

# The Varied Roads to Armageddon

## Unpacking the Use-It-Or-Lose-It Dilemma\*

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### Abstract

The use-it-or-lose-it dilemma has long been a staple of theorizing about deterrence and nuclear weapons. It has undergirded explanations for everything from strategic stability and escalation dynamics to nuclear strategy and arms control. The dilemma appears, at first glance, highly intuitive, and scholars have typically employed it without further elaboration, confident that both they and the reader appreciate its underlying logic. However, upon closer inspection, the dilemma and the escalatory pressures it is believed to produce, are more puzzling, if not wholly irrational. Here, I resolve the puzzle inherent in the use-it-or-lose-it dilemma by identifying the various mechanisms by which it can encourage nuclear use, sketching three non-rational mechanisms and more fully elaborating three rational mechanisms. Disaggregating and specifying these mechanisms enriches our understanding of a concept ubiquitous in the literature and sheds new light on potential escalation dynamics in an interstate crisis or conflict.

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The use-it-or-lose-it dilemma has long been a staple of theorizing about deterrence and nuclear weapons. It has undergirded explanations for everything from strategic stability and escalation dynamics to nuclear strategy and arms control. The dilemma appears, at first glance, highly intuitive, and scholars have typically employed it without further elaboration, confident that both they and the reader appreciate its underlying logic. However, upon closer inspection, the dilemma and the escalatory pressures it is believed to produce, are more puzzling, if not wholly irrational.

In the simple, implicit model of the use-it-or-lose-it dilemma, two nuclear-armed states confront one another in a crisis or conflict. For at least one of those states, the survivability of its nuclear arsenal is so fragile that the adversary could execute a disarming first strike. In this situation, the nuclear inferior state faces a Sophie's choice. It can launch its nuclear arsenal now, inviting certain and destructive retaliation by the adversary. Or it can wait and risk certain and equally destructive disarmament. Scholars have reflexively interpreted this situation as encouraging nuclear first use on the part of the weaker state under the assumption that it is better to strike than not. But, upon closer examination, the decision to launch now offers no benefits. If the weaker state uses its nuclear weapons, its deterrent is expended and it is exposed to certain destruction from the adversary. On the other hand, if it does not expend its arsenal, it risks having its arsenal preemptively destroyed, again eliminating its deterrent and exposing it to certain destruction from the adversary. The state is damned if it does, damned if it doesn't. Presented in this way, the dilemma may encourage a nuclear strike, but not for wholly rational reasons. Although much of the scholarly literature has grappled with the inherent challenges of credibility and rationality posed by nuclear weapons, scholars deploying the use-it-or-lose-it dilemma in their analyses rarely specify the underlying logic driving it. Further, in failing to articulate or interrogate that logic, scholars and policy analysts have missed important variation in the pathways from the dilemma to nuclear escalation. The use-it-

or-lose-it dilemma is real and, in various forms, can encourage the use of nuclear weapons for irrational, arational, and rational strategic reasons.

Here, I describe that variation by identifying the various mechanisms by which the use-it-or-lose-it dilemma can promote nuclear use. I sketch three non-rational mechanisms and more fully discuss three rational mechanisms. Some of these mechanisms have previously been identified in the literature, whether explicitly or implicitly. However, scholars who invoke the concept to explain interstate crisis or conflict dynamics rarely make explicit the underlying logic of these pressures. In doing so, they conflate the various pathways by which the dilemma can influence interstate dynamics. Here, I unpack the dilemma to reveal the important variation in its forms. In doing so, I systematize and specify the different forms in which the use-it-or-lose-it dilemma may operate and identify the conditions under which those forms are more or less likely to arise.

I begin by discussing the use of the use-it-or-lose-it dilemma in the literature and briefly sketch the implicit model scholars often use to describe and assess the dilemma. Next, I identify three embedded assumptions in those models which, when relaxed, permit a more realistic accounting of use-it-or-lose it pressures and how those pressures can encourage a nuclear first strike. I then proceed to identify each of the three mechanisms by which use-it-or-lose it pressures can operate, discuss the conditions which are likely to make each mechanism more or less salient, and provide illustrative examples. Finally, I close with a discussion of the analysis and some concluding thoughts.

## **Use-It-Or-Lose-It Pressures in the Literature**

The use-it-or-lose-it dilemma is not the only domain in which nuclear weapons can promote seemingly irrational behavior. The world of nuclear weapons is suffuse with

paradox.<sup>1</sup> It's a world in which, according to the logic of deterrence, the hope of never using a nuclear weapon rests on the promise to use one. As Brodie recognized, a nuclear capability should "be always ready to spring while going permanently unused. Surely there is something almost unreal about all this."<sup>2</sup> It's a world where the enemy's attempts to shore up its defenses can be reassuring. Informed that the Soviet Union had begun to harden its ICBM silos, U.S. Secretary of Defense Robert McNamara reportedly responded "Thank God."<sup>3</sup> And it's a world where peace at one level can generate violence at another. The stability-instability paradox predicts that while the deterrent effects of strategic nuclear weapons may decrease the likelihood of large-scale war between two nuclear-armed states, they may simultaneously increase the likelihood of lower-scale conflicts.<sup>4</sup> Schelling demonstrated the strategic advantages of the "rationality of irrationality."<sup>5</sup>

The use-it-or-lose-it dilemma is ubiquitous in the literature on nuclear weapons. The Cold War arms control agenda was often centered on—or, at least, some theorists claim, should have centered on<sup>6</sup>—efforts to avoid the creation of use-it-or-lose-it pressures for either superpower since it was feared that such pressures could produce dangerous crisis instability.<sup>7</sup> At the end of the Cold War, Posen implicitly relied on the concept to explain how a conventional conflict between NATO and the Warsaw Pact could inadvertently escalate to the nuclear level.<sup>8</sup> One analyst has lobbied for the United States to adopt a no-first-use

1. Hans J Morgenthau, "The Four Paradoxes of Nuclear Strategy," *American Political Science Review* 58, no. 1 (1964): 23–35.

2. Bernard Brodie, *Strategy in the Missile Age* (Princeton, NJ: Princeton University Press, 1959), 273.

3. Eric Schlosser, *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety* (New York: Penguin, 2013), 302.

4. Glenn H Snyder, *The Balance of Power and the Balance of Terror in Paul Seabury (ed.) The Balance of Power, 1965, 198–199.*

5. Thomas C. Schelling, "Arms and Influence," (New Haven, CT), 1966, 219–233.

6. Thomas C Schelling, "What Went Wrong with Arms Control?," *Foreign Affairs* 64, no. 2 (1985): 219–233.

7. Thomas C Schelling and Morton H Halperin, *Strategy and Arms Control* (New York: The Twentieth Century Fund, 1961); Robert Jervis, "Arms Control, Stability, and Causes of War," *Political Science Quarterly* 108, no. 2 (1993): 239–253.

8. Though Posen does not explicitly use the term "use-it-or-lose-it," the underlying logic is clear in his three-part model. Barry R Posen, "Inadvertent Nuclear War?: Escalation and NATO's Northern Flank," *International Security* 7, no. 2 (1982): 28–54; Barry R Posen, *Inadvertent Escalation: Conventional War and Nuclear*

nuclear policy, in part, to reduce the possibility of creating a use-it-or-lose-it dilemma for an adversary.<sup>9</sup> The use-it-or-lose-it dilemma has been used to explain the dangerous escalation pressures that could arise in a conflict between India and Pakistan.<sup>10</sup> More recently, scholars have used the dilemma to highlight the escalation risks stemming from misperception and possible conventional-nuclear entanglement in a conflict between China and the United States.<sup>11</sup>

However, despite their propensity for invoking the concept, scholars rarely specify the mechanisms by which these pressures could induce a nuclear first strike on the part of the pressured state. In fact, in its simplest form, the first use of nuclear weapons under conditions of mutual vulnerability, even in the face of use-it-or-lose-it pressures, is still irrational.<sup>12</sup> Typically presented as a stark choice between either preemptively using all of its nuclear arsenal or having all of that arsenal destroyed, this implicit model seems to permit no room for the rational use of nuclear weapons.<sup>13</sup> Framed in this way, the pressured (and presumably inferior) state faces a choice between certain annihilation in case it preemptively uses its weapons and certain annihilation in the case it does not.<sup>14</sup> Indeed,

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*Risks* (Ithaca, N.Y.: Cornell University Press, 1991).

9. Michael S Gerson, "No First Use: The Next Step for U.S. Nuclear Policy," *International Security* 35, no. 2 (2010): 38.

10. Zia Mian, R. Rajaraman, and M. V. Ramana, "The Infeasibility of Early Warning," in *Confronting the Bomb: Pakistani and Indian Scientists Speak Out*, ed. Pervez Hoodbhoy (Oxford: Oxford University Press, 2013), 116–42; Christopher Clary and Vipin Narang, "India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities," *International Security* 43, no. 3 (2019): 7–52.

11. Avery Goldstein, "First Things First: The Pressing Danger of Crisis Instability in U.S.-China Relations," *International Security* 37, no. 4 (2013): 49–89; Joshua Rovner, "Two Kinds of Catastrophe: Nuclear Escalation and Protracted War in Asia," *Journal of Strategic Studies* 40, no. 5 (2017): 696–730; Caitlin Talmadge, "Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States," *International Security* 41, no. 4 (2017): 50–92.

12. Indeed, in the paradoxical world of nuclear weapons, even a retaliatory nuclear strike could be considered irrational. Once deterrence has failed, as signaled by the first nuclear strike, the deterrent value of one's own nuclear arsenal has evaporated. John Steinbruner, "Beyond Rational Deterrence: The Struggle for New Conceptions," *World Politics* 28, no. 2 (1976): 223–245; Harold A Feiveson, "The Dilemma of Theater Nuclear Weapons," *World Politics* 33, no. 2 (1981): 282–298.

13. Michael S. Gerson, "Concepts of Deterrence in the 21st Century: Some Things Old, Some Things New," in *NATO and 21st Century Deterrence*, ed. Karl-Heinz Kamp and David S. Yost (Rome: NATO Defense College, 2009), 164.

14. The expected probability of annihilation in the case of not launching a preemptive nuclear strike may

as one recent work critiquing the logic of the use-it-or-lose-it dilemma has argued, "We may suppose that if a weaker adversary believes that it is about to be hit first with nuclear weapons and wiped out, then it may take a chance on striking first to try to inflict pain on the major power in order to compel that major power to back down. But why would the major power back down if the adversary has already expended its arsenal, making it more vulnerable to a devastating riposte?"<sup>15</sup> This critique embodies an implicit model of the use-it-or-lose-it dilemma which scholars have repeatedly deployed, whether in applying the use-it-or-lose-it dilemma or critiquing it. In it, a weaker state is in conflict or crisis with a stronger adversary. Both are nuclear-armed. But the weaker state's capabilities are so meager by comparison that, if the stronger adversary so chose, it could execute a complete and sudden disarming first strike against it.

Accepting the conditions embodied in this implicit model, it is still possible for the pressured state to launch a nuclear first strike for either irrational or arational reasons. First, state leaders confronting the use-it-or-lose it dilemma, even if facing certain annihilation, may draw emotional utility from inflicting damage on the enemy. Facing the shadows and ash of an impending nuclear strike, state leaders may launch their bombs, not to obtain any strategic or material gain, but only to hurt the enemy.<sup>16</sup> Emotions, including revenge, can be powerful forces in the conduct of interstate relations, especially when nuclear weapons are involved. Scholars have argued that a state is most likely to seek revenge when it believes the harm it suffers is morally outrageous, when it feels humiliated, and when "international retaliation is institutionalized by rules and laws that govern the use of cross-border force."<sup>17</sup> What would be more morally outrageous, more humiliating,

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still be high, but it is almost certainly lower than if the state were to launch preemptively.

15. Alexander Lanoszka and Thomas Leo Scherer, "Nuclear Ambiguity, No-First-Use, and Crisis Stability in Asymmetric Crises," *The Nonproliferation Review* 24, nos. 3-4 (2017): 350-351.

16. Rose McDermott, Anthony C Lopez, and Peter K Hatemi, "'Blunt Not the Heart, Enrage It': The Psychology of Revenge and Deterrence," *Texas National Security Review* 1, no. 1 (2017): 68-88.

17. Oded Löwenheim and Gadi Heimann, "Revenge in International Politics," *Security Studies* 17, no. 4 (2008): 685.

and more counter to the decades of non-use and just war principles of proportionality and discrimination than the prospect of a nuclear strike?<sup>18</sup> The underlying biological and emotional mechanisms driving the desire for revenge may have evolved to serve an instrumental deterrent purpose. But, as McDermott, Lopez, and Hatemi illustrate, those mechanisms also operate independently: "Revenge is not motivated by the rational expectation of future deterrence. It is instead driven by the intrinsic pleasure that one expects to experience upon striking back."<sup>19</sup> This mechanism is more likely to operate in state dyads featuring long-standing enmity, oppositional ideologies, or strident nationalism.

Second, the expectation that a nuclear-armed state might confront these kinds of pressures can encourage it to adopt a more assertive nuclear posture precisely to avoid or mitigate the dilemma. The leaders of a weaker nuclear-armed state may believe that adopting a more assertive nuclear posture, one which both decentralizes command and permits faster launches, will increase the survivability of its nuclear forces. A more assertive posture, characterized by peacetime targeting, launch-on-warning, and pre-delegation, could increase the likelihood of an accidental or unauthorized launch. As Sagan illustrates, nuclear weapons programs are characterized by tight coupling (systems with time-invariant processes) and interactive complexity (many interconnected and unplanned processes).<sup>20</sup> These characteristics create systems which are prone to unplanned accidents. The U.S. alone has experienced at least several dozen accidents involving nuclear weapons.<sup>21</sup> In the case of nuclear weapons, the risks inherent to any interactively complex and tightly

18. Nina Tannenwald, "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use," *International organization* 53, no. 3 (1999): 433–468; Nina Tannenwald, *The Nuclear Taboo: The United States and the Non-Use of Nuclear Weapons since 1945* (Cambridge University Press, 2007); Jeffrey G Lewis and Scott D Sagan, "The Nuclear Necessity Principle: Making U.S. Targeting Policy Conform with Ethics & the Laws of War," *Daedalus* 145, no. 4 (2016): 62–74.

19. McDermott, Lopez, and Hatemi, "'Blunt Not the Heart, Enrage It': The Psychology of Revenge and Deterrence," 21.

20. Scott Douglas Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton University Press, 1995).

21. Eric Schlosser, *Command and control: Nuclear Weapons, the Damascus Accident, and the Illusion of Safety* (New York: Penguin, 2013).

coupled system can be further exacerbated by organizational pathologies in the military bureaucracies entrusted with the weapons.<sup>22</sup> This mechanism is more likely to operate for states which are "immature" nuclear powers, meaning those which are relatively recent entrants to the nuclear club and those which have not yet developed comprehensive systems for securing and managing their nuclear weapons.

Finally, state leaders may launch a nuclear first strike for strictly "irrational" reasons. Irrational, of course does not mean impossible. Indeed, individuals confronted with time constraints, induced stress, and uncertainty are more likely to resort to decision-making styles vulnerable to cognitive errors.<sup>23</sup> These are the very conditions that abound in interstate crises and conflicts. According to one recent review of the neurobiological and behavioral studies literature, "when stressed, individuals tend to make more habitual responses than goal-directed choices, be less likely to adjust their initial judgment, and rely more on gut feelings in social situations."<sup>24</sup> Studies have shown that the presence of acute stressors induce individuals to resort to cognitive heuristics of the kind representative of intuitive decision-makers.<sup>25</sup> This is a recipe for irrationality. Indeed, a recent accounting of U.S. wargames during the Cold War found that, in every instance in which a team used nuclear weapons, the constraints of the crisis environment played a role.<sup>26</sup> According to

22. Scott D Sagan, "The Perils of Proliferation: Organization Theory, Deterrence Theory, and the Spread of Nuclear Weapons," *International Security* 18, no. 4 (1994): 66–107; Posen, "Inadvertent Nuclear War?: Escalation and NATO's Northern Flank"; Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks*; Jack Snyder, "Civil-Military Relations and the Cult of the Offensive, 1914 and 1984," *International Security* 9, no. 1 (1984): 108–146; Jack Snyder, *The Ideology of the Offensive: Military Decision Making and the Disasters of 1914*, vol. 2 (Cornell University Press, 1989); Stephen Van Evera, "The Cult of the Offensive and the Origins of the First World War," *International security* 9, no. 1 (1984): 58–107.

23. Vicki R LeBlanc, "The Effects of Acute Stress on Performance: Implications for Health Professions Education," *Academic Medicine* 84, no. 10 (2009): S25–S33; Rongjun Yu, "Stress Potentiates Decision Biases: A Stress Induced Deliberation-to-Intuition (SIDI) Model," *Neurobiology of stress* 3 (2016): 83–95.

24. Yu, "Stress Potentiates Decision Biases: A Stress Induced Deliberation-to-Intuition (SIDI) Model," 83.

25. Yavin Shaham, Jerome E Singer, and Monica H Schaeffer, "Stability/Instability of Cognitive Strategies across Tasks Determine Whether Stress Will Affect Judgmental Processes," *Journal of Applied Social Psychology* 22, no. 9 (1992): 691–713.

26. Reid BC Pauly, "Would U.S. Leaders Push the Button? Wargames and the Sources of Nuclear Restraint," *International Security* 43, no. 2 (2018): 183–186.

one wargame participant at the time, "If the US team had had more time to talk, it probably would have decided not to use nuclear weapons after all."<sup>27</sup> This mechanism is more likely to operate for immature nuclear powers and for states led by leaders featuring low levels of cognitive complexity. When it comes to nuclear weapons, experience matters. At the level of the state, Horowitz finds the likelihood of a nuclear-armed state to either reciprocate a militarized challenge or have its own militarized challenge reciprocated decreases over time.<sup>28</sup> At the level of the individual, research has demonstrated that deep relevant experience in a given area can reduce cognitive errors in decision-making related to that area.<sup>29</sup> States with less experience with nuclear weapons and crises involving them may be more likely to act in seemingly irrational ways. Similarly, and apart from variations stemming from experience, the state's susceptibility to irrational behavior may also vary with cognitive characteristics of the leader, as Rathbun demonstrates how variation in the cognitive styles of state leaders (whether highly intuitive or highly rational) can drive variation in state behavior.<sup>30</sup>

Having identified three irrational or arational reasons a state confronting the use-it-or-lose-it dilemma might choose to launch its nuclear weapons, I now move to a discussion of the rational strategic mechanisms by which the use-it-or-lose-it dilemma can induce a nuclear first strike on the part of the pressured state.

27. Pauly, "Would U.S. Leaders Push the Button? Wargames and the Sources of Nuclear Restraint," 184.

28. Michael Horowitz, "The Spread of Nuclear Weapons and International Conflict: Does Experience Matter?," *Journal of Conflict Resolution* 53, no. 2 (2009): 234–257.

29. See, for example, John A List, "Does Market Experience Eliminate Market Anomalies?," *The Quarterly Journal of Economics* 118, no. 1 (2003): 41–71; Lester CP Tong et al., "Trading Experience Modulates Anterior Insula to Reduce the Endowment Effect," *Proceedings of the National Academy of Sciences* 113, no. 33 (2016): 9238–9243.

30. Brian C Rathbun, *Reasoning of State: Realists, Romantics and Rationality in International Relations*, vol. 149 (Cambridge University Press, 2019).

## Implicit Models and Embedded Assumptions

Scholars have often employed implicit models like that outlined above to understand the concept of use-it-or-lose-it pressures and the limits of those pressures in (rationally) affecting state behavior. These implicit models contain three embedded assumptions which, together, make first use of nuclear weapons under conditions of mutual vulnerability appear irrational, regardless of the presence of use-it-or-lose-it pressures.

First, the implicit models assume complete and symmetric certainty on the part of both the pressured state and its adversary that a disarming first strike would succeed. The implicit model generally makes no room for uncertainty, either on the part of the weaker state or the strong one. However, the history of nuclear exchange modeling in the United States shows that state predictions about the outcomes of a nuclear strike were often fraught with uncertainty. Throughout the Cold War, various U.S. agencies attempted to quantify the number of fatalities that might result in a nuclear exchange with the United States.<sup>31</sup> These assessments exhibited significant uncertainty within assessment and variation across them. For example, one such assessment of the nuclear balance in 1962 conducted by the U.S. Department of Defense predicted that the United States would suffer anywhere from 4 to 85 million fatalities, while the Soviet Union would suffer anywhere between 10 and 95 million, despite the U.S. enjoying an advantage in total warheads of 25,000.<sup>32</sup>

Second, is the assumption that this complete destruction or disabling of the pressured state's nuclear arsenal will happen nearly instantaneously. If the pressured state faces the prospect of complete and (near) instantaneous disarmament, then it faces a stark choice

31. Author, working paper.

32. "Summary of Population Fatalities from Nuclear War in 1966 (In Millions)," U.S. Department of Defense, 17 February 1962.

in whether and how to use its nuclear arsenal. Any forces which are not used prior to the disarming strike will no longer be usable. However, even if an adversary is able, eventually, to complete a disarming first strike, it may not be able to accomplish it quickly enough to prevent a counterstrike, however limited that retaliatory attack may be. The longer the window between the destruction of the first nuclear asset and the last, the greater opportunity for the pressured state to maneuver strategically in response. The adversary may be able to destroy all of the pressured state's nuclear forces, but the time it takes to do so will likely grow with the size, sophistication, and diversity of the pressured state's nuclear forces.

The technical and military requirements necessary to successfully conduct a (nearly) simultaneous disarming strike are likely often tremendous and these requirements increase with the size, sophistication, and diversity of the opponent's nuclear forces. Forces must, in military vocabulary, "find, fix, track, target, engage, and assess" the nuclear systems of the adversary.<sup>33</sup> This can be complicated when those adversary systems are concealed, mobile, dispersed, and on varied platforms. The underlying question is not whether the state can successfully eliminate the adversary's nuclear forces, but whether it can do so quickly enough without giving the adversary time to respond.

Third, implicit models of use it or lose dynamics assume that the pressured state is confronted with a sharp choice between either using all of its nuclear arsenal or none of it. This third assumption proceeds logically from the first. If the pressured state faces certain and simultaneous impending disarmament, then there is no reason to save some of its capabilities. Any weapons which are not used now will necessarily be wiped out by the opponent and so, the logic, goes if one is to use any of the arsenal, one might as well use all of it. However, by relaxing these three assumptions, we permit the pressured state a wider (and more realistic) range of options in using its nuclear forces. Specifically, the

33. "Dynamic Targeting and the Tasking Process," U.S. Air Force Basic Doctrine, Annex 3-60.

pressured state may opt to launch a strike using only part of its arsenal, while reserving the rest of it for follow-on strikes or deterrent signals.

Relaxing each of these three assumptions permits us to build models which are both more realistic and which allow (unfortunately) for a broader range of uses of nuclear weapons, including rational ones. If the adversary is unable to execute a certain and simultaneous disarming first strike, use-it-or-lose-it pressures are no longer concentrated on a single point in time but, rather, operate across a period of time. This lengthening of the time frame then transforms the interactions between the two states from one best modeled as a one-shot game to one modeled as a repeated game. In the repeated game, though the time is compressed, there is still opportunity for interaction between the two states, creating space for the rational use of nuclear weapons.

Below I review three strategic mechanisms by which use-it-or-lose-it pressures can produce first-use of nuclear weapons: intra-conflict signaling, asymmetric offset, and post-conflict posturing, are all strategic mechanisms. The operation of each of the strategic mechanisms may be sensitive to both the embedded assumptions discussed above and other features of the interstate conflict. For each mechanism, I provide brief sketch of its underlying logic, a discussion of the conditions under which the mechanism is more or less likely to operate, and a real-world illustration of how the mechanism might work in practice. Table 1 summarizes the six mechanisms, identifies their rational basis, describes the underlying logic, and highlights conditions which facilitate their operation. I make no claims as to the frequency or likelihood with which each mechanism actually operates. These pressures may still be rare and, even when present, need not mechanistically produce a nuclear first strike. However, by adopting more realistic assumptions about the conditions under which these pressures may operate, we are able to see how states may still rationally perceive some utility in launching a nuclear first strike.

**Table 1:** Mechanisms Underlying the Use-It-or-Lose-It Dilemma

<i>Mechanism</i>	<i>Rationality</i>	<i>Description</i>	<i>Facilitating Conditions</i>
<i>Emotional Utility</i>	Arational	State gains emotional utility from hurting the adversary	Long-standing enmity, oppositional ideology
<i>Accidental Launch</i>	Arational	Complex, hair-trigger posture induces launch from mechanical, bureaucratic error	Nuclear immaturity, delegative postures
<i>Crisis Thinking</i>	Irrational	Crisis environment induces truly irrational launch	Nuclear immaturity
<i>Intra-Conflict Signaling</i>	Rational	State uses launch to reestablish deterrence	Longer time frame, uncertainty
<i>Asymmetric Offset</i>	Rational	State uses launch to compensate for adversary's conventional superiority	Longer time frame, conventional asymmetry, delegative postures
<i>Post-Conflict Posturing</i>	Rational	State attempts to lengthen adversary's relative post-conflict recovery time	Existential threat, relative power parity, relative nuclear parity

### **Mechanism 1: Intra-Conflict Signaling**

A state confronting use-it-or-lose-it pressures may feel compelled to launch a strike if it believes the window need for the disarming first strike to unfold is sufficiently large to permit the use of its nuclear arsenal for intra-conflict signaling. The signaling function of a nuclear strike works largely because of the ability of the pressured state to threaten similar future nuclear strikes if the adversary does not cease its attacks. This mechanism is very sensitive to the length of time it takes to execute the disarming first strike. If an adversary's disarming first strike truly could be accomplished (nearly) instantaneously, then there is

no hope of retaining some of the force for follow-on strikes, eliminating the possibility of intra-conflict deterrent signaling. However, as the time frame for accomplishing the strike expands, so does the potential for the pressured state to use its remaining force to conduct intra-conflict deterrence signaling.

The intra-conflict signaling mechanism is more likely to operate when there is greater uncertainty about the ability of the nuclear superior state to execute a disarming first strike and when the expected time needed to complete that strike is longer. This mechanism approximates the strategy of limited retaliation described by Robert Powell.<sup>34</sup> Here, the pressured state faces the possibility that its nuclear forces will be eliminated within a given window of time. However, if the window is sufficiently large, the pressured state may attempt to launch a limited nuclear strike against the adversary while still retaining some of its capabilities. In this way, the strike is valuable not because of the immediate damage it causes to the adversary, but rather because of the implied future damage to the adversary. So long as the adversary may have some uncertainty in its ability to completely and immediately disarm the pressured state of its remaining nuclear capabilities, the adversary may be deterred.

During the Cold War, war planners recognized the fact that nuclear strikes themselves might be carried out over periods of hours to even months, depending on the contours of the conflict. Some envisioned the United States waging a "protracted nuclear war," in which the conflict would consist of a series of nuclear exchanges spread across up to six months, with each side working to quickly reconstitute additional nuclear forces.<sup>35</sup> But

34. Robert Powell, "Nuclear Deterrence and the Strategy of Limited Retaliation," *The American Political Science Review* 83, no. 2 (1989): 503–519; Robert Powell, *Nuclear Deterrence Theory: The Search for Credibility* (Cambridge University Press, 1990).

35. See, for example, Kostas J. Liopiros, "Deterrence, Nuclear Strategy and the Post-Attack Environment," Office of the Secretary of Defense, 22 June 1981, 10; and *Concepts for Protracted War* (Seattle, WA: Boeing Aerospace Company, 1980); and *The Consequences of Nuclear War: Hearings Before the Subcommittee on International Trade, Finance, and Security Economics of the Joint Economic Committee*, (Washington, D.C.: U.S. Government Printing Office, 1986), 116.

even discussions of how the United States would employ its nuclear arsenal in larger-scale initial "spasm" strikes accounted for a "transattack period," defined as "[i]n nuclear warfare, the period from the initiation of the attack to its termination."<sup>36</sup> Planning for this period implies a recognition that even large-scale initial strikes might not be executed instantaneously. References to the imagined length of this transattack period are largely excised from public sources.<sup>37</sup> But one government source stated that "This period would normally be the first 12 to 14 hours after attack."<sup>38</sup> Though this window is certainly compressed by the standards of large-scale conventional war, it also permits some maneuverability within the conflict.

## Mechanism 2: Asymmetric Offset

Use-it-or-lose-it pressures may cause states to launch a nuclear first strike in an attempt to asymmetrically offset the superior conventional capabilities of an adversary. In this way, a state may view its nuclear weapons as crucial tools for deterring or defeating a conventional attack.<sup>39</sup> If the pressured state believes that the adversary is likely to launch a large-scale attack and that its own conventional forces are insufficient to either deter or defeat the adversary, it may view its nuclear forces as a necessary means of reducing the likelihood of suffering a devastating conventional attack. The very perception that its nuclear capabilities are under threat could even increase the perceived likelihood that the

36. Department of Defense Dictionary of Military and Associated Terms, U.S. Department of Defense, 1989, 376-377. For the gendered baggage and implications of terminology like "spasm strike," see Carol Cohn, "Sex and Death in the Rational World of Defense Intellectuals," *Signs: Journal of women in culture and society* 12, no. 4 (1987): 687-718

37. See, for example, Department of Defense Authorization for Appropriations for Fiscal Year 1981, (Washington, D.C.: U.S. Government Printing Office, 1980), 621.

38. MX Missile Basing, (Washington, D.C.: U.S. Government Printing Office, 1981), 292.

39. This was an explicit component of American strategy to offset the perceived conventional superiority of the Warsaw Pact during the Cold War. See, for example, National Security Strategy of the United States, White House, January 1988, 16.

pressured state confronts an impending large-scale conventional strike by the adversary.<sup>40</sup>

Crucially, and unlike the intra-conflict signaling mechanism, the asymmetric offset mechanism can operate regardless of whether, as discussed above, the use-it-or-lose-it pressures are concentrated at a point in time or are spread across a longer time frame. If those pressures are spread across a longer time frame, the pressured state may have more opportunities to use its nuclear arsenal in order to shift the military balance in its favor. But even if those pressures converge on a single point in time, the pressured state may find it rational to use its weapons if it believes both that conflict is imminent (or ongoing) and that using its nuclear weapons can meaningfully change the conventional balance. The pressured state may still find it fruitful to signal its resolve in the impending post-strike conventional conflict, even if the underlying signal does not materially change the military balance.<sup>41</sup>

The signal is also probably more likely to operate when the conventional military balance between the states is both sufficiently large that the conventionally inferior state sees an advantage in resorting to nuclear weapons and sufficiently small that the nuclear offset could make a meaningful difference.<sup>42</sup> That is, in crises or conflicts featuring overly large conventional military imbalances, no amount of nuclear offset may be enough while in crises or conflicts featuring relative parity, nuclear offset may be viewed as unnecessary.

This mechanism can operate at the level of the unified state, but it is likely to be more pronounced for states which have developed an asymmetric escalation nuclear posture.<sup>43</sup> This posture is characterized by the deployment of battlefield nuclear weapons and the

40. For a description of these dynamics in a hypothetical U.S.-China conflict, see Talmadge, [“Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States.”](#)

41. Robert Jervis, *The Illogic of American Nuclear Strategy* (Cornell University Press, 2019), 129.

42. For a recent discussion of how the relative conventional balance can affect nuclear weapons dynamics, see Lanoszka and Scherer, [“Nuclear Ambiguity, No-First-Use, and Crisis Stability in Asymmetric Crises”](#)

43. Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*, vol. 143 (Princeton University Press, 2014), 19-21.

pre-delegation of use authority for those battlefield weapons to lower-level military commanders. Under these conditions, lower-level military commanders may believe that the very survival of their units and themselves is dependent on defeating a local conventionally superior adversary force which could only be accomplished by resorting to their own battlefield nuclear weapons. In these instances, commanders may opt to launch a nuclear first-strike to save themselves, even if it risks escalating the broader conflict.

For example, a conflict between North Korea and the United States could generate some of these pressures for the leadership in Pyongyang. As Narang summarizes, "If North Korea and the United States wind up shooting at each other, it might make sense for Kim to use nuclear weapons first in a way that increases his chances of survival. The basic idea is to use one set of nuclear devices to stave off the conventional invasion, and hold in reserve longer range, more powerful devices that threaten the enemy's cities to deter nuclear annihilation."<sup>44</sup> In this way, despite the likelihood that the United States might be able to eliminate North Korea's nuclear arsenal, Pyongyang may still attempt a strike to weaken U.S. conventional forces in the region beforehand.

### **Mechanism 3: Post-Conflict Posturing**

Finally, use-it-or-lose it pressures can lead to nuclear first use under conditions of mutual vulnerability if the pressured state believes there is a sufficiently high risk of all-out war, including the likelihood of it suffering a nuclear strike itself. In this case, the pressured state may believe that a large-scale conflict and its attendant destruction is likely. Rather than concentrating solely on the immediate outcome of this impending conflict, the pressured state may also be concerned about how quickly it could recover from the

44. Vipin Narang, "Why Kim Jong Un Wouldn't Be Irrational to Use a Nuclear Bomb First," *Washington Post* 8 (2017).

conflict and, in particular, whether it could recover faster than the adversary.

This mechanism is more likely to operate when the pressured state believes that the coming conflict is likely to represent total war. The greater the expected scope and destructiveness of the conflict, the more the pressured state may look to its long-term strategic implications. This mechanism is also more likely to operate the greater the perceived degree of parity between the overall power of two states. The greater the power parity between the two states, the greater the parity in expected recovery times and, therefore, the more sensitive those relative recovery times will be to the immediate effects of a nuclear exchange. However, in highly asymmetric crises or conflicts in which one state enjoys a preponderance of power, it may be impossible for the weaker state to meaningfully affect the relative recovery time of the stronger state given the tremendous gap in starting points between the two. If the gap in overall power between the two states is sufficiently large and the nuclear capabilities of the stronger state are sufficiently powerful, it may even be possible for the stronger state to completely eliminate the weaker state a political entity, making moot the issue of recovery time.

During the Cold War, U.S. decision-makers explicitly weighed relative recovery time as an outcome measure in nuclear exchange planning and modeling. In 1974, President Richard Nixon issued National Security Decision Memorandum-242, "Planning Nuclear Weapons Employment for Deterrence," which outlined a framework for the employment of U.S. nuclear weapons. That framework was concerned not only with the immediate capabilities offered by the nuclear arsenal in a general war with the Soviet Union. It also explicitly looked to the post-war era in mandating that U.S. forces be able to create the "[d]estruction of the political, economic, and military resources critical to the enemy's postwar power, influence, and ability to recover at an early time as a major power."<sup>45</sup> Sim-

45. National Security Decision Memorandum 242, "Policy for Planning the Employment of Nuclear Weapons," 17 January 1974, 2.

ilarly, in his 1977 report to Congress, Secretary of Defense Donald Rumsfeld explained that "We believe that a substantial number of military forces and critical industries in the Soviet Union should be directly targeted, and that an important objective of the assured retaliation mission should be to retard significantly the ability of the USSR to recover from a nuclear exchange and regain the status of a 20th-century military and industrial power more rapidly than the United States."<sup>46</sup> The aim of U.S. nuclear strategy was not to "win" the immediate war (though it did aim at that) but, more significantly, to win the inevitable race to recovery which came after.<sup>47</sup>

In the event of a major crisis or conflict today between seemingly more equally powerful states such as between the United States and China or the United States and Russia, these pressures would be more likely to exist. However, the post-conflict posturing mechanism is unlikely to operate between states with drastic disparities in overall power for at least two reasons. First, the gap in overall power between the two states is likely to be so large that it could be offset only by a similarly large and opposite nuclear balance. Second, the nuclear balance is likely correlated with the overall power balance, meaning that the weaker state is unlikely to possess anywhere near the massive nuclear forces necessary to offset its inferiority. For example, the United States today enjoys such a tremendous relative power advantage over North Korea that, in the event of a large-scale conflict between the two, it is inconceivable that North Korea could ever hope to enjoy a recovery time faster than the United States.

46. Donald Rumsfeld, Report of Secretary of Defense Donald H. Rumsfeld to the Congress on the FY 1978 Budget, FY 1979 Authorization Request and FY 1978-1982 Defense Programs (Washington, DC: U.S. Government Printing Office, 17 January 1977), 68.

47. See, for example, *Industrial Survival and Recovery After Nuclear Attack: A Report to the Joint Committee on Defense Production*, U.S. congress (Seattle, WA: The Boeing Company, 1976).

## Conclusion: The Varied Roads to Armageddon

Unpacking the use-it-or-lose-it dilemma has important implications both for international relations scholarship and for practitioners of national security policy-making. For scholars, this conceptualization helps to specify both the underlying mechanisms and the conditions under which those mechanisms are likely to arise, resolving an apparent puzzle in the literature, and refining our understanding of when and how the dilemma can produce escalatory pressures. For policymakers and analysts, it helps to better identify, anticipate, and respond to the different risks that the use-it-or-lose-it dilemma may present.

A comparison of three notional interstate conflicts helps to illustrate the variation in mechanisms and the significance of that variation. Here I sketch three notional conflicts: one involving the Soviet Union and the United States during the Cold War, one involving the China and United States today, and one involving India and Pakistan today. In each crisis, I describe key features of the conflict and identify which mechanisms are most likely to promote the first use of a nuclear weapon.

A conflict involving the Soviet Union and the United States would have been most likely to see the asymmetric offset and post-conflict posturing mechanisms. A war between the Soviet Union and the United States would have been characterized by moderate (perceived) conventional asymmetry, existential threat perceptions, and relative power and nuclear parity. Throughout the Cold War, the United States and its NATO allies, confronting a perceived conventional inferiority vis-a-vis the Soviet Union, embedded tactical nuclear weapons into their front-line units.<sup>48</sup> These units were meant to provide a meaningful advantage on the battlefield but also to introduce the risk that an otherwise conventional conflict between the two sides could escalate to the nuclear level. Lower-

48. Beatrice Heuser, "The Development of NATO's Nuclear Strategy," *Contemporary European History* 4, no. 1 (1995): 37–66.

level NATO military commanders, facing the prospect of destruction at the hands of a conventionally superior Soviet force and empowered with use authority over their battlefield nuclear weapons, might execute a nuclear strike rather than being overrun. Reducing the first-use risks stemming from asymmetric offset might have required addressing the conventional inferiority of the NATO forces or implementing a re-centralization of use authority over battlefield nuclear weapons.<sup>49</sup>

Similarly, military planners on both sides of the Iron Curtain expected that a conflict would be large-scale, fought in the shadow of the strategic nuclear forces, and threatening to the core interests and even the very survival of the participants. Faced with the prospect of a costly conventional conflict and the specter of nuclear annihilation, state leaders might have thought it better to gain the advantage of striking now. Here, relative gains become particularly salient, not because of its implications for winning the war at hand but, rather, for winning the (dismal) peace that would come after.<sup>50</sup> As discussed above, this was a key consideration for U.S. nuclear warplanning efforts. As one observer described the U.S. plan to debilitate the Soviet Union's post-conflict recovery efforts, "[O]ne objective of nuclear war planning was to increase to the greatest extent possible the enemy's economic recovery time. A nuclear war would knock both sides down flat. Whoever got to his feet first won."<sup>51</sup>

In a conflict today between China and the United States, the intra-crisis signaling mechanism is most likely to operate. Such a conflict would likely be characterized by relative conventional parity, strong nuclear superiority favoring the United States, and both a longer time frame and greater uncertainty about the feasibility of a disarming U.S. first

49. Of course, these risks of nuclear use were central to the NATO deterrence strategy.

50. John J Mearsheimer, "The False Promise of International Institutions," *International security* 19, no. 3 (1994): 5–49; Robert Powell, "Absolute and Relative Gains in International Relations Theory," *American Political Science Review* 85, no. 4 (1991): 1303–1320.

51. Ivan C Oelrich, *Sizing Post-Cold War Nuclear Forces*, technical report (Alexandria, VA: Institute for Defense Analyses, 2001), 11-12.

strike against China's nuclear deterrent. Although the United States enjoys a significant overall conventional superiority relative to China, the local balance of forces would be much more even given that any notional conflict is likely to be fought near China and given Beijing's investment in anti-access/area denial capabilities.<sup>52</sup> China has not developed or deployed tactical nuclear forces and exercises strong centralized control over its nuclear weapons.<sup>53</sup> Together, this relative local conventional parity, limited tactical nuclear options, and strong central control collectively mean that Beijing would be relatively unlikely to initiate a nuclear strike for the purposes of asymmetric offset. Such a conflict is also unlikely to feature the post-conflict posturing mechanism. A conflict between China and the United States today may be high intensity but is unlikely to be viewed as existential. The geography of the two states, separated by the Pacific Ocean, significantly reduces the existential threats posed to each side.<sup>54</sup>

In addition, the significant nuclear superiority enjoyed by the U.S. would preclude the operation of the post-conflict posturing mechanism. However, despite this nuclear superiority, leaders in the United States might not be confident they could execute a certain and simultaneous disarming first strike. China has invested heavily in a nuclear modernization program and deploys an increasingly diverse array of nuclear weapons on land and at sea. Qualitative improvements to the arsenal have made these systems more mobile, more rugged, and, ultimately, more survivable.<sup>55</sup> Instead, in the face of a potential use-it-

52. Thomas J Christensen, "Posing Problems without Catching Up: China's Rise and Challenges for U.S. Security Policy," *International Security* 25, no. 4 (2001): 5–40; Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Rand Corporation, 2015).

53. David C Logan, "Hard Constraints on a Chinese Nuclear Breakout," *The Nonproliferation Review* 24, nos. 1-2 (2017): 13–30; M Taylor Fravel and Evan S Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security* 35, no. 2 (2010): 48–87.

54. On the role of geography in determining threat perceptions, see Stephen M Walt, *The Srigins of Alliances* (Cornell University Press, 1990), 23-24; and Robert Jervis, "Cooperation under the Security Silemma," *World politics* 30, no. 2 (1978): 167–214, 194-196.

55. For some technical analysis and competing claims about the survivability of China's nuclear forces, see Li Bin, "Tracking Chinese Strategic Mobile Missiles," *Science & Global Security* 15, no. 1 (2007): 1–30, Tong Zhao, "Conventional Counterforce Strike: An Option for Damage Limitation in Conflicts with Nuclear-Armed Adversaries?," *Science & Global Security* 19, no. 3 (2011): 195–222, Wu Riqiang, "Living with Uncer-

or-lose-it dilemma, a nuclear strike from Beijing would more likely be for the purposes of establishing or reestablishing deterrence.<sup>56</sup> Indeed, Chinese doctrinal materials explicitly call for demonstration strikes using long-range strategic missiles armed with conventional warheads in order to reestablish deterrence.<sup>57</sup>

Finally, in a conflict between India and Pakistan today, the three non-rational mechanisms and the asymmetric offset mechanism might be most likely to trigger nuclear use. A conflict between India and Pakistan would be characterized by strong nationalism, nuclear immaturity, conventional asymmetry, and relative nuclear parity. Scholars have written extensively about the possibility that the combination of Pakistan's conventional inferiority and its asymmetric escalation nuclear posture could raise the risks of a nuclear strike through the asymmetric offset mechanism.<sup>58</sup> Both states are comparatively recent entrants to the nuclear club and may not have developed or deployed important safety and security protocols for nuclear arsenals.<sup>59</sup> Observers have noted the role that "nuclear nationalism" in both states could play in inhibiting the learning or application of classical nuclear deterrence strategies.<sup>60</sup> In a crisis or conflict, national leaders may face strong domestic political

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tainty: Modeling China's Nuclear Survivability," *International Security* 44, no. 4 (2020): 84–118, Keir A Lieber and Daryl G Press, "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security* 30, no. 4 (2006): 7–44, Keir A Lieber and Daryl G Press, "The New Era of Counterforce: Technological Change and the Future of Nuclear Deterrence," *International Security* 41, no. 4 (2017): 9–49, and Bruce G Blair and Chen Yali, "The Fallacy of Nuclear Primacy," *China Security*, 2006,

56. A nuclear first-strike by China might still be very unlikely overall. China's declaratory nuclear policy includes a firm No-First-Use pledge and its nuclear forces are largely configured in a way that supports that pledge. However, if such a strike were to occur from use-it-or-lose-it pressures, it would likely take the form of intra-crisis signaling.

57. For a general discussion of developments in China's approach to strategic deterrence, see Michael S Chase and Arthur Chan, *China's Evolving Approach to "Integrated Strategic Deterrence"* (Rand Corporation, 2016).

58. Vipin Narang, "Posturing for Peace? Pakistan's Nuclear Postures and South Asian Stability," *International Security* 34, no. 3 (2010): 38–78.

59. Christopher Clary, *Thinking about Pakistan's Nuclear Security in Peacetime, Crisis and War* (Institute for Defence Studies / Analyses (IDSA), 2010).

60. Pervez Hoodbhoy and Zia Mian, "Nuclear Battles in South Asia," *Bulletin of the Atomic Scientists* 4 (2016); Happymon Jacob, "The Concept of Nuclear Learning: A Study of the Indian Experience," in *Nuclear Learning in South Asia: The Next Decade*, ed. Feroz Hassan Khan, Ryan Jacobs, and Emily Burke (Monterey: Naval Postgraduate School, 2014).

or bureaucratic pressures to appear resolute in a crisis or conflict. Together, these factors increase the salience of the non-rational emotional utility, accidental launch, and induced irrationality mechanisms.

The use-it-or-lose-it dilemma has so far, fortunately, not resulted in a nuclear strike. This may be, in part, because several of the mechanisms identified here might operate only under certain assumptions. For example, the rationality of the post-conflict posturing mechanism assumes that states prioritize relative gains in a dyadic framework. However, in a crisis or conflict, states may instead prioritize absolute gains or relative gains against a broader set of actors not participating in the crisis or conflict. The mechanisms assume a narrow set of goals which do not incorporate ethical or moral goals, prescriptions, or proscriptions. And, relatedly, they assume that the actors involved would have no qualms about triggering or overseeing the mass murder of millions.

While each of the mechanisms identified above may end in the same destination—that of a nuclear explosion—they take different paths to reach it. By better appreciating the conditions which make it possible for states to stumble down such paths, scholars are better able to understand and assess intra-conflict and intra-crisis escalation dynamics. Future research might investigate empirically whether some of the mechanisms have been more or less prevalent, how strong these mechanisms are relative to other more stabilizing pressures, and the most effective means of manipulating the mechanisms to make them more or less likely to operate.

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