

**THE DEVELOPMENT OF KINETIC IMPACT PROJECTILES SINCE 2000**  
**THE DEMATERIALIZATION OF VIOLENCE THROUGH "LESS-THAN-LETHAL"**  
**WEAPONS DEPLOYMENT SINCE 2000**

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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The law enforcement schema of the United States stands to reinforce the status quo of the state apparatus. Although we remain adhered to the title of liberal democracy, displays of power act to quench dissent, a rising feature of a world made inequitable by historical decision-making. In 2020, as has become commonplace since the rise of alternative globalization demonstrations in the 1990s, United States law enforcement continues to use “non-lethal” weapons against protestors advocating against police violence (Shantz, 2012, p. 11). This use of force extends past local agencies and into federal paramilitary deployments in Portland, Chicago, New York, Philadelphia, Detroit, and more which actively sidestep choices by localities to limit the use of these “less-lethal” alternatives (Baker et al., 2020).

The state-of-the-art technical and STS projects work to analyze these weapons through their development and use within the institutional context of the United States since 2000. The technical report focuses solely on the development of Kinetic Impact Projectiles (KIPs), a class of “less-lethal” ammunition, over this period. The STS research project applies Normalization Process Theory (NPT) to explore how use-of-force criteria, the expanded use of “less-lethal” weapons, and the formation of institutional normalcy acts to dematerialize violence, reinforce state power, and undermine human rights in internal state policing. These research elements, to be completed over the next six months, are tightly coupled explorations of how these weapons came to be, how they alter our understanding of the world, and where these worries can be mitigated into the future.

### **BULLETS, BATONS, AND BEAN BAGS**

The idea of the bullet, the baton, and the bean bag seem to show a progression in force and violent tendency. A common understanding of a bullet is primarily in their lethal metallic form. The baton becomes something with a purpose to strike, but likely not kill. The bean bag is

simply a toy or perhaps even a piece of lounge furniture. These components, however, all remain pieces of this “less-lethal” question, as they have been coated in rubber and sold as solutions to a nation’s grievances.

“Less-than-lethal, Less-lethal, Non-lethal” all refer to a category of weapon that intends not to kill a target, but rather to temporarily incapacitate. Including ammunitions, explosives, chemical agents, electroshock devices, and directed energy devices, law enforcement agencies and militaries often use these objects to limit perceived anti-state or criminal actions by civilians or non-active combatants. More precisely, the United States Department of Defense defines “non-lethal” weapons through its DoD Directive 3000.03E as:

Weapons, devices, and munitions that are explicitly designed and primarily employed to incapacitate targeted personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment. [Non-lethal weapons] are intended to have reversible effects on personnel and materiel. (Department of Defense, 2018).

The Department of Defense goes further to define incapacitation and reversible effects. To incapacitate is “to disable, inhibit, or degrade one or more functions or capabilities of a target to render it ineffective” and reversible effects are defined by “the ability to return the target to its pre-engagement functionality, usually measured by the time and level of effort required for recovery of the target” (Department of Defense, 2018).

Within this now-defined scope of “non-lethal” weaponry, there exist Kinetic Impact Projectiles (KIPs). KIPs are a class of “less-than-lethal” ammunition used by police across the United States and the world. Typically known as rubber bullets, rubber batons, or bean bag rounds, security forces, in-particular the 31% of police departments whose officers or supervisors actively carry these rounds, use these arms to disperse crowds deemed unlawful by the state (Smith et al., 2010, p. 3-7).

Historically, The National Institute of Justice (NIJ) led much of the research into the development of these weapons, alongside academic and governmental partners such as the Institute for Non-Lethal Defense Technologies (INLDT) at Penn State University and the Department of Defense (DoD) (Cecconi, 2005). In 2000, “the NIJ had 17 ongoing projects on “non-lethal weapons” that had begun during the mid to late 1990s. The focus of research was on safety and effectiveness studies of blunt impact projectiles and OC (“pepper spray”)” (Davidson, 2009, p. 70).

After the September 11, 2001 attacks on the World Trade Center, the role of the NIJ grew to fill the expanded security task of a PATRIOT Act America. This research even included the arming of strategic civilian personnel on-board airplanes when The Aviation and Transportation Security Act called upon the NIJ to “assess the range of less-than-lethal weaponry available for use by a flight deck crewmember” (Aviation and Transportation Act, 2001). Shown in Figure 1, the formation of an expanded “less-lethal program” integrated a number of public and private institutions towards a common goal which highlighted the need to force compliance on suspects and prisoners.

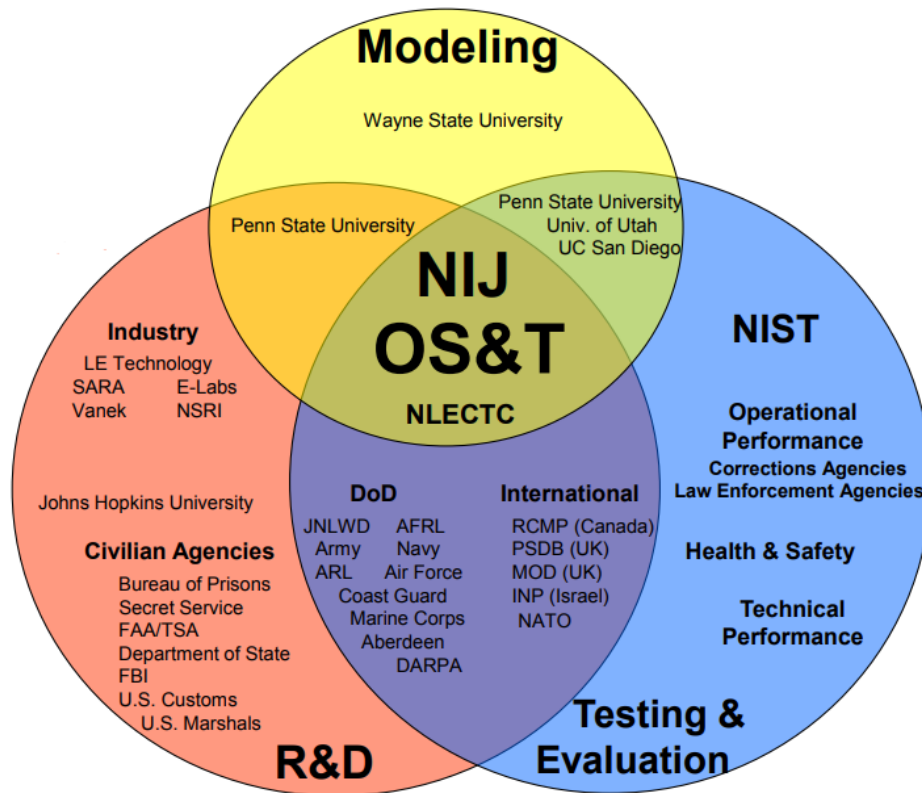


Figure 1: Organizational “Less-Lethal Program” Map. This figure shows the role that each public and private entity held within the “less-lethal program”. The number and scale of the institutions differs greatly within the given circles with a majority of the actors focused on research and design. (Cecconi, 2005, p. 50).

As more institutions adopted these technologies, questioning rose from “organizations such as Amnesty International and the American Civil Liberties Union” over the role these devices play (Albert et al., 2011, p. 1). During this period, as a result of the Iraq War and other associated administrative measures by then-president George W. Bush, civil disobedience and direct action in the United States continued to rise (Heaney & Rojas, 2007). Additionally, previous trends toward protest management by police already resulted in new elements of targeting, including surveillance and targeted arrest, which avoid the negative stigma produced by police action deemed violent (Gillham & Noakes, 2007).

As a common deterrent, research focused on safety and effectivity increased to counter these claims. Still, in the period from 1990 to 2017, the use of Kinetic impact projectiles (KIPs)

by law enforcement agencies resulted in permanent disability and death in 15% and 3% of cases, respectively (Haar et al., 2017, p. 3).

Institutional research funded by the National Institute of Justice balanced these claims by pushing the idea of the Taser and pepper spray. In 2010, analysis “showed that pepper spray use reduced the likelihood of injury to suspects by 70 percent”, while increasing the risk of officer injury to 39 percent (Albert et al., 2011, pg. 13). Additionally, Conductive Energy Devices (CEDs), or Tasers, “significantly reduced the likelihood of injuries” (Albert et al., 2011, pg. 14). These claims follow from language which ignored the disparity between officer risk of injury and suspect risk of injury. Additionally, the research limited the scope of “healthy” adults, claiming that the risks of CEDs “are clinically insignificant in healthy individuals but [they] could be harmful or even life threatening in at-risk populations (e.g., obese subjects with heart disease and/or intoxicated on drugs who struggle with police)” (Smith et al., 2010, p. 22). Of note, at least 12.1% of the United States population falls within this at-risk category (Blackwell et al., 2014).

This shift away from a critical study of KIPs as best paths forward marks an increased body of evidence which shows blunt impact devices shot from the barrel of a gun with 3,500 Newtons of force are dangerous to human health and life (Raymond et al., 2009). Despite this, KIPs are still in use with the DoD Non-Lethal Weapons Program deploying a “Spider Non-Lethal Launcher” since 2013 which “fires two variants of non-lethal effects (sting ball and flash bang) and adds increased escalation-of-force capability to units executing area denial missions” (Department of Defense, 2015).

The aim of the technical topic is therefore to study the state-of-the-art within the technological context of “Less-than-lethal” kinetic impact projectiles in the period since 2000. The objective for this work lies in building an understanding of the technological development of

these ammunitions and to outline any institutionally delineated paths forward through a state-of-the-art scholarly article.

## **A REFORMATION OF LETHALITY**

“Less-lethal” weapons build their common understanding by operating on their root idea of lethality. We understand the concept of “non-lethal” only inasmuch as we understand the concept of lethal. This idea of lethality has so conjoined itself with the idea of violence that the common image of violence is one that causes direct bodily harm, the significance of which is altered by our perceptions of the one committing the act, but focuses on the proximity placed away from full health. The aforementioned definitions of non-lethal weapons by the DoD further this by simply pushing the idea of reversible incapacitation rather than a clear avoidance of serious injury or death. Mark Vorobej, associate professor of philosophy and director of the Centre for Peace Studies at McMaster University in Canada, points out that the Oxford English Dictionary definition “emphasizes what individuals *do* to others, at the cost of ignoring what *happens* to people” (Vorobej, 2016, p. 52). This common definition ignores structural violence or that inherent in policing or war.

## **THE DEMATERIALIZATION OF VIOLENCE**

When applied to war and social conflicts with power apparatuses, Brad Evans, political philosopher and critical theorist, describes the “emergent dematerialization of the consequences of violence... as a war against the critical witnessing of war” (Evans & Lennard, 2018). For many individuals, the understanding of violence in these sanctioned corners of society, whether it be the street protest or the warfront, is separated both symbolically and materially from their existence. Part of this symbolic interplay is normativity, one of the five fundamental dimensions

of violence defined by Vorobej alongside harm, agency, victimhood, and instrumentality (Vorobej, 2016, p.4). For within the status quo, an individual would perceive those who act against the state as a form of other, less they, too, are explicitly sympathetic, which itself is limited if they are not directly taking part in the material reality of those acting as “others”. This otherness is associated with a form of dehumanization as media forms and interpersonal conversation discuss abstract groups of others whether it be “protestors”, “terrorists”, or “rioters”. Symbolic annihilation of non-lethal violence by the state occurs specifically in this case when the common definition of violence, media representations of violence, and the experience of violence all lack the ability to fully grasp the reality of non-lethal weapons as used in policing and war. Combining these aspects of power and privilege, violence is made entirely symbolic and foreign.

Our ability to critique the reformation of lethality is worsened by the relation to death in our society. Health is the premier quality of our life that is understood with death simply being its absence. It is quantified through measurements of height, weight, and intelligence and distributed to people through articles, papers, and charts telling individuals the best way to live their life in health. For example, this quantification goes as far as representing the COVID-19 pandemic as simply a line graph which fundamentally fails to portray the human toll or reality of death, as seen in Figure 2 on page 8. Meanwhile, associated news operates to recommend best paths to “flatten the curve” or stay healthy, rather than explicitly tackling the existential risk surrounding society (Roberts, 2020). Altogether, the idea of death is held at a distance. The reality of it is made abstract and its symbolic value made null or only active as a negation of life. As stated by Baudrillard, “at the very core of the “rationality” of our culture is an exclusion that precedes every other... preceding all these and serving as their model: the exclusion of the dead and of death” (Baudrillard, 1993, p. 126).



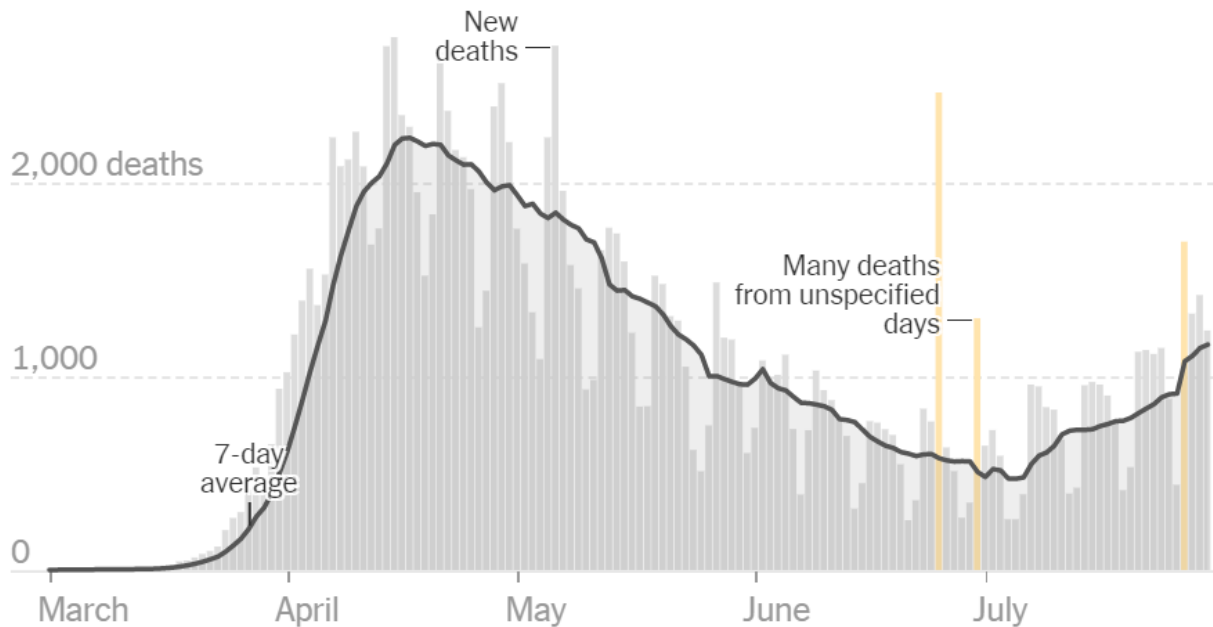


Figure 2: COVID-19 Deaths by Day: This line graph seeks to represent the reality of death, but acts to further separate the sign from the signified. The graph uses a specific visual form as a sign of the underlying data which must be interpreted. Death, as is signed through these data, still remains within societal confines which restrict the public experience of material nonexistence. (The New York Times, 2020).

This phenomenon is intertwined with the ease at which state forces can use power. It is expected, given that the state is an entity with a monopoly on violence, that, as the state modifies its idea of violence and perpetuates these acts through media and policy, a positive feedback loop would begin which deconstructs the freedom of people (Weber, 1978). This investment in a kind of hyperindividualistic, state-centered policing brings with it an increased denial of codified human rights when the state is challenged. John B. Alexander, a senior fellow at the Joint Special Operations University from 2005 to 2015, in “Non-Lethal Weapons: No Road to Hell” expressed this dehumanization in crude language when responding to the risk non-lethal weapons pose to people with disabilities, as shown in Figure 3 on page 9. It should be noted that the Joint Special operations University is an agency within the United States Special Operations Command tasked

with providing “relevant SOF-specific education to ... partners to influence the current and future strategic environment” (Joint Special Operations University, 2020)

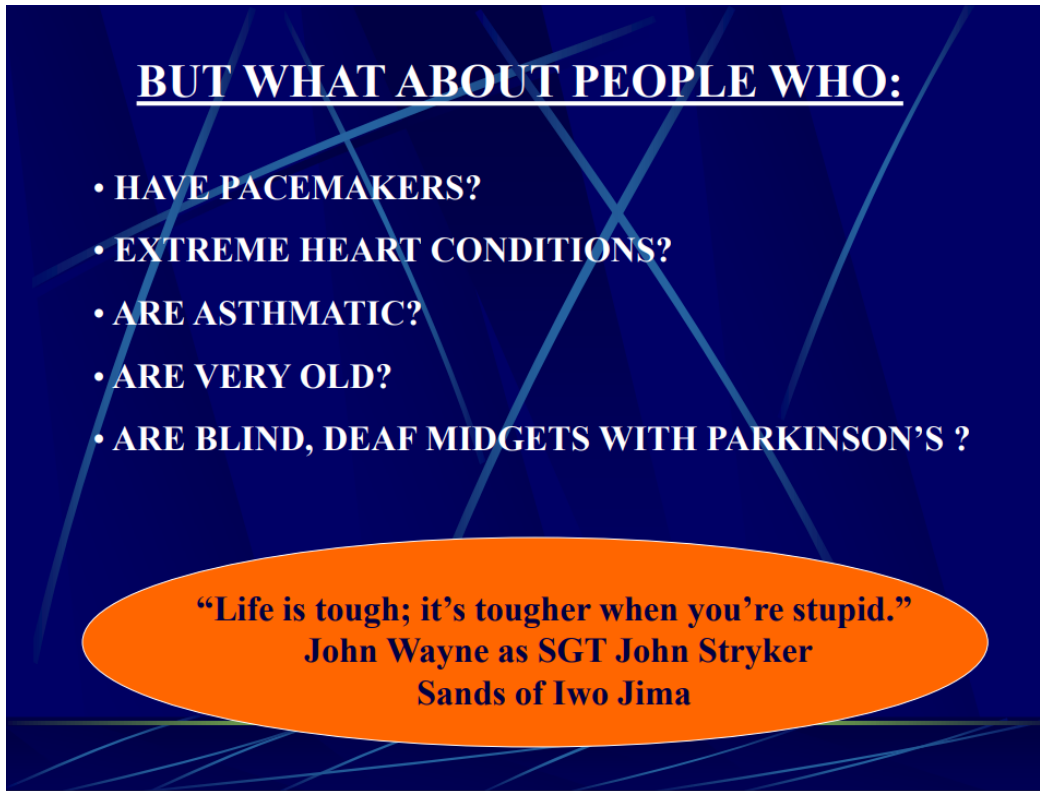


Figure 3: Institutional Discussion of Lethality. This slide from John Alexander shows the kind of language used around the risk of “less-lethal” weapons by those in key state institutions. Possible harm is justified against the elderly and people with disabilities by ignoring the decision of state actors, instead highlighting the supposed stupidity in challenging the state. (Alexander, 2005, p. 34).

## **THE POLICY OF STATE ESCALATION**

“Less-lethal” weapons allow the beginning of the dematerialization process by precipitating a symbolic evaluation of human life. More specifically, the use of force continuum, a standardized, agency-level guideline for when a degree of force is deemed necessary, is a subjective notion that is projected by administrative policy onto the officer (Walker, 1993, p.23). The ability to enact this evaluation is, in and of itself, the application of a norm. Even today,

while a vernacular understanding of “less-lethal” weapons excites the prospect of de-escalation, an NIJ non-lethal weapons review explicitly states, “law enforcement officers should never consider less-lethal weapons to be a replacement for the legal use of lethal force; rather, they should use less-lethal weapons as an instrument of force in the continuum between show of force or verbal commands and deadly force” (National Security Research, Inc & United States of America, 2002, p.61). Coupled with another finding by the NIJ that, while in interviews with officers, “researchers heard comments that hinted at a “lazy cop” syndrome” which meant that officers may turn to “less-lethal” weapons too early rather than rely on conflict resolution skills,” the use of “less-lethal” weapons begins to act more as a tactic for escalation and a reinforcement of power which avoids the pitfalls of overtly lethal threats against free citizens (Albert et al., 2011, p.16).

## **NORMALIZATION PROCESS THEORY**

The ability for the state to turn these ideas of violence into agency-level and societal-level norms is understood through an application of Normalization Process Theory (NPT). Initially developed for use in healthcare, NPT is a formal middle-range STS theory which seeks to explain the adoption of innovations within institutional environments, while avoiding the constructions of agency around non-humans as is the case with Actor-Network Theory (Callon, 1991; Latour, 1987). The general propositions of NPT are:

1. Material practices become routinely embedded in social contexts as the result of people working, individually and collectively, to implement them. From this follows specific propositions that assert that define a mechanism (*i.e.*, embedding is dependent on socially patterned implementation work).
2. The work of implementation is operationalized through four generative mechanisms (coherence, cognitive participation, collective action, reflexive monitoring). From this follows specific propositions that define components of a mechanism (*i.e.*, those factors that shape socially patterned implementation work).

3. The production and reproduction of a material practice requires continuous investment by agents in ensembles of action that carry forward in time and space. From this follows specific propositions that define actors' investments in a mechanism (*i.e.*, how the mechanism is energized). (May et al., 2009, Appendix 4)

The method of applying this framework will be to examine the core constructs of NPT within a proper social and organizational context, as shown in Figure 4. These four core constructs are coherence, cognitive participation, collective action, and reflexive monitoring which are all defined by their relationship to routine embedding, embedding work, and the production and reproduction of a practice.

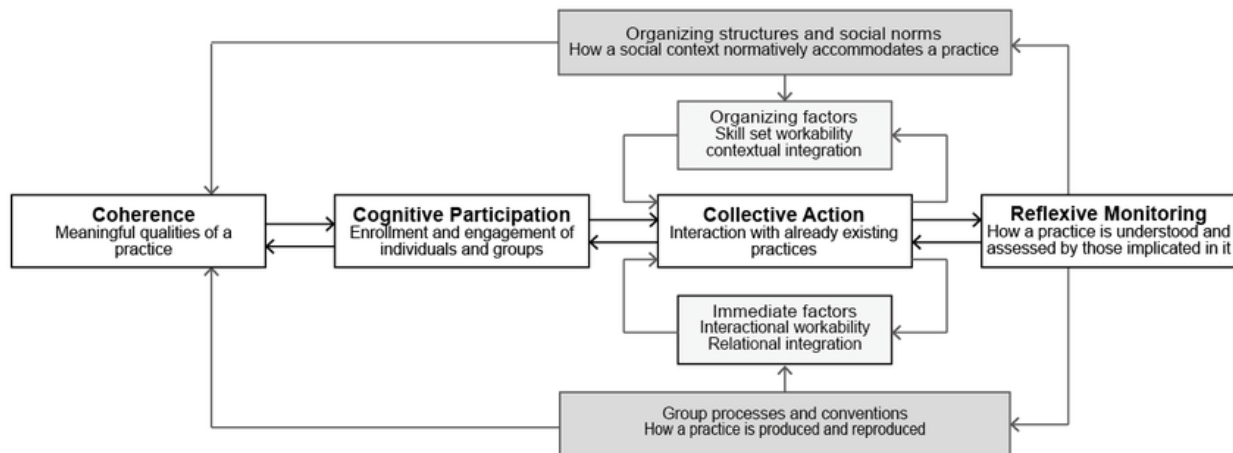


Figure 4: NPT Concept model. This figure outlines the base constructs of NPT and their interactions with the social and organizational structures relevant to a given institutional innovation or practice. The constructs themselves represent the interplay between the production of a practice and the scripting of normativity. (Vis et al., 2019).

Coherence will be examined through the construction of policing. Use-of-force continuums and any associated trainings will pass through the lens of semiotics to analyze the meaning and necessity of use of force as it guides the action of policing. Cognitive participation involves the organization and involvement of officers and suspects. Analyzed through rates of use, the extent to which an officer participates in the behavior remains key. Collective action

looks at the actual operationalization of “less-lethal” weapons through the dissemination of materials and the policies around enacting the use of said weapons. Reflexive monitoring focuses on the common understanding of the use of “less-lethal” weapons and the degree to which individuals invest in the understanding of their use. When these factors act together, it can be expected that the practice is working toward the formation of a norm.

It is expected that the key areas which may alter behavior, should norm-setting be revealed, are coherence and collective action. Coherence in the belief of meaning behind the use of “less-lethal” weapons when in a global context relies on the silencing of outside institutional pressures which may dissent with action, or the alignment with ones which agree. The justification for many forms of violence by the state lie in necessity, proportionality, legality, and accountability (American Association for the International Commission of Jurists, 1985). In crowd control spaces, this idea of proportionality which is the basis for many use of force recommendations is problematized (Hoffberger, 2017). Given that it is a core driver of use of force recommendations, a challenge to this pillar fundamentally shifts the meaning of “less-lethal” use.

A similar effect of outside pressures is presented through collective action, as can be seen in the operational scenarios for US law enforcement when pressured to work with the North Atlantic Treaty Organization (NATO). More specifically, US law enforcement must “capture useful operational input in a form consistent with the accepted NATO framework, but with a focus on US law enforcement operational needs” (Institute for Non-Lethal Defense Technologies, & United States of America, 2010, p. 10).

This analytical STS report will look at each of these factors to understand the implications of “less-lethal” weapons and their deployment among United States police

departments, while informing methods to mitigate any harm done towards our understanding of life within and around the state.

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