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Reactions from the Next Generation

The Fragile Balance of Terror: Deterrence in the New Nuclear Age

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A Report of the CSIS Project on Nuclear Issues

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

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About the Project on Nuclear Issues

The Project on Nuclear Issues (PONI) was developed in 2003 to develop the next generation of policy, technical, and operational nuclear professionals by fostering and convening a community of emerging experts. PONI's programs provide inclusive, diverse, and creative opportunities for rising experts to learn about policy, technical, and operational aspects of the nuclear community; develop and present new concepts and ideas; engage in thoughtful and informed debates; and tour and visit sites across the nuclear enterprise.

PONI strives to achieve this mission through several objectives:

- Identifying emerging thought leaders and providing them with the opportunity to develop and present new concepts and ideas
- Sponsoring new cutting-edge research
- Encouraging thoughtful and informed debate on the nuclear community's most pressing challenges
- Engaging a broad and diverse community domestically and internationally

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The Fragile Balance of Terror and Nuclear Uncertainty

By Heather Williams

The Fragile Balance of Terror, edited by Vipin Narang and Scott Sagan, outlines the rising nuclear risks associated with arms racing between the United States, Russia, and China; crisis escalation; and nuclear proliferation.[1] It paints the picture of an evolving and potentially destabilizing nuclear balance. At the outset, Narang and Sagan offer a harrowing observation: "We are unprepared for it."[2] *The Fragile Balance of Terror* includes analyses of multipolar deterrence, the impact of social media on crisis escalation, nuclear survivability, and command and control, among many others.

As a follow-on to *The Fragile Balance of Terror*, the Project on Nuclear Issues (PONI) at the Center for Strategic and International Studies invited eight early- and mid-career experts to offer their reflections on the volume's chapters and conclusions. These rising voices outline a landscape of uncertainty that they will confront throughout their careers. Their reflections are succinct and insightful, and they point to specific trends contributing to nuclear uncertainty that raise challenging questions for policymakers and scholars alike. While much of the nuclear policy community is focused on the challenges of a return to great power competition and how to deter two peer competitors while reassuring allies, as these next generation experts highlight, *The Fragile Balance of Terror* is a timely reminder of the wider nuclear landscape and the new complexities of nuclear deterrence.

This reaction series points to three interrelated trends that will shape the future nuclear landscape. First, newer nuclear actors feature prominently in *The Fragile Balance of Terror* and in these reflection pieces. For the most part, the authors agree that these smaller regional nuclear actors will undermine strategic stability and increase nuclear risks, although over time this may be less of a concern. Jamie Kwong captures Caitlin Talmadge's two-tiered approach to nuclear competition at both the great power and regional levels, which will complicate—and potentially undermine—both arms control and extended deterrence and assurance efforts. These regional actors may value nuclear weapons differently than the Cold War superpowers or contemporary

great powers; Doreen Horschig describes newer nuclear actors as valuing "political gains of prestige-bestowing displays . . . over the increased reliability of their forces" in her analysis of Jeffrey Lewis and Ankit Panda's chapter, and suggests that over time deterrence could become stronger as new nuclear programs become more sophisticated. Conversely, Jessica Link notes the uncertainty around nuclear learning among new nuclear actors, cautioning that we should not assume they will "inevitably fall into these stable deterrence patterns," in her analysis of Mark Bell and Nicholas Miller's chapter.

A second theme of the reaction series is the importance of the information domain and new pressures on nuclear decisionmaking. One of these new pressures relates to perceptions of counterforce, whereby new technologies may or may not undermine nuclear survivability. Lachlan MacKenzie's exploration of Christopher Clary's chapter captures the debate about counterforce amid arms racing and technological innovation and points to important policy challenges for nuclear decisionmaking, including during crises. MacKenzie, like Clary, comes to a potentially optimistic assessment, whereby "strategic stability is more durable than many appreciate." An additional pressure on nuclear decisionmaking will be the credibility of information. Melissa Chan's reaction essay points to the "ever-widening gaps of knowledge" due to new nuclear actors, new technologies, and poisoning of the information domain. In reacting to Narang and Heather Williams's chapter, Suzanne Claeys observes, "In a nuclear-tinged crisis, disinformation on social media platforms could cause unintended escalation (due to increased ambiguity), impact decisionmaking processes, and amplify nationalism, resulting in stronger public pressure for escalation." Decisionmaking resilience and the credibility of information is a wider challenge not just for crises, but also for intelligence and analysis, with open-source intelligence (OSINT) being increasingly vulnerable to poisoning with implications for analysis, as captured by Joseph Rodgers's reaction to Amy Zegart's chapter.

A final trend the authors identify is the role of psychology in nuclear uncertainty, particularly the rise of personality regimes and populism. Psychology and perception are an inherent theme in *The Fragile Balance of Terror*, including in how scholars and practitioners perceive adversary capabilities, but also in how adversaries might perceive U.S. capabilities and behaviors. Jessica Link's essay, for example, points to the recent U.S. ban on anti-satellite weapons testing as one example of risk reduction efforts and a way for the United States to signal its responsible intentions and influence others' perceptions. The psychological challenges of deterrence are not wholly new, but one emerging contemporary challenge is the rise of populist leaders and "personalist regimes," the subject of McDermott's chapter in *The Fragile Balance of Terror*. In his analysis of the chapter, Nicholas Adamopoulos captures potentially shifting strategic values in personalist regimes, such as "protection of status" and "demonstrations of strength and resolve." Populist leaders may also have different decisionmaking structures, "valuing loyalty over competence" in their advisers. This should be a concern not only for the United States in engaging its adversaries but also in how others perceive U.S. leadership and nuclear decisionmaking.

This volume should be read as a snapshot of what the next generation of nuclear leaders have identified as their challenges. These are the issues they expect to confront in their careers. It speaks not only to rising nuclear risks and uncertainty, but also to the need for continued scholarship into new nuclear actors, nuclear decisionmaking, and personalist regimes, along with the importance of knowledge transfer and community building among nuclear experts. *The Fragile Balance of Terror* is the start of that much longer conversation.

2

Response to "Multipolar Deterrence in the Emerging Nuclear Era"

By Jamie Kwong

Caitlin Talmadge opens *The Fragile Balance of Terror* by presenting a framework for policymakers and experts alike to conceptualize the new nuclear age. She characterizes this as an era of interrelated nuclear competitions at the great power and regional levels. No longer defined and bound by the bipolar Cold War era, these competitions are indicative of changing relationships among a larger set of nuclear actors. Talmadge explores how this "two-tiered, multi-actor nuclear world" may play out in peacetime or in crisis by drawing on historical vignettes that bring a concerning dose of reality to her forecasting.[3]

In addition to effectively explaining and exploring these dynamics, Talmadge makes three important contributions. First, her chapter helps to address a key set of policy questions: What will deterrence look like in the new nuclear age? Will this emerging era of multiple, overlapping nuclear competitions present new risks? And how will different sets of nuclear competitors interact? Talmadge makes a strong case that deterrence will become inherently more complex and difficult to navigate in this emerging era. On the one hand, the potential for an opportunistic third actor to take advantage of a dyadic conflict—what Talmadge dubs the "postwar predation problem"—may inform nuclear states' decision calculus and bolster rational deterrence, that is, discourage states from deliberately escalating and instead incentivize restraint.[4]

On the other hand, the interrelated nature of both great power and regional nuclear rivalries increases the risk of misperception, arms racing, accidental or unauthorized use, and inadvertent escalation—risks that outweigh the marginal benefits of bolstering deterrence. Central here is recognizing that decisions made in both peacetime and crisis will not remain insular to a single competitive relationship. The impact of those decisions—including diverging interpretations of intent—will be felt beyond the competition at hand, as a result of an emerging feedback loop between these different competitive groupings. In a crisis, the effects of a nuclear signaling feedback loop between different sets of competitors could plausibly draw in additional actors or even prompt a concurrent and exacerbating conflict, only making de-escalation harder. In short, a world

of more and interrelated nuclear rivalries will make for an increasingly dynamic, difficult, and dangerous deterrence landscape.

Second, Talmadge's chapter highlights the implications of this world for arms control and extended deterrence. Because states will have to account for multiple nuclear competitors, it is unlikely they will agree to arms limitations with one competitor that may thwart their capabilities vis-à-vis additional competitors. While universal arms control remains unlikely, these conditions will challenge the prospect for future arms control agreements. Even worse, the need to ensure that arsenals are equipped to respond to multiple threats not only disincentivizes arms control but also incentivizes arms racing. These dynamics are already playing out at the great power level, with important implications for U.S. nuclear policy. The United States, China, and Russia have seeded a new arms race through their extensive modernization campaigns. China in particular appears to be expanding its arsenal at a rapid pace. Growing U.S. concerns about China's nuclear expansion, in turn, will likely challenge efforts to negotiate a U.S.-Russian follow-on agreement to New START—even beyond the challenges posed by Russia's recent suspension of the treaty. Without an agreement in place, the United States could face an unrestrained arms race with two peer competitors.

These pressures are intensified by extended deterrence relationships that have historically posed challenges to arms control efforts. The need for a patron to assure its allies of a credible security commitment—and also to convince their adversaries that it is ready and willing to follow through on that commitment—favors larger and highly capable arsenals. This is particularly pertinent in the U.S. context, as the United States has extended deterrence commitments with allies in multiple regions. Calls for greater assurance will only become more pressing as nuclear competitions continue to heat up. South Korea and Japan, for example, are already seeking greater U.S. assurances in the face of North Korea's advancing arsenal—developments which are, in turn, being closely monitored by China. To make matters more complicated, a world with more nuclear competitors may drive some nonnuclear states to seek their own nuclear weapons to counter growing threats. If its historical nonproliferation efforts are any indicator, the United States might try to mitigate this proliferation pressure by forging new extended deterrence relationships—only amplifying these challenges, and thus making arms control prospects even dimmer, in the process.

Finally, Talmadge lays out a pressing agenda for this new nuclear age. How should scholars adapt—or entirely rethink—deterrence theories for this multi-actor era of interrelated nuclear rivalries? How must assumptions based on a bipolar Cold War order change? What are the implications of these changes in terms of escalation pathways and risks? How does this vary in big power versus regional contexts, or in nuclear dyads versus nuclear trios? How should policymakers advance arms control and mitigate arms racing dynamics? How must these efforts differ from their bilateral precedents, and how can allies effectively contribute to these efforts? How will feedback loops between distinct competitive relationships challenge the ways in which states conduct deterrence? What are the risks of an increasingly interconnected deterrence landscape and how can they be mitigated?

The Fragile Balance of Terror helps to scope and present some initial answers to these critical questions, making it required reading for practitioners and experts in the nuclear field. Talmadge's chapter in particular makes an invaluable contribution, providing a common framework for understanding and approaching this emerging landscape—a foundational step to ensuring that the nuclear community is adequately prepared to navigate and manage deterrence in the new nuclear age.

3

Response to "Psychology, Leaders, and New Deterrence Dilemmas"

By Nicholas Adamopoulos

While nuclear states today feature a wide variety of regime types, the vast majority of them have a degree of institutional strength capable of checking the leader's ability to exercise complete control over their nuclear arsenal. North Korea could be considered the exception to this description, and thus it provides a glimpse into the rather bleak picture that Rose McDermott paints about deterring nuclear-armed states with personalist regimes in her chapter "Psychology, Leaders, and New Deterrence Dilemmas."

McDermott highlights three features of personalist regimes that will complicate efforts to deter them from nuclear threats or use: (1) few, if any, organizational constraints on leaders; (2) the resultant ease with which psychological mechanisms and individual pathologies can influence decisionmaking; and (3) the inability of personalist leaders to learn from previous mistakes. Taken together, these three aspects of personalist regimes raise substantial deterrence challenges, as these regimes will behave less predictably in crises and may conceptualize the risk and reward of nuclear brinksmanship differently than their democratic counterparts.

The concept of state survival is central to deterrence thinking: state survival is presumably the highest priority of actors in deterrence games; therefore, the rationality of all subsequent decisions is judged with the pursuit of that goal in mind. McDermott's characterization of personalist regimes sheds light on how different understandings of what constitutes survival for such leaders may make deterring them in crises extremely difficult. While democratic leaders tend to see themselves as responsible temporary shepherds of a collection of institutions, and therefore define survival as the continuity of these mechanisms, survival for personalist leaders is far more personal. Threats to their power are more likely to be perceived as existential threats to the state, and therefore decisions are made with personal survival in mind. This leads to personalist leaders valuing loyalty over competence when choosing advisory staff, which in turn threatens their ability to act coherently and learn from previous mistakes, again increasing the potential for rapid escalation in crisis.

There is a similar discrepancy in how the established nuclear powers and potential personalist nuclear states view nuclear weapons as a symbol of, and tool for, achieving status. Personalistic leaders will be more risk-tolerant when protecting their international status, as losing it risks overthrow from within. Protection of status is more likely to be considered an existential consideration in personalist regimes—again making them far less predictable in crises and more likely to manipulate risk to demonstrate resolve. In turn, strategies of deterrence designed to threaten state resources will likely be less persuasive to personalist leaders, as they value demonstrations of strength and resolve above all and are less beholden to constituencies that may be put at risk during periods of international brinksmanship.

Central to McDermott's argument is the notion that leader behavior is the result of personal preferences expressed within a particular organizational context, and that the new challenge to deterrence comes from leaders who possess certain mercurial tendencies but lack the institutional guardrails that can course-correct them toward more predictable behavior. McDermott provides some initial thinking on how to manage future adversaries that fit this bill in the form of psychological advisors that could provide recommendations for dealing with the personalities of such leaders. While this might drastically improve insight into adversary thinking and lend a degree of stability to crisis situations, it poses interesting questions for the future of U.S. deterrence planning. How can the United States maintain a coherent deterrence strategy if it must also be carefully tailored to manage the individual pathologies of adversary leaders? While bilateral relationships may be relatively straightforward, states learn a great deal from interactions between their adversaries and third parties; and as McDermott points out, personalist regimes are particularly bad at learning due to their valuation of loyalty over competence in advisory circles. This may lead to personalistic leaders drawing incorrect conclusions about U.S. resolve or intent while observing third-party interactions, increasing the likelihood for miscalculation in crises. The United States will therefore be faced with a difficult balancing act between maintaining coherence and clarity in its communicated deterrence strategy while tailoring it to match individual leader psychological profiles.

McDermott concludes with perhaps the most important lesson for future policymakers and strategists: the likelihood that this could happen at home. While democratic institutions are by far the regime type best suited to counter the negative traits of personalistic leaders, these protections are not ironclad. Institutions can be crippled or co-opted by a handful of well-placed individuals, allowing the same personal pathologies to run free in leaders of nominally democratic regimes. While deterring nuclear saber-rattling from personalist regimes with weak institutional constraints will be a challenge worth dedicating serious intellectual resources to, considerable time and effort is needed to ensure such leaders are appropriately constrained in democratic regimes as well.

In the future, strategists should factor leadership psychology into their deterrence planning, as one-size-fits-all deterrence strategies may be just as likely to provoke as they are to deter in the face of nuclear-armed personalist regimes. At the same time, while nuclear proliferation to new personalist regimes is a problem worth considering in the near future, it is not a certainty, and intense effort should be focused on preventing those regimes from acquiring a nuclear capability. Finally, faced with a potentially much less stable nuclear future, the United States and its allies should make great efforts to ensure that all nuclear powers retain strong institutional guardrails surrounding nuclear use and look for ways to incentivize nondemocratic nuclear powers to invest in similarly restrictive measures.

4

Response to "Thermonuclear Twitter?"

By Suzanne Claeys

"Thermonuclear Twitter?" by Vipin Narang and Heather Williams examines the role of social media platforms during crises, particularly ones involving one or more nuclear powers. The chapter analyzes three case studies—the 2019 India-Pakistan crisis, the 2018 Hawaii missile alert, and the 2017 U.S. Forces Korea evacuation order from the Korean Peninsula—to explore whether and how social media affects crisis dynamics. The chapter makes three important contributions to current literature and policy implications related to social media and crisis dynamics.

First, Narang and Williams address key policy questions: How do social media platforms affect crises, particularly between nuclear-armed states? Do social media platforms trigger crises and increase escalation, or do they just serve as noise without fundamentally affecting crisis dynamics? And do different platforms affect dynamics in different ways?

These questions have become more relevant as people—including world leaders—flock to social media to receive and disseminate information. Today, social media has increased the interconnectivity of the world's population, with limited restrictions on content, leading to questions and concerns about the ways in which social media can and should be leveraged in crises, especially by political leaders. Similar to the advent of the 24/7 news cycle, social media—especially open platforms—increases public pressure on governments to respond to events in real time. However, the breadth of users on social media means that decisionmakers can also be reached in real time and might fall victim to disinformation online.

A close examination of the three case studies finds that although social media platforms may not independently cause crises or escalation, they can add complexity to the broader information environment. However, social media platforms are not monolithic, and different platforms create different effects depending on platform properties, crisis properties, and audience properties.

Second, "Thermonuclear Twitter?" highlights policy implications for the growing reliance on social media platforms, especially as a means of information sharing. World leaders and organizations are using social media as a form of communication and signaling, but if those profiles are hijacked by hackers or malicious actors during a crisis, it creates potentially very escalatory scenarios regarding the chain of command. Should all statements made on social media by a world leader be considered an official order or policy? The chapter does not have a concrete answer to this question, but the question itself raises concerns about the use of social media for signaling purposes.

Moreover, if social media can be a source of escalation, should governments shut it down during a crisis? The answer is complicated, but shutting social media down during crises may increase disinformation and rumors while also potentially removing pathways for de-escalation. Although all social media platforms have become vehicles for disinformation, Narang and Williams find that open platforms, like Twitter, will generally provide more accurate information while closed platforms, like WhatsApp, will generally reinforce mis- and disinformation.

Overall, social media platforms create complexity and increase information velocity in a nuclear-tinged crisis. The speed at which information is spread and the vast audiences that can be reached through social media mean that today, both the public and policymakers are subject to the same disinformation campaigns. In a nuclear-tinged crisis, disinformation on social media platforms could cause unintended escalation (due to increased ambiguity), impact decisionmaking processes, and amplify nationalism, resulting in stronger public pressure for escalation. However, platform properties, crisis properties, and audience properties will all impact the situation, creating unpredictable outcomes—some escalatory and some de-escalatory. In preparing for future crises, decisionmakers will need to consider the role that different social media platforms could play and leverage them accordingly.

Finally, Narang and Williams note that research at the nexus of social media and crisis escalation treats social media as a monolith or focuses on a single platform, with no differentiation. Moreover, social media literature does not distinguish between shorter versus longer crises. This raises several important questions and lines of effort for future scholarship: How should researchers disaggregate the effects on crises of different social media platforms? How should the public, as well as state leaders, interpret social media posts by U.S. policymakers? Are there different interpretations depending on which social media platform is used? How much impact does information on social media actually have on the decisionmaking process? And how should social media platforms be used during crises?

"Thermonuclear Twitter?" offers a novel approach to research on the topic by disaggregating types of platforms, crises, and audiences to create a more granular approach. Narang and Williams' main finding is that different social media platforms will have varied volume, accuracy, and speed of information, which in turn create distinct pathways for escalation or de-escalation during crises. These findings and continued scholarship on the nexus between social media platforms and crisis dynamics will be increasingly important as more people turn to social media for news and information.

In addition to implications for future scholarship, Narang and Williams's findings have policy implications, specifically related to the ways in which the U.S. government should interact with social media companies and disinformation in future nuclear-tinged crises. Today, content moderation is not required of social media companies, but there is an international push to hold companies more accountable for the information on their platforms. The different characteristics of platforms could require different levels of moderation and interaction between social media companies and the government. It seems, based on the chapter's

findings, that closed platforms present more of a risk for the U.S. government during a crisis, as they often enforce already held beliefs, creating echo chambers and resistance to contrary views. To counter future disinformation, the U.S. government should focus on engaging key stakeholders (including social media companies), putting out coherent messaging on social media platforms, and building societal resilience to disinformation via digital literacy initiatives.

5

Response to "Understanding New Nuclear Threats: The Open Source Intelligence Revolution?"

By Joseph Rodgers

"The Open-Source Intelligence Revolution" by Amy Zegart examines the emergence of a community of nongovernmental analysts in nuclear policy that will have a profound impact on the way that governmental intelligence analysts conduct their work. Zegart explores the benefits and costs of this emerging network of analysts (referred to as OSINT) and poses questions about how to best regulate this network to maximize beneficial uses and mitigate the detrimental impact of bad analysis in the public domain.

Zegart broadly defines open-source analysts to include virtually all experts and hobbyists outside of government. Some OSINT analysts are former government employees, while others have little or no technical or government experience. This community includes corporations, journalists, academics, interested amateurs, and policy wonks. Zegart notes that currently, this "US-led ecosystem serves the country's national interests well. But the future is likely to bring more players from more countries with less expertise, less responsibility, and less connectivity" to the United States and its allies.[5]

The network that spans the nongovernmental ecosystem utilizes a variety of tools and technologies to analyze developments in nuclear policy. Zegart largely focuses on the use of newly available commercial satellite imagery, but OSINT analysts also use machine learning, social media, computer modeling, crowdsourcing, and metadata to examine nonproliferation and arms control.

The creation of this network of nongovernmental analysts will have a significant impact on the day-to-day operations of the intelligence community. OSINT is by nature public, and OSINT analysts are publishing their findings in newspapers and media outlets that policymakers and journalists see every day. Publications in the news may distract government intelligence analysts. Zegart notes that "the more time intelligence officials spend going over what they already know, the less time they spend on what they do not."[6]

OSINT may unintentionally get analysis wrong, polluting the information ecosystem with disinformation that appears to be backed by credible evidence. There are numerous instances where OSINT analysts produced false news reports backed by misinterpreted satellite imagery analysis. Zegart notes one such example in 2001, when an OSINT analyst claimed to have information about Saddam Hussein's nuclear weapons program, including an alleged covert nuclear test in 1989. In this new information environment, intelligence agencies are increasingly focusing their efforts to serve as what Zegart calls "verifiers of last resort," assessing whether OSINT analysis is correct.[7]

While some OSINT analysts can draw wrong conclusions, the crowdsourced nature of this network of nongovernmental analysts means it can self-correct. For example, Phillip Karber and a group of Georgetown students claimed that China had constructed tunnels holding up to 3,000 hidden nuclear weapons in 2011. Other OSINT analysts reassessed the images and found serious analytical errors.

That said, it is also worth noting that U.S. government intelligence itself is not always correct. Zegart notes that several academic analyses of the U.S. intelligence community have found that the track record for assessing foreign nuclear weapons programs has been poor and has tended toward overestimation.

While OSINT poses significant challenges, there are also several opportunities there for U.S. intelligence agencies. Within the military and intelligence community, evaluating information and publicly releasing data is a bureaucratic process that can be slow and cumbersome, and Zegart notes that the "classified environment is designed to induce caution and confidence in analysis, but it moves at a slower pace."[8] One benefit of OSINT is that it can be produced publicly at a rapid rate. OSINT analysis can provide support for claims or can debunk government lies; for example, analysts at the Center for Nonproliferation Studies have repeatedly used open-source information to question North Korean claims about missile development and nuclear testing.

One potential avenue for future scholarship is to look at other fields outside of the nuclear community for lessons. Numerous other disciplines have grappled with questions of data-rich environments and emerging actors. There may be useful frameworks for understanding these developments in other fields, such as systems theory or the study of technology. Policymakers should consider how to best regulate this new development to maximize benefits while minimizing the disruptive potential of OSINT to detract from the intelligence community's vital missions.

Policymakers could also consider enacting small-scale changes to improve OSINT's standards, such as lowering restrictions on the resolution of commercially available satellite imagery. Currently, it is not legal to purchase satellite imagery that was captured at less than 25 centimeters resolution. On a larger scale, the U.S. government should consider how to foster the development of standards and best practices for OSINT. Where possible, publicly sharing best practices from intelligence agencies or holding publicly available government-sponsored workshops to train OSINT analysts could show that the United States is a leader in promoting the democratization of these technologies.

The most important takeaway from this new era is that intelligence agencies are no longer the only players in the nuclear threat assessment landscape. For better and worse, these changes are inevitable, and getting ahead of the curve is the responsible course of action.

6

Response to "How Much Is Enough? Revisiting Nuclear Reliability, Deterrence, and Preventative War"

By Doreen Horschig

In contrast to the old nuclear states, new ones such as India, Pakistan, and North Korea tend to value the political gains of prestige-bestowing displays—including nuclear explosions, missile flight tests, and other military exercises—over the increased reliability of their forces. This relegates technical considerations to the periphery, as Jeffrey Lewis and Ankit Panda explain in their chapter, "How Much Is Enough? Revisiting Nuclear Reliability, Deterrence, and Preventive War." They argue that new nuclear states have seemingly internalized the dramatic effects of nuclear weapons early in their development, even if their deterrent effects possess low levels of credibility. In other words, they perceive *enoughness*—their self-determined technical and political threshold in accomplishing their nuclear deterrence objectives—differently than the old nuclear states.

Lewis and Panda's chapter explores how political and military leaders in new nuclear states claim a nuclear force capable of sufficiently deterring aggression. It also provides a timeline of states' nuclear developments, presents the rationale for respective levels of weaponization, and explains when adversaries accept other capable nuclear forces, while unpacking the requirements for deterrence between both sides. Lastly, the chapter explores what mechanisms are at play if two states perceive their own capabilities and those of their opponents differently. A state's perception of *enoughness* often has little to do with the adversary's reasoning about its capabilities, suggesting an inherent risk of misperceptions and misunderstandings that need to be addressed by policymakers.

There are five specific implications of the chapter's findings for international security. First, if domestic political calculations matter more than technical ones to leaders in nuclear states, there is room for error in building and testing nuclear materials. When technical considerations are of secondary importance, this can lead to major accidents during weapons displays. The humanitarian and environmental effects of such mishaps would likely be hidden given the opacity of nuclear programs, several of which have personalist leaders with little interest in publicizing errors.

Second, the chapter explains that *enoughness* should be understood through the perception of the states themselves. This poses the broader implication that decisionmaking in foreign policy should circumvent mirrored thinking and similar cognitive biases. Instead, policymakers should comprehend the opponent's perspective and mode of reasoning. Pyongyang does not rationalize nuclear developments in the same way Washington did. Hence, policymakers cannot use Cold War thinking to understand new nuclear states, as these do not determine their *enoughness* using the same quantitative and qualitative metrics of the old nuclear states. However, if decisions are driven by internal pressures, it is extremely challenging to understand North Korea's domestic political situation.

Third, when a new nuclear state prioritizes political gains, meaningful arms control agreements can be difficult to achieve. New states may be less willing to engage in negotiations or agree to restrictions on their nuclear programs, which makes nuclear risk reduction more difficult. For example, Pyongyang's refusal to comply with international inspections and verification measures impedes any monitoring of its nuclear activities to ensure compliance. This poses significant challenges for arms control efforts in the region.

A fourth implication is heightened regional tensions. If new nuclear states engage in frequent displays of their nuclear capabilities for "dramatic effects," it can create a sense of mistrust among others in the region.[9] For example, Pakistan felt validated in its nuclear pursuit after India's 1974 nuclear explosion. Adversaries may interpret these displays as threats and risk arms races to develop their own nuclear capabilities for countering the perceived threat. This dynamic is also visible between India and Pakistan with their 1998 nuclear tests, which led to escalatory tensions and increased concerns about regional stability. Similarly, North Korea's displays of its nuclear and missile programs have led to an expanded military presence, joint military exercises between the United States and South Korea, and elevated concerns about the possibility of a nuclear conflict on the Korean peninsula. These dynamics increase the risk of regional arms races, exacerbate tensions, and amplify the risk of conflict, both conventional and nuclear.

Lastly, the chapter implies that deterrence is at its weakest in the *early* stages of a state's nuclear program, whether it values political or technical factors. An important pillar of robust nuclear deterrence is a secure second-strike capability, through which two nuclear states refrain from attacking each other. Yet, early-stage programs tend to have uncertain retaliatory capabilities, according to Lewis and Panda. The gap between a state's perceptions and its opponent's perceptions of its nuclear capabilities could differ significantly, presenting a challenge for strong deterrence. Policymakers should aim to understand an opponent's perception of its nuclear capabilities to address this challenge to deterrence.

A subsequent, encouraging lesson is that deterrence ultimately becomes stronger as new nuclear programs become more sophisticated. The authors pose that new nuclear states evolve their conceptions of *enoughness* and eventually begin behaving like the preexisting nuclear powers, engaging with the security dilemma of attaining advantage and assuring survivability. Hence, if policymakers can get through an initial period of instability, a stronger form of deterrence will emerge. This is closely related to the concept of nuclear learning, which suggests that there will be more stability as new states learn that nuclear weapons are useful for

deterrence, as discussed in Chapter 8. However, Bell and Miller argue that this theory is weak and that new nuclear states are unlikely to adapt restrained nuclear policies like the old nuclear powers.

Several key questions for future scholarship emerge. For one, in what circumstances does deterrence theory change? In other words, if the decision to expand nuclear arsenals derives primarily from domestic political calculations, how does it change the strategy of deterrence and engagement with nuclear adversaries? Traditionally, the strength of deterrence is measured by technical benchmarks, but posture and doctrine are seemingly as important—if not more so. Future scholarship should explore if deterrence remains robust despite less tangible political benchmarks.

Another thought-provoking question is whether it is in the international community's interest if new nuclear states test their capabilities. If their technical benchmarks are not tested and verified as with prior nuclear powers, deterrence may weaken in this new global order. On the other hand, testing capabilities would not only incur international costs and violate global norms but also raise tensions with adversaries and have environmental effects. Given this unequal treatment, new nuclear states may feel permitted to test because of the inherent injustice of the nuclear order.

A last case-specific question that derives from the Lewis and Panda chapter is how North Korea's nuclear program will change. According to the authors, it has shifted from latency to a rudimentary, unreliable nuclear deterrent to an operational force. Given the ongoing discussion of a possible South Korean nuclear deterrent, will Pyongyang move beyond simple operationality? And if so, what might this shift look like with regard to modernization and nuclear strategy?

The balance of terror described in the book is fragile and highly sensitive to changes in states' technical capabilities. However, according to Lewis and Panda, the experience of new nuclear states suggests that the nuclear balance does not lie on technical considerations but on political ones. This contrasts with much of the academic and policy writing surrounding these issues and emphasizes a need for policymakers to reconsider how deterrence is conventionally understood and applied.

7

Response to "Survivability in the New Era of Counterforce"

By Lachlan MacKenzie

In his chapter, "Survivability in the New Era of Counterforce," Christopher Clary challenges experts' assertions—namely those of Keir Leiber and Daryl Press—that the world has entered a new era of counterforce, in which protecting nuclear arsenals against attack is significantly more difficult. Clary argues that states refrained from employing counterforce attacks during past periods of highly questionable force survivability and that, while developments in sensing and strike technology have introduced new vulnerabilities for nuclear forces, technological advancement is unlikely to generate greater instability than in previous crises. Specifically, Clary suggests that, while hardening may now have less value for survivability, force mobility can still generate significant uncertainty for counterforce targeters. Clary further asserts that there is a large degree of asymmetry in the competition between counterforce "hiders and finders."[10] While wealthier nuclear powers will need to spend heavily to develop sensing and strike capabilities that could enable counterforce, smaller nuclear states will need only an "arms jog" to preserve the security of their forces.[11] Nonetheless, smaller states' reactive measures could have serious ramifications for strategic stability.

Clary's finding that counterforce is no easier today than in past eras has at least two significant implications for international security. First, it indicates that U.S. leaders will continue to contend with mutually assured destruction (MAD) as an inescapable condition in competition with its principal nuclear adversaries. Despite significant investments in intelligence, surveillance, and reconnaissance (ISR) and prompt strike capabilities, the United States, like all nuclear powers, will remain unable to unilaterally eliminate the threat posed by other states' nuclear forces. Second, Clary's work suggests that strategic stability is more durable than many appreciate. Weaker nuclear powers—with the possible exception of North Korea—should not be overly concerned about falling victim to counterforce. Minimal investment on the part of Russia, China, and Pakistan will ensure that counterforce remains an unappealing option for U.S. and Indian leaders. Russian investments in novel nuclear delivery systems and the massive ongoing expansion of the Chinese nuclear force—sometimes

assessed as responses to U.S. missile defense developments and related concerns about counterforce vulnerability—may therefore be unnecessary for the maintenance of strategic stability. To the extent that counterforce fears drive these modernization efforts, they could reflect misunderstanding on the part of foreign leaders about the technical feasibility of counterforce.

Clary's discussion of states' possible responses to the development of new counterforce-enabling capabilities also raises an important question for U.S. policymakers: Does the continued pursuit of nuclear primacy serve U.S. interests when that pursuit is unlikely to mitigate challenges posed by mutual vulnerability and may provoke destabilizing responses from adversaries? As a case in point, do the advantages that new ISR and strike capabilities provide to conventional forces outweigh the risks that might result from U.S. adversaries expanding and dispersing their nuclear forces, or potentially moving to launch-on-warning postures (possible responses that Clary identifies)? U.S. policymakers should carefully weigh the strategic benefits of new technologies against their potentially destabilizing impacts. When possible, it may make sense to tailor investments in ISR and prompt strike capabilities to maximize the conventional advantages that these capabilities confer, while minimizing their counterforce applications—and thereby forestalling adversaries' dangerous reactions.

Finally, Clary's work raises three key questions for future research about the factors that might influence a leader's decision to pursue counterforce. First, how do the leaders of nuclear-armed states assess the military feasibility of counterforce? While Clary makes a compelling argument that nuclear forces will remain survivable despite ongoing technological changes, Russian and Chinese nuclear modernization and expansion programs indicate that the leaders of those states may believe otherwise. Understanding what the leaders of nuclear-armed states believe about counterforce vulnerability and why they hold those beliefs is crucial for understanding counterforce temptations, since leaders will ultimately make policy based on their perceptions—rather than on the reality—of counterforce feasibility.

Second, how do factors other than the chances of military success—such as considerations about third-party intervention, the difficulties of dealing with a target state after a nuclear strike, or global perceptions—influence a leader's counterforce deliberations? Clary and other experts focus on military feasibility as the key determinant of whether states will pursue counterforce. In the Sino-Soviet case of 1969, however, non-military factors appear to have been decisive in deterring Soviet counterforce strikes, so is scholars' focus on military feasibility well-placed? Developing an understanding of the full range of factors that influence a leader's decisionmaking is crucial for understanding the circumstances under which a state might employ counterforce strikes.

Third, how does a leader's psychology influence the chances that a state will pursue counterforce? While leaders refrained from launching counterforce strikes during past crises, could events have played out differently had a more arrogant, paranoid, or vengeful leader been in command? Previous studies on the viability of counterforce have largely ignored personality and psychology. As leadership psychology gains increasing recognition as an important determinant of strategic stability, it will be important to examine how psychology and personality interact with counterforce temptations.

Clary's chapter contributes new thinking to the counterforce debate, carries significant implications for international security and U.S. policy, and raises a number of important questions for follow-on research. Exploring these questions will be vital for developing a fuller understanding of counterforce temptations, especially as states invest in modernizing and expanding their nuclear forces and as tensions between nuclear powers—most notably the United States, Russia, and China—continue to escalate.

8

Response to "The Fulcrum of Fragility: Command and Control in Regional Nuclear Powers"

By Melissa Chan

In their chapter, Giles David Arceneaux and Peter D. Feaver highlight a fundamental dilemma of possessing nuclear weapons: nuclear weapons should *always* be ready and secure to resist preemptive or decapitating efforts and should *never* be launched without authorization. Nuclear command and control (NC2) arrangements are designed to address this dilemma.

Arceneaux and Feaver explain that early NC2 theories from the post-Cold War era were mostly accurate for regional nuclear powers. The theories predicted that regional NC2 could vary based on geostrategic context, political and material constraints, and learning derived from the U.S. and Soviet experiences, which is all true. However, regional nuclear powers are forced to make tradeoffs—not previously made by the two superpowers—between the resilience and reliability of their arsenal and its safety and security. To increase readiness and response time for deployment, political leaders must sacrifice administrative oversight and recognize the value of delegating decisionmaking to lower-level military commanders. In contrast, efforts to increase arsenal reliability jeopardize arsenal safety due to the increased likelihood of unauthorized or accidental use. The authors also argue that all nuclear states must ultimately defer to military operators for delivering a nuclear strike, although political leaders may initiate it. Their new framework for understanding NC2 asks *when* the delegation occurs with respect to a crisis: in peacetime, early in a crisis, or late in a crisis. The authors introduce three distinct NC2 styles with inherent policy implications.

First, delegative control systems authorize nuclear use—including physical assets control—to lower-level military operators during peacetime, though not typically with use-control technologies such as permissive action links (PALs) and their equivalents. The authors present one challenge to this: it enables the military

to launch a nuclear strike under any conditions for the sake of arsenal readiness. To avoid decisionmaking mishaps in governing the nuclear arsenal, the military has to reinforce standard operating procedures for nuclear codes, prevent divergence in the chain of command, and anticipate threats with an objective mentality. During a crisis, the military is closer to initiating a nuclear strike and more prone to using nuclear weapons to resolve conflicts whenever they see fit.

Second, *assertive control systems* promote resilience against unauthorized nuclear use by deferring to a centralized authority in a crisis. This includes deeper political control with PALs or equivalents to dissect administrative control and physical possession with limited military influence. Arceneaux and Feaver explain that this strategy increases decisionmaking time and delays the reassembly of warheads and delivery platforms to initiate a nuclear strike, rendering arsenals—especially ground-based missile systems—vulnerable to decapitation. Even with time-related vulnerabilities, there are opportunities to fill the assembly time required by occupying the adversary's attention with nonnuclear and face-saving tactics, such as diplomacy and alliance building. The time needed for deployment can allow optimal collaborative moments for building trust, calling off a nuclear strike entirely, and de-escalating a crisis.

Finally, *conditional control systems* are a mixed approach, because delegation powers lie with a centralized authority during peacetime but are then transferred to military operators early in a crisis. The authors highlight three implications: (1) rapid assembly and nuclear weapons readiness can signal malign intent to an adversary and further increase escalation; (2) rapid transfer of delegation powers can weaken political oversight and increase chances of a political-military conflict while political leaders attempt to de-escalate a crisis; and (3) the fast decentralization process may convince adversaries of intended first use, along with any other misperceptions.

From these three approaches, Arceneaux and Feaver explore three arguments for explaining regional NC2. A state's *external threat environment* creates "use them or lose them" pressures that encourage a preemptive strike. Nuclear threats tend to produce delegative control because of increased urgency for rapid use, especially in states with small arsenals, inferior conventional capabilities, limited geographic depth, and nuclear adversaries. However, the authors explain that this argument fails to explain assertive control in states facing nuclear threats, such as China and India, and persistent delegative control within the United Kingdom and France. Observing an adversary's external threat environment is more doable but more prone to accelerating crises due to the existing likelihood of nuclear use.

The strategic rationale of the arsenal is derived from first-use or late-use nuclear strategies that shape NC2. Arceneaux and Feaver explain the nuclear postures of China (assured retaliation), France (first use), South Africa (late use), and India (late use), but they note the unexpected first-use strategy held by Pakistan (excluding delegation powers to the military during peacetime) and the United Kingdom's persistent delegative control despite their late-use doctrine. This argument illustrates discrepancies, but understanding regional nuclear doctrines can help determine the next move in a crisis.

The domestic political environment pertains to civil-military relations, including political and military interests, domestic instability, and regime survival. The authors mention the United Kingdom's entire history of military involvement in nuclear decisionmaking due to limited bureaucratic barriers, China's domestic instability after the Cultural Revolution, South Africa's apartheid regime, and India's exclusion of the military in nuclear issues. However, they note that this argument does not predict how strong military influences in Israel and South Africa did not lead to assertive control and how domestically stable states like the United Kingdom retained delegative control even when external threats subsided. Regional domestic politics can be considered

the least understood, especially in authoritarian regimes, because of a lack of transparency and understanding of different societies.

The simplified Cold War–era framework through which the nuclear community has been approaching NC2 needs to evolve on a case-by-case basis for understanding new nuclear powers. The limited knowledge of NC2 systems is further disrupted by new technologies like social media, cybersecurity, and artificial intelligence. Each form complicates the always/never dilemma and opens additional pathways for crisis escalation and nuclear use related to disinformation, technical controls, and nuclear use authorization and decentralization processes. With greater uncertainty about the intentions and capabilities of new nuclear powers, how should the United States modernize its NC2 system to address the additional caveats that come with the technological age while learning how new nuclear powers govern their own NC2 systems?

In an era of numerous nuclear states, there is a clear need to rethink ways for strengthening strategic stability to reinforce de-escalation tactics with adversaries during a crisis. New nuclear powers have opted for more flexible NC2 styles, making their behaviors more unpredictable. With recent events including Russia's suspension of New START and rejection of obligatory inspections, North Korea's cadence of missile tests, and China's reacting to U.S. diplomatic visits by threatening Taiwan's sovereignty, the urgency of creatively strengthening strategic stability coincides with ever-widening gaps of knowledge as all nuclear states navigate the international security order in the age of advancing technologies. This is further exacerbated by the noticeable lack of technological studies in the strategic studies community.

In the event of nuclear use, the fallout includes ramifications to climate change, global health, the international economy, and humanitarian crises. To prevent this, knowing the ins and outs of command and control systems in regional nuclear powers is the first step to reinforcing deterrence, strengthening strategic stability, and preventing nuclear use in a conflict. Some challenges in pursuit of this goal include a closed "us versus them" outlook when rationalizing adversarial behaviors, new nuclear states pursuing destabilizing NC2 features, and advancing technologies corrupting scholars' limited understanding of regional nuclear powers' doctrines.

9

Response to "The Limits of Nuclear Learning in the New Nuclear Age"

By Jessica Link

In their chapter, "The Limits of Nuclear Learning in the New Nuclear Age," Mark Bell and Nicholas Miller challenge core assumptions of the nuclear learning argument, which posits that the behaviors of nuclear-armed states become more stable over time as they learn from nuclear interactions and crises. Proponents of nuclear learning assume that stable deterrence dynamics emerge after a period of learning.

While Bell and Miller acknowledge that some nuclear learning can occur, they push back against the assumption that it is an inevitable, automatic path to stable deterrence relationships. The authors highlight several weaknesses in the nuclear learning argument. First, states are "poor learners" that face several institutional barriers to identifying and understanding the correct lessons.[12] Moreover, states might struggle to implement what they have learned into the domestic institutions responsible for nuclear stewardship. Second, states may learn the wrong lessons that encourage destabilizing behavior, especially if they emerge from a situation in which destabilizing behavior paid strategic dividends. Finally, dynamics between nuclear-armed states are not necessarily conducive to positive nuclear learning. Interactions between nuclear-armed adversaries are marked by skepticism about the intent behind stabilizing actions, thus undermining their impact. Some states might also intentionally exploit their adversary's stabilizing measures to gain an advantage.

Nuclear learning will only become more difficult in the coming decades given increasingly complex deterrence dynamics, weakened crisis stability, horizontal and vertical proliferation of emerging technologies that "increasingly facilitate aggressive, counterforce-oriented nuclear postures," and higher levels of nuclear secrecy, particularly by potential proliferators.[13] Considering this, Bell and Miller's chapter makes several valuable contributions to international security policy and scholarship.

First, Bell and Miller's findings have important implications for the international security environment as states contend with a weakened nonproliferation regime, high global levels of nuclear latency, and a new

set of states with heightened demand-side drivers for proliferation. Some U.S. nuclear strategy circles (albeit small ones) advance the idea of "nuclear optimism" in a way that excuses or tolerates future proliferation. For example, these advocates might openly flirt with the idea that proliferation by South Korea will lead to more stable deterrence dynamics in East Asia, particularly with North Korea. Under certain conditions, nuclear weapons deter aggression and create a stabilizing balance between adversaries. However, there is no guarantee that new nuclear actors will inevitably fall into these stable deterrence patterns.

If anything, as Bell and Miller point out, future nuclear actors might face incentives to undertake risky and destabilizing behavior and steer their arsenals to meet aggressive counterforce requirements. As *The Fragile Balance of Terror* meticulously outlines, the new nuclear era is increasingly complicated, and risks of intentional and unintentional escalation are heightened. The destabilizing impact of future proliferation is unpredictable and nuclear learning is not guaranteed. To hedge against this uncertain future, U.S. policymakers must maintain a steadfast commitment to nonproliferation and strengthen extended deterrence commitments to prevent the emergence of new nuclear-armed states.

Bell and Miller also address several key policy questions against the backdrop of an increasingly complex nuclear order and worsening proliferation landscape. Do new nuclear-armed states represent unique risks to stability, whereas established nuclear-armed states do not? Do recent proliferators that act in destabilizing ways, such as North Korea, pose long-term policy challenges or short-term problems that will naturally stabilize over time?[14] Bell and Miller establish that the international community cannot expect states such as North Korea to naturally act within the bounds of stable deterrence dynamics after an initial period of learning. As such, North Korea might very well be a long-term policy challenge for the United States. Moreover, policymakers and scholars cannot assume that established nuclear-armed states will inevitably demonstrate responsible nuclear behavior. Russia's nuclear saber-rattling in the context of its invasion of Ukraine—along with its willingness to allow strategic stability measures, such as arms control agreements and crisis communication mechanisms, to atrophy—clearly demonstrates that experienced nuclear-armed states might behave outside the bounds of stable deterrence dynamics despite decades of learning.

U.S. policymakers should continue to seek stable deterrence relationships with other nuclear-armed states where possible—perhaps with more innovative approaches, such as engaging non-aligned movement (NAM) states to advocate for the adoption of globally beneficial stability measures by the United States, Russia, and China. However, knowing that U.S. efforts might fail since some states face incentives for destabilizing behavior, the United States should also be prepared to mitigate risks emanating from destabilizing nuclear-armed states. For example, unilateral moves to establish responsible behavior norms, such as the U.S. ban on anti-satellite weapons testing, as well as track 2 (backchannel) diplomacy, might provide valuable avenues for risk reduction when official multilateral efforts fail.

Finally, this chapter poses critical considerations for future scholarship as Bell and Miller push back against the assumption that nuclear-armed states change their behavior in a progressive and normative way, rather than a "value-neutral" way.[15] In other words, advocates of the nuclear learning argument assume that nuclear-armed states value stable deterrence patterns above other foreign policy objectives and, therefore, progressively change their behavior to that end. The authors, however, highlight that this is not always the case—not all nuclear-armed states value stable deterrence as it is defined in the United States. As a new nuclear era marked by unprecedented nuclear dynamics emerges, scholars must interrogate their assumptions about the nature of state behavior and its drivers in order to provide accurate scholarship. Looking at the nuclear learning argument within a value-neutral framework raises several questions in need of rigorous analysis: Under what

conditions does nuclear learning yield positive impacts to stability versus negative impacts? What other factors might impact these outcomes? What qualities and characteristics of the stabilizing measure (i.e., permissive action links) itself make it more or less likely to be adopted by states? As the world enters into a new nuclear era, these questions might yield insights into how the international community can reinforce stability between nuclear-armed states.

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Endnotes

1 All quotes are sourced from Sagan, Scott, and Vipin Narang, eds. *The Fragile Balance of Terror: Deterrence in the New Nuclear Age* (Cornell University Press, 2023), https://www.cornellpress.cornell.edu/book/9781501767029/the-fragile-balance-of-terror/#bookTabs=1.

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