸ DoD Law of War Manual, *supra* note 88, at § 6.6; *see also* DoD Law of War Manual at § 6.6.3.2 (noting that it limits the consideration of unnecessary suffering and superfluous injury to “harm inflicted upon the persons who are struck by the weapon.”).

¹¹⁹ *See, e.g.*, Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. Rep. 226 (July 8).

¹²⁰ *Id.* at ¶ 78.

¹²¹ VCLT, *supra* note 100, at art. 31(3)(c).

¹²² *See* Jeffrey Kahn, “*Protection and Empire*”: *The Martens Clause, State Sovereignty, and Individual Rights*, 56 VA. J. INT’L L. 1, 25 (2016).

protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.”¹²³

Generally speaking, there are two interpretations of the Martens Clause.¹²⁴ On one end, the ICJ seems to regard the Martens Clause as a positive law, which functions as a freestanding constraint on states’ actions during wartime and provides “an effective means of addressing the rapid evolution of military technology.”¹²⁵ This view has been supported by some NGOs including the ICRC and Human Rights Watch.¹²⁶ On the other end, a more widely accepted view is the one adopted by the U.S., under which the Martens Clause is not regarded as an independent source of international law but only illustrates the basic principles of LOAC.¹²⁷ However, no matter which view is adopted, it should be a consensus that the Marten Clause can be applied to interpret written international laws.¹²⁸ As The International Criminal Tribunal for the former Yugoslavia (ICTY) eloquently held, the Martens Clause shall “enjoin, as a minimum, reference to those principles and dictates any time a rule of international humanitarian law is not sufficiently rigorous or precise.”¹²⁹ The Martens Clause “clearly shows that principles of international humanitarian law may emerge

¹²³ API, art. 1(2).

¹²⁴ See Kahn, *supra* note 122, at 26-27 (noting that besides the two interpretations this article will discuss, Russia once argued that the Martens Clause shall never be applicable because the evolution of LOAC has rendered it superfluous); see, e.g., Stephen E. White, *Brave New World: Neurowarfare and the Limits of International Humanitarian Law*, 41 CORNELL INT’L L.J. 177, 189 (2008) (citing Written Statement and Comments of the Russian Federation on the Issue of the Legality of the Threat or Use of Nuclear Weapons 13 (Jun. 16, 1995) (noting that few scholars agree with this interpretation, and considering that the Martens Clause had been written into Article I of API, this paper rejects this interpretation as unreasonable).

¹²⁵ Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, *supra* note 119, at ¶ 78; Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, 1996 I.C.J. Rep. 226, 406-11 (July 8) (separate opinion by Shahabuddeen, J.); but see Rupert Ticehurst, *The Martens Clause and the Laws of Armed Conflict*, 317 INT’L REV. RED CROSS 125, 127-28 (1997) (arguing that the ICJ’s holding is ambiguous with respect to the status of the Martens Clause).

¹²⁶ See Tyler D. Evans, *At War with the Robots: Autonomous Weapon Systems and the Martens Clause*, 41 HOFSTRA L. REV. 697, 717 (2013).

¹²⁷ See Michelle A. Hansen, *Preventing the Emasculation of Warfare: Halting the Expansion of Human Rights Law into Armed Conflict*, 194 MIL. L. REV. 1, 19 (2007).

¹²⁸ See Antonio Cassese, *THE MARTENS CLAUSE: HALF A LOAF OR SIMPLY PIE IN THE SKY?*, 11 EUR. J. INT’L L. 187, 208 (2000).

¹²⁹ See Prosecutor v. Kupreskic, Case No. IT-95-16-T, Judgement, ¶ 525 (Int’l Crim. Trib. for the Former Yugoslavia Jan. 14, 2000).

through a customary process under the pressure of the demands of humanity or the dictates of public conscience, even where State practice is scant or inconsistent.”¹³⁰

Certainly, it is sometimes hard to ascertain what constitutes the “dictates of public conscience” under the Martens Clause, and there is no commonly agreed singular meaning of this term.¹³¹ However, the clause at least comprises the customary principle of humanity and the prohibition against all kinds of unnecessary suffering.¹³² Thus, even those holding the narrowest view will likely agree that the dictates of public conscience require a reading of Article 35(2) that prohibits the use of military HE that can cause superfluous injury or unnecessary suffering to enhanced soldiers.

iv. Drafting and Negotiating History

Since interpreting Article 35(2) purely according to Article 31 does not render it either “ambiguous or obscure” or “manifestly absurd or unreasonable,” I will not refer to Article 32 further in this discussion.¹³³ Nevertheless, even if Article 32 is considered, this paper’s conclusion is still sound under the positivist approach.

Article 35(2) was built upon four previous international law sources.¹³⁴ The origin of the principle underlining Article 35(2) was the preamble of the Declaration of St. Petersburg of 1868, which provides that “the necessities of war ought to yield to the requirements of humanity,” and thus, “only those calamities which are imperatively necessitated by war” can be employed.¹³⁵ This principle was more clearly articulated in Article 13(e) of the 1874 Project of an International

¹³⁰ *Id.* at ¶ 527.

¹³¹ *See* Evans, *supra* note 126, at 715.

¹³² *See id.* at 714-15.

¹³³ VCLT, art. 32.

¹³⁴ *See generally* Henri Meyrowitz, *The Principle of Superfluous Injury or Unnecessary suffering: From the Declaration of St Petersburg of 1868 to Additional Protocol 1 of 1977*, 34 INT’L REV. OF THE RED CROSS 98, 98-122 (1994).

¹³⁵ *See id.* at 99-100.

Declaration concerning the Laws and Customs of War, which forbids "the employment of arms, projectiles or material calculated to cause unnecessary suffering."¹³⁶ Finally, Article 23(e) of the 1899 Hague Convention No. II and the Fourth Hague Convention of 1907 basically inherited this terminology.¹³⁷ Since none of these four sources focused on anything but the legality of weapons and other means of warfare, injuries to one's own soldiers were clearly not relevant during this time.¹³⁸ However, the drafters of Article 35(2) did not intend it to bear the exact same meaning as Article 23(2) of the 1907 Hague Convention by making two important changes. First, the term "superfluous injury" was changed to "superfluous injury or unnecessary suffering" to further emphasize the need of balancing the military necessity of a means or methods of warfare and the principle of humanity.¹³⁹ Second, the term "calculated to" was changed to "of a nature of."¹⁴⁰ Thus, whereas side-effects of HE would not have been covered by Article 23(2) because HE technologies are not designed specifically to harm soldiers employing them, it is plausible to govern them under Article 35(2) of API.

Besides, to comprehensively understand the drafting history of API, it is not enough to simply review the Hague Law tradition. Another branch of LOAC, the Geneva Law, must also be examined since API was intended to incorporate these two branches of law.¹⁴¹ Unlike the Hague Law, which is primarily concerned with rules of conduct of hostilities,¹⁴² the Geneva Law deals with "the protection of the victims of armed conflicts."¹⁴³ The Geneva Law contains four parts. Firstly, the First Geneva Convention was first drafted in 1864 and codified "the general protections for the

¹³⁶ *See id.* at 101.

¹³⁷ *See id.*

¹³⁸ *See id.* at 99-101.

¹³⁹ *See Fry, supra* note 63, at 467-68.

¹⁴⁰ *See, e.g., Meyrowitz, supra* note 134, at 102.

¹⁴¹ *See, e.g., George H. Aldrich & Christine M. Chinkin, A Century of Achievement and Unfinished Work*, 94 AM. J. INT'L L. 90, 95 (2000).

¹⁴² *See, e.g., HILAIRE MCCOUBREY, INTERNATIONAL HUMANITARIAN LAW 2* (Routledge 1998).

¹⁴³ INT'L COMM. OF THE RED CROSS, *Law of Geneva*, <https://casebook.icrc.org/glossary/law-geneva#:~:text=As%20opposed%20to%20the%20law,longer%20take%20part%20in%20hostilities>.

care of the wounded and sick.”¹⁴⁴ Then, after the conclusion of World War I, the Third Geneva Convention was drafted, which provides a legal framework for the treatment of prisoners of war.¹⁴⁵ Lastly, the draconian scale of injuries caused by World War II triggered a comprehensive reform of the Geneva Law. Not only was the scope of the First and Third Geneva Conventions substantially enlarged, but two new conventions also emerged: the Second Geneva Convention which protects wounded and sick in naval warfare and the Fourth Geneva Convention which protects civilians.¹⁴⁶

Whereas some scholars argued that the distinction between the Hague Law and the Geneva Law is not meaningful because they share similar LOAC principles and contain several similar provisions,¹⁴⁷ it is more proper to interpret API’s merge of the two branches of laws as an evolution of LOAC jurisprudence.¹⁴⁸ Thus, the incorporation of the Geneva Law into API shall change our construction of the unnecessary suffering principle.

One notable distinction between the Hague Law and the Geneva Law drawn by Derek Jinks and David Sloss is that whereas the Hague Law governs the treatment of persons “subject to the enemy’s lethality,” the Geneva Law governs the treatment of persons “subject to the enemy’s authority.”¹⁴⁹ This characterization is not perfect, since it is an overgeneralization and ignores the law of neutrality,¹⁵⁰ laws governing the duties and rights of international humanitarian organizations like

¹⁴⁴ Stephen W. Simpson, *Shoot First, Ask Questions Later: Double-Tapping Under the Laws of War*, 108 W. VA. L. REV. 751, 764 (2006).

¹⁴⁵ Convention Relative to the Treatment of Prisoners of War, July 27, 1929, 118 L.N.T.S. 343.

¹⁴⁶ See Erin Creegan, *Protocol Additional to the Geneva Conventions of 12 August 1949, and Relating to the Treatment of Terrorist Combatants (Protocol IV)-A Proposal*, 41 CAL. W. INT’L L.J. 345, 353–54 (2011).

¹⁴⁷ See Fry, *supra* note 63, at 466-68 (citing Esbjörn Rosenblad, *International Humanitarian Law of Armed Conflict* 43 (1979), and Louise Doswald-Beck, *International Humanitarian Law and the Advisory Opinion of the International Court of Justice on the Legality of the Threat or Use of Nuclear Weapons*, 316 INT’L REV. RED CROSS 35, 36 (1997)).

¹⁴⁸ See, e.g., *id.*

¹⁴⁹ Derek Jinks & David Sloss, *Is the President Bound by the Geneva Conventions?*, 90 CORNELL L. REV. 97, 109 (2004).

¹⁵⁰ See Convention (V) Respecting the Rights and Duties of Neutral Powers and Persons in Case of War on Land, Oct. 18, 1907, 36 STAT. 2310.

the ICRC,¹⁵¹ and the protection of objects with high cultural value,¹⁵² etc. Nevertheless, it provides a useful insight for the discussion as it correctly indicates that although the Hague Law is also built upon basic humanitarian principles, the applicability of such principles are largely restricted to addressing the relationship between adversary states; the API, in contrast, through the incorporation of the Geneva Law, extended the applicability of such principles to “every aspect of armed conflict” and to govern all relations in warfare,¹⁵³ which shall of course also include the relationship between a state and its soldiers. In fact, such a legal relationship has already been covered in the Geneva Law - as ICRC has made clear, in its 2016 Commentary to the First Geneva Convention,¹⁵⁴ its 2017 Commentary to the Second Geneva Convention,¹⁵⁵ and its 2020 Commentary to the Third Geneva Convention,¹⁵⁶ that some provisions of Geneva Law are applicable to a party’s own armed forces, and soldiers enjoy the protection, even where they are suffering from abuse committed by their own state. Therefore, the interpretation of Article 35(2) shall consider a state’s obligation to its soldiers. It would be absurd to contend that a state can arbitrarily employ military HE with severe side effects and inflict suffering upon its warfighters that is disproportionate to the anticipated military necessity.

To be sure, in negotiating Article 35(2), no state specifically mentioned the plausibility of applying Article 35(2) to side effects of human enhancements or other injuries that a means or method of warfare might cause to a state’s own warfighters. However, there were just no means or methods of warfare that were comparable to military HE that existed at that time. As the ICRC

¹⁵¹ See, e.g., Geneva Convention for the Amelioration of the Condition of the Wounded, Sick and Shipwrecked Members of Armed Forces at Sea, art. 9, Aug. 12, 1949, 75 U.N.T.S. 85.

¹⁵² See Convention for the Protection of Cultural Property in the Event of Armed Conflict, May 14, 1954, 249 U.N.T.S. 240.

¹⁵³ INT’L COMM. OF THE RED CROSS, *Reaffirmation and Development of The Laws and Customs Applicable in Armed Conflicts*, 75 (1969).

¹⁵⁴ INT’L COMM. OF THE RED CROSS, *Commentary of 2016 to Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field*, ¶ 547 (2016).

¹⁵⁵ INT’L COMM. OF THE RED CROSS, *Commentary of 2017 to Geneva Convention for the Amelioration of the Condition of Wounded, Sick and Shipwrecked Members of Armed Forces at Sea*, ¶ 569 (2017).

¹⁵⁶ INT’L COMM. OF THE RED CROSS, *Commentary of 2020 to Geneva Convention relative to the Treatment of Prisoners of War*, ¶ 581 (2020).

made clear in its 1987 Commentary to API, Article 35(2) was supposed to be interpreted by states with due course and in a liberal way – “whenever a precise proposition shall be drawn up in view of future improvements which science may effect in the armament of troops, in order to maintain the principles which they have established, and to conciliate the necessities of war with the laws of humanity.”¹⁵⁷ Therefore, in light of the immense challenges to the laws of humanity brought by the development of HE technologies, Article 35(2) should be interpreted as requiring the consideration of their side effects to enhanced warfighters.

B. *The Contextualist Approach*

Although the positivist approach is still the “prevalent approach in international law,”¹⁵⁸ with the rise of the New Haven School of international law,¹⁵⁹ a policy-oriented contextualist approach has been welcomed by many scholars since the 1960s.¹⁶⁰ Contextualists regard law as a process instead of merely a stable set of codes, and policies always have a vital role in the formation as well as the interpretation of international treaties.¹⁶¹ When technology breakthroughs or substantial social changes happen, contextualists will try to construct laws to meet parties’ shared values and expectations.¹⁶² Through such liberal construction, contextualists argue that international laws can be updated to meet contemporary challenges and thus maintain their legality.¹⁶³ This is especially important for the law of war as its continuing validity is especially prone to be challenged by the

¹⁵⁷ INT’L COMM. OF THE RED CROSS, Commentary of 1987 to API, ¶ 1410 (1987),

¹⁵⁸ Michael N. Schmitt, *The Resort to Force in International Law: Reflections on Positivist and Contextual Approaches*, 37 A.F. L. REV. 105, 106 (1994).

¹⁵⁹ See generally Eisque Suzuki, *The New Haven School of International Law: An Invitation to a Policy-Oriented Jurisprudence*, 1 YALE J. WORLD PUB. ORD. 1 (1974).

¹⁶⁰ See, e.g., Richard A. Falk, *On Treaty Interpretation and the New Haven Approach*, 8 VIRGINIA J. INT’L L. 323, 330 (1968).

¹⁶¹ See *id.*; see also Blake D. Morant, *Lessons from Thomas More's Dilemma of Conscience: Reconciling the Clash Between a Lawyer's Beliefs and Professional Expectations*, 78 ST. JOHN'S L. REV. 965, 986-87 (2004).

¹⁶² See Morant, *supra* note 161, at 987.

¹⁶³ See Nigel Purvis, *Critical Legal Studies in Public International Law*, 32 HARV. INT’L L.J. 81, 125-26 (1991).

development of new technologies.¹⁶⁴ And it is worth noting that the ICJ has supported and “relied heavily on” the contextualist approach.¹⁶⁵ Shall a contextualist approach be adopted, the side-effects of military HE must be taken into account in analyzing whether they are prohibited under Article 35(2).

First, in terms of domestic policy, the use of HE must not conflict with military ethics, which provides fundamental principles guiding the relationship between a state and its soldiers. A key component of military ethics is military medical ethics, which clearly counsels against using military HE with side effects disproportional to concrete military objectives. Certainly, military medical ethics can be less stringent during wartime than in peacetime, and it is not necessary for them to strictly match civilian ethical principles because military objectives can override some of the soldiers’ individual rights, but it nevertheless requires the infringement of soldiers’ right to be analyzed in a “utilitarian” way.¹⁶⁶ One of the most notable models concerning the use of HE on the battleground is the so-called hybrid military model proposed by Maxwell J. Mehlman, Patrick Lin, and Keith Abney.¹⁶⁷ Under this model, the use of HE to enhance the performance of soldiers is not *per se* unethical or illegal, provided that there is an operational necessity in achieving a legitimate military purpose.¹⁶⁸ However, there are several ethical restrictions. Three of the restrictions are particularly relevant here. First, HE should be employed only if there are “no less costly means of achieving the legitimate military objective.”¹⁶⁹ Second, the benefits of employing HE must outweigh the risks and severity of side effects.¹⁷⁰ Lastly, any side effects must be minimized and reversible

¹⁶⁴ See, e.g., Brad Allenby, *The Implications of Emerging Technologies for Just War Theory*, 27 PUB. AFF. QUARTERLY 49, 61-64 (2013).

¹⁶⁵ See Fry, *supra* note 63, at 461-62.

¹⁶⁶ Taraska, *supra* note 2, at 6-7.

¹⁶⁷ Mehlman, et al., *supra* note 4, at 120-24.

¹⁶⁸ *Id.* at 121-22.

¹⁶⁹ *Id.* at 121.

¹⁷⁰ *Id.* at 121-22.

when possible.¹⁷¹ These three principles perfectly match Article 35(2), with the first principle reflecting Article 35(2)'s prohibition of "unnecessary suffering" and the second and third principle reflecting Article 35(2)'s prohibition of "superfluous injury." Therefore, on the one hand, interpreting Article 35(2) as requiring the consideration of injuries to one's own warfighters is required by military medical ethics. On the other hand, such a reading of Article 35(2) can also help realize principles of military medical ethics into a well-established, concrete, and workable legal framework.

Second, in terms of international policy, the use of HE should not conflict with the just war theory, which "deals with the justification of how and why wars are fought."¹⁷² Just war theory and LOAC can be regarded as "nonidentical twins" – they share many similarities but have several important distinctions as well.¹⁷³ Originally, earlier international law scholars did not even differentiate just war theory and LOAC.¹⁷⁴ These two concepts later parted away, with just war theory becoming more of a philosophical theory and LOAC becoming more of a set of legal rules.¹⁷⁵ According to positivists, a key difference between them is that legal rules might be applied in a way without considering their underlying reasonings and justifications, whereas philosophical arguments are never detachable from reasonings.¹⁷⁶ This distinction, however, is apparently less important when the policy-oriented contextualist approach is adopted. Under the contextualist approach, thus, the question that should be addressed is whether interpreting Article 35(2) as requiring the consideration of side-effects of HE is in better congruence with the principles of just war theory in general and *ius in bello* in specific. This question should by no means be challenging. First, just war theory is "rooted

¹⁷¹ *Id.* at 122.

¹⁷² Alexander Moseley, *Just War Theory*, INTERNET ENCYCLOPEDIA OF PHILOSOPHY, <https://iep.utm.edu/justwar/>.

¹⁷³ See David Luban, *Just War Theory and the Laws of War as Nonidentical Twins*, 31 ETHICS & INT'L AFF. 433, 433-40 (2017).

¹⁷⁴ See *id.* at 434.

¹⁷⁵ See *id.*

¹⁷⁶ *Id.* at 437-38.

in the concept of our common humanity.”¹⁷⁷ And the principle of humanity is one of the “cardinal principles” of the just war theory.¹⁷⁸ In fact, it is also the most important foundation of Article 35(2).¹⁷⁹ Although there have not been many articles discussing the application of this principle to address the relationship between a state and its own warfighters, it would be unreasonable to argue that common humanity allows a state to incur disproportionate harm to its people to achieve its goals. In any case, a just war shall be a competition of comprehensive national power instead of a competition that incurs more harm to one’s own citizens. Second, the *jus in bello* principle of proportionality prohibits military actions that cause harm that is disproportionate to military objectives.¹⁸⁰ In conducting the proportionality analysis, it is required to balance “the goals sought through war” against all “physical and moral evils war will bring with it.”¹⁸¹ Side-effects of military HE are clearly and exactly such “evils” brought by armed conflicts, and thus they must be considered.

IV. CONCLUSION

With global frictions becoming increasingly severe, several tragic regional conflicts occurred in recent years. Such warfare has inflicted grievous harm and reminded us of the importance of having a robust LOAC framework regulating the ways by which states fight. Unfortunately, LOAC rules have not been faithfully followed, and grave breaches included the observation of the intentional killing of civilians.¹⁸² This is an alarming signal. To be sure, merely relying upon LOAC

¹⁷⁷ Erich Freiberger, *Just War Theory and the Ethics of Drone Warfare*, E-INT’L REL. (Jul. 18, 2013), <https://www.e-ir.info/2013/07/18/just-war-theory-and-the-ethics-of-drone-warfare/>.

¹⁷⁸ Lieutenant Commander Luke A. Whittemore, *Proportionality Decision Making in Targeting: Heuristics, Cognitive Biases, and the Law*, 7 HARV. NAT’L SEC. J. 577, 598 (2016).

¹⁷⁹ *See id.*

¹⁸⁰ *See* John F. Coverdale, *An Introduction to the Just War Tradition*, 16 PACE INT’L L. REV. 221, 268 (2004).

¹⁸¹ *Id.*

¹⁸² *See, e.g.*, Tara John, Jonny Hallam, & Nathan Hodge, *Bodies of ‘executed people’ strewn across street in Bucha as Ukraine accuses Russia of war crimes*, CNN (Apr. 3, 2022, 6:49 PM), <https://perma.cc/PC6Q-Q62T>.

might not always be able to deter rogue states like Russia. However, situations can only get substantially worse without a set of workable LOAC rules and principles. Nevertheless, as many scholars have already warned, LOAC rules have not been able to “keep pace with the evolution of how and why states fight.”¹⁸³ An important reason is that many terms of LOAC treaties are very broad and thus can lead to confusion and disagreements as to how they should be applied. Unfortunately, the current situation of international politics makes it highly unlikely, if not totally impossible, that a new and better-written LOAC treaty will be signed and ratified by all members of the U.N. Security Council, not to mention one that can be signed and ratified by all countries. Therefore, it shall be a very high priority to revive and clarify the meaning of current LOAC treaties as applied to modern and future warfare. The failure of doing so has not only jeopardized the international order but also led to confusion within the executive branch and military community which might negatively influence our military operations.¹⁸⁴

This paper aims to contribute to this mission by discussing the possible application of the current LOAC framework to regulate the use of military HE on the battleground. This topic will be vital in future warfare because of military HE’s potential to effectively contribute to military operations and cause severe side effects to enhanced warfighters simultaneously. This paper proposes a method-based approach, under which employing military HE will be a prohibited method of warfare if (1) it is meant to make an effective contribution to a military operation, and (2) its normal or expected use will inevitably lead to the suffering of enhanced soldiers caused by side effects of such HE that is disproportionate to its military effectiveness.

¹⁸³ Watts, *supra* note 78, at 368.

¹⁸⁴ See, e.g., David Fickling, *Geneva Conventions Vague, Says Bush*, THE GUARDIAN (Sept. 15, 2006), <https://www.theguardian.com/world/2006/sep/15/usa.davidfickling1>.