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Jacobs, Ryan

Monterey, California. Naval Postgraduate School

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The Challenges of Nuclear Learning in South Asia

Feroz Khan
Ryan Jacobs

Khan is a professor in the National Security Affairs Department of the Naval Postgraduate School in Monterey, California.

Jacobs is a Research Assistant at the Naval Postgraduate School.

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1 The Challenges of Nuclear Learning in South Asia

Feroz Khan and Ryan Jacobs

The sustainability of strategic stability in South Asia remains of the highest importance to U.S. national security policy. The South Asian Nuclear Learning project was accordingly conceived to examine the region's nuclear experiences after the 1998 tests. The end of the first decade (1998-2008) represented a good starting point. Later, the project expanded to further analyze the nuclear learning curve in the next decade, when security environment and technological innovations undertook major shifts. The National Nuclear Security Administration sponsored this research, which involved selected scholars and experts from Pakistan, India and United States. Some of these contributors also helped shape their state's nuclear decisions in the earlier period following the nuclear tests.

Learning, in general, regards change or evolution in existing paradigms "as a result of the observation and interpretation of experience."[1] Nuclear learning simply inserts the complexities of nuclear weapons into the discussion. The project initially conceived of learning as a simple and observable phenomenon; however, it soon became clear that we had to define what it meant to learn in a complex fashion. We had to ask: Who learns? At what level (individual, institutions, or states)? In the realm of South Asian nuclear learning, this was no easy task. The following pages represent a partial answer to how South Asia has learned to live with nuclear weapons and what obstacles lie ahead.

The Road to Nuclear Learning: What is it? Who Learns? What Matters?

Before delving into South Asia's specific nuclear experiences, some conceptual-level insights will address the questions posed above and will help frame the following analysis. Unsurprisingly, new nuclear weapon states often arrive on the world stage without prior experience in conceptualizing how these weapons interact with a country's security strategy. This lack of experience tends to complicate the learning process and provide opportunities at multiple levels of learning. Thus, no clear consensus emerges from the theoretical literature on the issue and contributors to this project tended to link different levels of learning without assigning definitive values to them. Individual-based nuclear learning does not automatically disengage the state. Instead, individual learning occurring within organizations can be institutionalized through standard operating procedures and other methods. If observers employ a comprehensive picture of the learning pathway, states also can and do learn.

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[1] Jack S. Levy, "Learning and Foreign Policy: Sweeping A Conceptual Minefield," *International Organization* 48, no. 2 (Spring 1994): 283.

What constitutes learning? Building on research by Jeffery Knopf and others, an answer can be outlined in two categories. Factual learning consists of the empirical facts associated with nuclear weapons – numbers, types and capabilities of various weapon systems. Inferential learning involves the lessons learned and applied to policy decisions. By way of distinction for example, "the effects of a nuclear detonation are important for factual learning," while "what it means to employ nuclear weapons for political purposes is a matter of inferential learning."[2]

The normative goals of nuclear learning also tend to change based on whom is questioned. For instance, Pakistani tactical nuclear weapons (TNWs) development might be considered correct, simple learning for the tactical puzzle-faced. Nonetheless, for more complex learning associated with strategic stability, TNW development can constitute incorrect learning since these weapons can prolong and intensify security dilemmas. The inherently contested nature of nuclear learning laid out above demonstrates that policymakers must be aware of the dangers posed by biases.

A common discourse might help navigate effectively through biases. To assist, the project identified some similar characterizations from South Asia's diverse scholarly community, such as the shared use of factual and inferential learning. One should note, however, that scholars did not always use the same terminology for the same concept. For instance, the term *adaptation* corresponded with simple learning where there is a change of means change but not a change in the overarching goals.

Breaking Myths to Further Learning
Dr. Peter Lavoy-

Myth 1: Track two, non-governmental, and academic gatherings do not matter

Policymakers mistakenly believe responsibility for problem solving lays with themselves. Yet, track twos are critical for three reasons: 1) They enable small steps, which create domestic awareness for the need to develop solutions; 2) allow states to share perspectives on how they conceive reality differently without track one limitations, which provides more space to find innovative solutions; and 3) enable participants to capture a comprehensive and easily implementable package of ideas difficult to achieve in interagency and track one meetings.

Myth 2: Governments do not learn

Government can learn even if it rarely does; however, conditions must be right. Two are important for complex learning: 1) Leadership matters. Learning is quite hard if new assumptions are based off an accumulation of past decisions, but good leaders challenge fundamental assumptions and foster a culture of learning. And, 2) Good leaders help but they must also work in an organization that institutionalizes learning and retains a dynamic character, which incentivizes challenging assumptions and revaluating goals.

Myth 3: The automaticity of stability or instability upon the introduction of nuclear weapons

One should not assume instability or stability is automatic when nuclear weapons are introduced. Accepting the reality of nuclear weapons should be more important than condemning new nuclear states for breaking non-proliferation norms. Instead, established nuclear powers must share experiences with new ones to enable effective nuclear learning that ensures strategic stability.[3]

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[2] Jeffery Knopf, "The Concept of Nuclear Learning," *Nonproliferation Review* 19, no. 1 (March 2012): 79-93.

[3] Peter Lavoy, remarks during keynote address during Nuclear Learning workshop, Second Iteration, Bangkok, Thailand, May 15-17, 2012.

Models coexist with an ever-present criticism of their applicability to new or somehow different situations. This is no different in the South Asian case. Research into the second decade of nuclear learning found that both sides recognized the existence of deterrence models and more general, potentially applicable, Cold War nuclear experiences. Yet, Indian and Pakistani scholars only warily appreciated the potential for learning from or adapting these models and processes to their circumstances. The Indian scholars also indicated that Cold War, NATO – Warsaw Pact era models were not designed for an adversary willing to use sub-conventional, terrorist tactics. Even without the benefits of history, however, nuclear learning in South Asia can still produce tangible consequences or examples of progress. A few examples include pushes to improve doctrine, command and control (C2), safety and security, and conceptual understandings. Keeping the above foundational knowledge in mind, we can now ask how nuclear learning has or has not occurred in South Asia.

Learning Pathways in South Asia

South Asia's first decade saw a limited war and various military and political crises inhibit lasting efforts toward peace and security. In the nuclear realm, technological maturation and the development of reliable nuclear forces progressed slowly while crises interrupted nuclear learning at every turn. Despite these interruptions, however, both sides demonstrated lessons learned.

Five major inflection points during the first decade framed South Asia's nuclear learning pathway: 1) 1998 nuclear tests, 2) Kargil War, 3) 2001-2002 military standoff, 4) revelations regarding A.Q. Khan, and 5) Mumbai terrorist attacks.

The 1998 Nuclear Tests

Domestic politics represented the single most important factor in the 1998 tests, but threat perceptions also compelled changes in security policies. Decision makers in India, captivated by the ideal of their country's rise, concluded that India's newfound status should be coupled with coming out of the nuclear closet. In this light, nuclear weapons were seen as the chief currency of power on the world stage. In turn, Pakistan's reaction originated from the leadership's fears that no response to the perceived Indian provocations would be domestic political suicide. After the tests, neither country was well-prepared for the implications of becoming declared nuclear powers.

The Kargil War

The 1999 conflict over Kargil defined the India-Pakistan relationship for years to come. Due to the international sympathy for India's rising power position generated; its leaders were pleasantly surprised by the outcome. Pakistan, on the other hand, was rudely shaken by international condemnation and isolation. Kargil also engendered a deeper debate within South Asian policy and academic circles regarding two related nuclear concepts developed during the Cold War: Glenn Snyder's strategic instability paradox and Robert Jervis's nuclear revolution. Building on Peter Lavoy's research, the project found that Kargil represented a lack of nuclear learning in both India and Pakistan. For better or worse, Kargil led to new doctrinal learning on both sides. In India, Kargil validated the potential for limited war under a nuclear umbrella and led decision makers to call for a declared nuclear doctrine. In Pakistan, policymakers came to see a clear articulation of effective C2 as more critical than a declared nuclear doctrine. Thus, India chose a declared doctrine of no-first use (NFU) with little articulation of its C2 structure while Pakistan chose to retain an undeclared option of first-use combined with well-defined C2.[4]

The 2001-2002 Military Standoff

Nuclear learning does not occur in a static environment and the pace of change in the region affected India and Pakistan's learning process. The terror attacks of 9/11 and the subsequent U.S. military intervention in Afghanistan affected Indian and Pakistani security postures. Therefore, the 2001-2002 standoff tested India's theorizing on limited war under the nuclear umbrella. Both sides learned different and exaggerated lessons from the crisis. India learned that a prolonged military mobilization could prevent a surprise attack and compel positive shifts in Pakistani policy – in the long run this led to Cold Start. Pakistan learned that its combined counter-mobilization and nuclear capability effectively deterred India.[5] The more important question, however, was whether both sides prevented war on their own or an exogenous variable, such as international intervention, diffused the crisis.[6]

Revelations Regarding A.Q. Khan

The unraveling of A.Q. Khan's proliferation network presented a significant shock to Pakistan's standing in the international community. Coming on the heels of Kargil, Pakistan faced a huge challenge in repairing its international image. Conversely, this crisis helped India because it was already seen as a victim of conventional aggression after Kargil and ongoing non-state actor attacks. After A.Q. Khan, India also maintained a cleaner image on nonproliferation. As a result of these challenges, Pakistani learning was heavily impacted and its priorities shifted even more to creating a tightly controlled nuclear C2, where management and accountability reigned supreme. Despite the various challenges facing India and Pakistan in the first half of the decade, some positive nuclear learning also occurred. For a period of five years from 2003-2008, both countries made a concerted effort to forge a structure of peace, security, and détente –during which time no war broke out.[7]

The Mumbai Terrorist Attacks

This positive learning curve suffered a paralyzing shock from the Mumbai attacks. The level of distrust and anger from the incident seeped into the learning process and the intensity of this distrust now shapes the attitude both countries have towards one another. Indians believe elements within the

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[4] See a detailed and comprehensive analysis of the Kargil Conflict and its aftermath in Peter Lavoy ed., *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict* (New York: Cambridge University Press, 2009).

[5] For a comprehensive analysis see Zachary Davis ed., *The India- Pakistan Military Standoff:" Crises and Escalation in South Asia* (New York: Palgrave Macmillan, 2011).

[6] This dynamic came to be known as yet another paradox – the independence-dependence paradox. See Feroz H. Khan, "The Independence-Dependence Paradox: Stability Dilemmas in South Asia," *Arms Control Today* (October 2003).

[7] For a detailed assessment of AQ Khan network and its impact see, International Institute for Strategic Studies, *Nuclear Black Markets: Pakistan, A.Q Khan and the Rise of Proliferation Networks, A Net Assessment* (London: International Institute for Strategic Studies, 2007). Also see Feroz Hassan Khan, *Eating Grass: The Making of the Pakistani Bomb* (Stanford University Press, 2012), 162-173;359-376

Pakistani state harbor deep grievances and hope to derail the peace process due to vested interests. Pakistanis have become equally hardened in their belief that India's grand strategy to keep the country week rests in the determination to destroy Pakistan's military potential. These shared conspiratorial mindsets negatively affect the learning process.

Where South Asian Learning Stood: A Decade after the Test

Ultimately, these five inflection points and a cumulative assessment of the nuclear experience in the first decade highlight a potentially destabilizing lack of adequate learning. These are encapsulated more clearly through nine major conclusions:

- India and Pakistan lack a shared assessment of each other's nuclear capabilities.
- Both countries do not fully comprehend the motives driving the adversary's force modernization goals.
- No mutual understanding of escalation dynamics. Pakistan does not fully comprehend how its domestic negligence and perceived complicity regarding asymmetric threats to India can result in a conventional war. Conversely, India believes it can wage a limited conventional war and control escalation without crossing Pakistani nuclear thresholds
- Political leaders in both countries do not fully grasp critical nuclear issues and the subtleties required to refine policy discourse and decision making.
- Polemics and media hype undermine serious discussion on nuclear behavior, security policy, and the dangers involved in rhetorical and overt threats.
- Both countries are committed to minimum deterrent postures; however, both continue force modernization and develop a strategic triad while leaving arsenal size requirements undefined.
- Pakistan was more advanced in operationalizing its nuclear deterrent and integrating it with its conventional military plans, while India lagged in most categories of nuclear force development and clearly articulated command systems.
- Bilateral communications need improvement to manage crises and prevent escalation. Existing arrangements helped avoid misunderstandings in peacetime but did not contain crises.
- Almost all crises were diffused through U.S. intervention and active involvement.

Where South Asian Learning is Heading: The Next Decade

The second decade dawned amidst the mixed baggage of its forerunner. While distrust deepened, new factors began to affect the learning process. First, structural changes in the region's geopolitics applied pressure on Indian and Pakistani policymaking. Second, new security doctrines began to emerge, which incorporated India's Cold Start and Pakistani TNWs. And finally, both sides initiated major force modernization programs where technological maturation enabled more fissile material, delivery systems, and improved intelligence, surveillance, and reconnaissance (ISR) capabilities. Have these changes brought more stability or less? The second iteration of the Nuclear Learning in South Asia project aimed to answer these questions.

Pakistan and India remained outside the mainstream of the nuclear age. Thus, they were novices when it came to adopting the norms of behavior that nuclear weapon powers upheld. Both countries existed primarily outside non-proliferation regimes and lacked a prior history in nuclear weapons before 1998. Hence, they entered into the nuclear era relatively unacquainted with their atypical status and its ramifications. States learn by doing, and this trial and error approach to nuclear learning appeared analogous to South Asia's experience at lower escalation levels. In particular, our research highlighted the odd utility of Indo-Pak iterative brinksmanship. This approach instigated lesson learning in both countries as information on red lines and the limits of security policies were learned through crises.

In particular, the 2001-2002 crises were consistently exhibited as one example. To an extent, while Pakistan learned about Indian resolve in response to alleged proxy threats, India realized the limits of action under Pakistan's nuclear shadow. This iterative brinksmanship erupted in a quick succession of events, which led some to believe that the timescales involved were too quick to permit adequate learning.[8] New Delhi's interactions with Islamabad over the last few decades also taught that India's most effective weapon against Pakistani malfeasance was a reliance on shaming Pakistan in global public opinion for supposed deviant behavior, which many in the international community could bandwagon due to a shared aversion to terrorism. This reliance on the international community also intersects with the processes that both sides learned to utilize in the case of deterrence spirals, whereby third party conflict mitigation was required to forego escalation. Lastly, despite the existence of epistemic communities in both states focused on nuclear weapons, scholars found no agreement on whether these groupings helped or hurt efforts toward stability. What almost all could agree on, however, was the likely destabilizing effects of technological maturation.

Technological Maturation and India-Pakistan Strategic Stability

Technological maturation presents India and Pakistan with a problem of monumental proportions. Yet, neither side has truly come to grips with the precarious consequences of their strategic competition – evidenced by their mutual pride regarding nuclear weapons. This so-called nuclear nationalism, however, more easily supports capability acquisitions rather than doctrinal innovation. In other words, both states are acquiring new capabilities without involving much strategic forethought into their decision making. Technological competition, therefore, overwhelms prudence in regards to stability on the subcontinent and can instigate an arms race spiral that will be difficult to terminate.

Five major technological innovations in South Asia have complicated the learning process between India and Pakistan due to their impact on stability: 1) Ballistic Missile Defense (BMD), 2) Multiple Independent Reentry Vehicles (MIRVs), 3) Sea-based Deterrents, 4) Battlefield Nuclear Weapons (BNW), and 5) Cruise Missiles. Two out of these five innovations are extremely destabilizing (BMD and BNW); the others could either be destabilizing or stabilizing. In the first decade, fewer strategic delivery systems existed. In the second decade, the increased number and variety of delivery means is seemingly driving doctrinal change, which inhibits effective learning.

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[8] Zachary Davis, ed. *The India- Pakistan Military Standoff: Crises and Escalation in South Asia* (New York: Palgrave Macmillan, 2011), 229-235.

In particular, BMD has become a critical new nuisance that seems set to threaten current or future conflict dynamics in the region. Claims from India's Defense Research Development Organisation (DRDO) of a deployable BMD system are somewhat questionable at best. Yet, BMD impacts Pakistani threat perceptions because, in the long term, it compromises the perceived effectiveness of Pakistani nuclear weapons. Islamabad considers that the offense-defense balance will tilt toward India. A protective shield, real or imagined, provides Indian decision makers an umbrella from which to engage in provocative acts. Thus, Pakistan's countervailing strategies involve further technological innovations such as MIRVs, decoys, and increased fissile and ballistic missile stocks. This dynamic also incentivizes Pakistan to develop BNWs and cruise missiles. At best, this interaction represents simple learning of an action-reaction character, which can hinder the chance for more transformative learning.

Some believe BMD emanates more from India's prideful scientific establishment than its strategic decision makers. India's various cooperative defense agreements with other nations in the BMD game – Russia, the United States, and Israel – also alarm Pakistani decision makers. After all, Israel's recent Iron Dome demonstrations highlight the potential for missile defense systems to negate a weaker adversary's advantages in combat. Thus, the introduction of BMD, even if only for point defense, has the potential to upset stability by eroding mutual vulnerability. The perceived erosion of mutual vulnerability relates back to concerns that factual nuclear learning has not yet entered the public domain in both countries. For uneducated publics, BMD increases the sense of invincibility even though it may not provide an invulnerable shield.

One further threat to strategic stability emanates from another DRDO pet project: MIRVs. Although technically feasible, MIRVs could significantly increase India's ability to engage numerous Pakistani nuclear targets and thus limit the damage from retaliatory strikes. If deployed, this could provoke a potentially unstable arms race dynamic. In a democratic system, this perception can place inopportune pressure on decision makers to engage in dangerous acts.

A more comprehensive examination of the ongoing technological processes highlights both sides' moves toward a secure second strike capability, which arguably can be more stabilizing. In particular, comparative increases in weapon numbers with parallel efforts to increase survivability through a larger and more dispersed deployment of delivery devices such as ballistic missile submarines (SSBNs) (India's *Arihant* class) and longer range missiles (Pakistan's *Shaheen* family of missiles) should lead to mutually assured destruction. This does not necessarily imply a less confrontational South Asian future will occur; however, its existence must be mutually accepted in Pakistan and India. The pattern of learning so far examined in South Asia, points to iterative brinksmanship games that produce nuclear learning only at the conclusion of crises.

Some foresee a troubled road ahead for India and Pakistan at lower levels of the use of force spectrum, including the potential employment of BNWs as war-termination devices. Principally, this prognosis owes conceptual homage to Glenn Snyder's stability-instability paradox. Simply put, as both sides' develop more systems for conventional and tactical nuclear use under the umbrella of strategic stability, the chances for conflict below a strategic nuclear exchange increases. There will likely be a high confidence that these lower levels of force will not escalate to a strategic nuclear exchange. Platforms with a latent potential for miniaturized nuclear warheads – such as tactical missile systems and cruise missiles –deployed at readier states of alert will help push this dynamic. Specific systems include Pakistan's *Nasr* multiple launch rocket system (MLRS) and *Babur* cruise missile, and India's *Prahaar* MLRS and *BrahMos* cruise missile.

One additional factor regards China's primary place in Indian nuclear strategy. This inherently means that capability developments fashioned with Beijing in mind affect the Indo-Pak nuclear relationship. Therefore, the technological competition in South Asia is multidirectional. Nuclear learning on the subcontinent must be understood from a wider prism, which includes Sino-Indian nuclear interaction.

In South Asia, technological maturation complicates nuclear learning. Cold War lessons that brought about strategic stability are lost because doctrinal thinking becomes too complex given the ever growing impact of disruptive technologies. In the end, both sides are likely to spend themselves into an unwinnable and distracting arms competition. While such a race might be affordable for superpowers, South Asian states have less resources and more pressing domestic fissures to resolve. Ideally, decisions on doctrine and C2 should precede widespread force modernization. However, this sequence is always difficult to achieve – as was the case in the first nuclear age.

Strengths and Weaknesses in South Asian C2, Doctrine, and Arms Control

Nuclear doctrines exist at the policy and operational level to define how and under what circumstances the employment of nuclear weapons should be considered. On a practical basis, however, understandings of doctrine do not need to complement each other at different levels and opposing doctrines do not always suit one another since this prevents unhealthy doctrinal competition. Once again, the India and Pakistan's peculiar structural positions suggest different nuclear weapon doctrinal outlooks. Although these doctrines borrow from Cold War experiences and thus represent some form of mutual learning, lessons are applied into a unique structural reality. India retains evident conventional military and resource superiority in the South Asian dyad and consequently can afford a more benign, yet declared doctrine. Pakistan, on the other hand, considers a more ambiguous, undeclared doctrine advantageous since its weapons are designed to offset India's conventional forces and the general structural – or geophysical – imbalance.

Indian Doctrine

New Delhi's attempts at making its doctrine's principal attributes clear have been muddled; however, India's doctrine seems relatively discernible compared to Pakistan's direct policy of ambiguity. India treats nuclear devices as political weapons and revolves around a NFU policy with credible minimum deterrence. Thus, New Delhi maintains its nuclear forces to threaten massive punitive retaliation if India suffers a first strike. To remain credible, Indian forces need to be survivable and effective, which leads policymakers to opt for a triad force structure. By design, almost any decisions on nuclear weapons are made by India's civilian political leadership.

Despite rhetoric of peaceful intent and civilian control, Indian doctrine has not been wholly perceived as de-escalatory. An ever-increasing reliance on new and technologically sophisticated weapons and related devices still leads some to accuse India of adopting a maximalist rather than minimalist nuclear posture. For example, movement toward SSBNs might compel an undersea arms race despite India's intended deterrent. Perhaps a more troubling debate surrounds India's NFU policy. Although Indian officials consistently signal adherence to NFU, hawks as well as India's National Security Advisory Board have recently recommended serious reconsideration of the doctrine. Two primary reasons drive these calls: 1) Other nuclear powers do not accept Indian NFU on faith and 2) NFU involves inherent and catastrophic costs if deterrence should fail, e.g. a Pakistani first strike on an Indian metropolis or forces in the battlefield.

The consequences of an Indian reversal on NFU carry significant risks for strategic stability and may represent learning in the wrong direction. A first-use doctrine has its own inherent risks. India's potential adversaries possess second-strike capabilities and a first-use posture would require significant, costly modifications regarding resource investments and decision-making authorities which may not sit well with India's political elites. Moreover, India's doctrine and status provides certain benefits like the ability to stand on the subjective moral high ground and shame Pakistan on the international stage. In the long run, China poses future doctrinal difficulties. Given the growing power gap in both the conventional and nuclear realms, New Delhi may one day find itself in a similar situation to Pakistan – a more capable opponent that requires an asymmetric, ambiguous, and hair-trigger posture to deter irredentism.

Pakistani Nuclear Doctrine

A comprehensive understanding of Pakistan's doctrine would require access and archives, neither of which suits its outwardly ambiguous approach. Yet, the doctrine – regardless of the specifics – has evolved since Kargil. Hopefully, the lessons Pakistan learns from its iterative brinksmanship games with India – contextualized by historical animosity and realpolitik – may move towards positive doctrinal innovations.

Pakistan's nuclear doctrine evolved under a military-dominated system during its formative nuclear years. Pakistan's nuclear weapons are often attributed to contain five major elements of its strategy and three additional roles that have obvious doctrinal consequences. Peter Lavoy surmises five dimensions to its deterrent policy: 1) an effective conventional fighting force augmented by nuclear weapons as last-resort weapons to prevent military defeat or loss of territory; 2) a minimum deterrence doctrine and force posture; 3) an adequate stockpile of nuclear weapons and delivery systems to provide for an assured second strike ; 4) a survivable strategic force capable of withstanding sabotage and conventional military attacks; 5) a robust strategic command and control apparatus designed to ensure tight negative use control during peacetime and prompt operational readiness (positive control) at times of crises and war.[9] At times, additional roles to the acquisition of nuclear capabilities are attributed such as: facilitator of low-intensity conflict; tool for internationalizing disputes; and tool for providing extended deterrence.[10]

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[9] Peter R Lavoy, "Islamabad Nuclear Posture: Its Premises and Implementation" in *Pakistan's Nuclear Future: Worries Beyond War*, ed. Henry L Sokolski (Carlisle Barracks: Strategic Studies Institute, 2008), 131.

[10] For detailed analysis of roles of nuclear weapons see Feroz Hassan Khan and Peter R Lavoy, "Pakistan: The Dilemma of Nuclear Deterrence," in *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, ed.

These roles remain hotly contested and some obvious lessons affect their perceived efficacy. For instance, Pakistan's weapons are unable to favorably internationalize its dispute with India. Kargil and the 2001-2002 standoff highlighted a doctrinal failure in advantageously raising territorial issues. Throughout the decade this has only become clearer as India's de facto nuclear status has grown. Obviously, a deeper understanding of how Pakistan measures the success of its doctrine is necessary. For example, Pakistan only developed TNWs after democratic transitions had successfully taken root. The first short-range battlefield nuclear weapons, commonly referred to as TNWs, were introduced in 2011.

Theoretically, TNWs are meant to provide more flexible responses for policymakers and therefore enhance deterrence credibility. Thus, Pakistan in one way or another has begun incorporating TNWs into its wider doctrine. Since any significant Indian response to provocations would seem to cross Pakistani redlines, flexibility comes with an escalatory cost. The deployment of TNWs also has negative consequences for doctrinal transparency. Yet, the military and resource imbalance between India and Pakistan likely means Pakistani transparency will remain out of reach. With mutually escalatory doctrines facing off on the plains of India and Pakistan, instability at the tactical level will likely increase.

India's doctrinal response, however, has come from the conventional world. Cold Start is designed not to break Pakistani red lines; instead, it calls for the launching of integrated battle groups into Pakistan in order to achieve limited military and political objectives. These incursions come with a concomitant employment of indirect fire meant to retard Pakistan's conventional reserves. Altogether, Cold Start is meant to communicate a more credible and flexible response option to Pakistani proxy activity and to counter Pakistani short lines of communication within its territory. Yet, South Asia's tit-for-tat doctrinal innovations have developed into a spiral dynamic fed by capability developments. Thus, Pakistan's doctrinal response has raised the stakes for any conventional, cross-border attacks. To India, this implies a shield for waging proxy war. This cycle of misperceptions and action-reaction has inhibited any positive learning in the region. Outside influence or intervention to break this cycle has remained unsuccessful.

Muthiah Alagappa (Stanford University Press, 2008), 215- 240; Peter Lavoy, "Pakistan's Nuclear Doctrine," in *Prospects for Peace In South Asia*, eds. Rafiq Dossani and Henry S. Rowen (Hyderabad, India: Orient Longman, 2005), 280-300; Also see S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Stanford: Stanford University Press, 2007).

Command and Control

As a means to a state's deterrent interests, C2 mechanisms ensure the appropriate and authorized use or nonuse of nuclear weapons. Both India and Pakistan require robust C2 systems to ensure their nuclear deterrent, but given their differing political structures, the makeup of both countries' systems necessarily diverges.

India's C2 arrangements reflect the shortcomings of its nuclear development, planning, decision making, and doctrine. Despite recent progress operationalizing nuclear capabilities, nuclear C2 remains embedded in complex political and bureaucratic structures, which raise questions about the efficacy of India's Nuclear Command Authority (NCA) to produce timely decisions, especially in a crisis. Military officials have little if any independent authorities on nuclear weapons, while technical experts connected to political leaders manage critical C2 functions. Slowly but surely, India is learning to build a more regularized C2 structure with "dual-rule" release procedures and other innovations, but unnecessary opacity still stymies effective deterrence through visibly robust and redundancy. Not surprisingly, New Delhi is not alone in facing an unsettled C2 environment.

Potential Future Stressors on Indo-Pak C2

BMD: It is unclear how this emerging Indian capability will be integrated with civilian political authorities. Who will control its use and how will info on incoming threats be distributed?

Conventional Capabilities, Nuclear Signatures: As both states consider employing cruise missiles and MLRS systems with conventional and nuclear potential, they must figure out launch authorities and protocols for reacting to incoming dual-use weapons. The presence of ambiguous threats will require effective C2 structures to communicate information quickly to decision nodes.

Targeting: Given the rise in precision weaponry, how will both states' military and political apparatuses navigate the targeting of sensitive dual-use targets with implications for escalation?

Non-Permissive Operating Environments: Many scenarios exist where enemy action incapacitates established C2 networks. Yet, deterrent minded redundancies and SOPs still seem undeveloped.

Deterrence at Sea: Custody issues abound regarding the deployment of nuclear weapons on surface and sub-surface combatants.

Pakistan's nuclear C2 lies in the military portfolio. The effects of this centralization remain debatable. The 1998 tests prompted development of a Strategic Plans Division (SPD) and Army Strategic Forces Command that were supported by a cadre of experts to ensure continuity in nuclear policy. The following year, Kargil only reinforced this need for effective C2 mechanisms – both states went to war in uncertain states of nuclear alert. The Musharraf regime's subsequent significant resource investment and prioritization of nuclear C2 led to the creation of an effective and tightly synced Pakistani National Command Authority (NCA). Thus, the security and safety of Pakistan's nuclear deterrent through personnel screening, permissive action links (PALs), and specialist protection details was given precedence. The supposed benefits of the military's well-defined control were said to enhance Pakistani nuclear doctrine by enabling a tightly articulated – if outwardly ambiguous – weapons policy that ensured smooth transition from the conventional to nuclear realm. Yet, this rigorous internal C2 system fits awkwardly into Pakistan's current political environment and is disquieting especially since the revelations of AQ Khan's erstwhile network still resonates in international circles. Under the NCA's authority, the SPD has performed admirably, especially in the realm of nuclear security.[11] Since the 2010 legislation, Pakistan's civilian leadership has increased its role and involvement in nuclear oversight and decision-making mechanisms. Given the precedence, however, the Army still remains the key voice on nuclear issues. Going forward, C2 systems are likely to evolve more robustly than in the previous decade in both countries. Gradually, the Indian military and the Pakistani civilians will get more firmly into the loop of decision making in their respective nuclear command system.

Conclusions

Multiple proposals to strengthen nuclear learning emerged at the two conferences and roundtable sessions organized for the South Asian Nuclear Learning project. While some remain unworkable as long as an intense Indo-Pak rivalry persists, others provide tangible objectives that both sides can strive for in the current strategic environment.

In the next decade, both India and Pakistan will likely undergo NCA reforms for a variety of reasons. Despite some of the efficiencies put in place in the past 15 years, new implications will arise due to democratic shifts, technological advances, and increased joint leadership due to the shifting emphasis in the roles of the Navy and Air Force.

Pakistan's current NCA includes civilian and military leaders but its operating procedure may require reevaluation, especially given the country's new political direction where legal authorities and political legitimacy continue to fluctuate. Subtle reforms may be necessary given the recent democratic transitions and civil rule, and introduction of new weapon systems that would eventually result in the triad. Instead of an Army-dominated system, the new decade may require more joint leadership on nuclear issues in both civilian as well as the tri-service command structure.

Some Pakistani observers believe the military remains too focused on capability development at the cost of other elements to ensure deterrence and survivability. For example, the hardening of C2 through physical and technical means and the expansion of redundant space-based C2 will continue to lag behind. Overall, Pakistan will continue to face challenges in finding the appropriate balance between measures to prevent unauthorized nuclear weapon use and measures to strengthen C2 from decapitating strikes. This implies strengthening of ISR, instituting a more robust C2 network, and developing a more sophisticated internal nuclear management system. In the future, these elements must be a higher priority rather than simply expanding arsenals for "more deterrence."

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[11] Pakistan has been rated amongst the top of nuclear weapons capable state to have taken maximum nuclear security measures in the Second Nuclear Threat Initiative (NTI) Report of 2014. For details see 2014 Nuclear Materials Security Index available at http://ntiindex.org.

Progress has been made in Indian defense reform despite incessant snubs from New Delhi's political leadership. Most of these calls regard a need for more professional military input into the policy-making process. One such appeal was for a unified, tri-service command structure in which India's Strategic Forces Command would report to a newly minted Chief of Defense Staff, who would report directly to a group headed by the Prime Minister. This group – comprised of the Defense Minister and heads of the NCA and National Security Council – could signal a more robust and credible Indian deterrent with a centralized and established C2 structure. As a consequence of this reform, the professional military's limited role in nuclear weapon policymaking – where the political-civilian sphere dominated – could be modified to the general benefit of Indian decision making. A streamlined decision-making process would also be essential in ensuring the effectiveness of technical C2 systems. Knowledgeable Indians express admiration for Pakistan's SPD and its supporting role for Pakistan's NCA.

Both sides exhibit confusion and misperception in understanding one another's nuclear signals. The creation of an authoritative and mutually acknowledged national source in both countries for consistent nuclear signaling would be imperative to enable accurate and perceptible communication. In addition, track two efforts can catalogue nuclear signals from both sides in an effort to historicize these signals for future South Asia policymakers.

Managing nuclear capabilities in South Asia has been challenging for the past fifteen years, and Indian and Pakistani managers have embarked upon a more evolutionary process of learning through trials and tribulations both by themselves and others. Nevertheless, the two countries are new nuclear powers so the meanings of nuclear revolutions are more subtle and gradual. This pattern is likely to continue in the next decade. The following chapters in this volume explain in greater detail the varying perceptions of Indian and Pakistani authors.