NUCLEAR LEARNING IN SOUTH ASIA: THE NEXT DECADE

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Preface

This collection of selected papers brings together findings from the Center on Contemporary Conflict's (CCC) South Asian Nuclear Learning project. With support from the National Nuclear Security Administration, a group of regional scholars from India, Pakistan, and the United States convened in Bangkok, Thailand in 2012 to discuss the concept of nuclear learning and apply it to the regional context of South Asia. Participants presented research findings assessing regional perspectives on nuclear learning, doctrinal developments, command and control setups, deterrence strategies, and approaches towards arms control, and confidence-building measures.

Three years prior, the CCC's South Asian Nuclear Learning project kicked off with a conference entitled, "A Decade of Nuclear Learning: Ten Years After the South Asian Nuclear Tests." A small group of experts from India, Pakistan, and the United States met in Honolulu, Hawaii to assess the evolution of Pakistani and Indian nuclear policies since the first nuclear tests in 1998. Scholars evaluated nuclear learning in India and Pakistan by examining divergent developments in nuclear decision-making, nuclear doctrine, command and control, and deterrence in the first decade. This report reflects the findings of both conference iterations. The overarching goal of the conferences was to identify whether India and Pakistan have reached a point in their nuclear learning that would ensure there will be peace and stability in the region. While there have been some positive gains in the realm of nuclear learning, this group of experts concluded that India and Pakistan took divergent learning paths and therefore significant progress still needs to be made to narrow this gulf and ensure détente and peace.

The selected papers explore a range of factors that have shaped, induced, and inhibited nuclear learning in South Asia. Feroz Khan and Ryan Jacobs summarize the key findings over the five year period of this research project. They explain the divergent learning pathways taken by India and Pakistan and analyze proposals to enhance nuclear learning proffered during the conference discussions. Happymon Jacob and Naeem Salik provide theoretical insights into India and Pakistan's respective nuclear learning experiences. Next, Vipin Narang and Mansoor Ahmed identify technological trends and their impact on security doctrines as well as emphasize the role of political leadership in promoting stability. They also assess the implications of military modernization on strategic stability in the region. Contributing authors Naeem Salik and Sadia Tasleem describe steps that Pakistan has taken to develop institutional mechanisms to manage its nuclear capability and tackle the relationship between nuclear learning and doctrinal thinking. Christopher Clary's chapter traces the differing trends and analyzes the forthcoming challenges in command and control in both India and Pakistan. Following Clary, Ghulam Mujaddid critically analyzes Pakistan's existing command and control structure and advocates a single joint strategic force command for the future. In her chapter, Manpreet Sethi explains the causes of regional failure on restraint and détente and offers suggestions for improving nuclear arms control and regional confidence building measures. Last, Zafar Jaspal discusses the instability likely to affect in South Asia with the introduction of Ballistic Missile Defense. Both Sethi and Jaspal emphasize the importance of constructive dialogue and ultimately an arms control arrangement to ensure strategic stability.

The chapters in this volume are produced as written and researched by the authors and have been edited for content, brevity, and scholarly convention. The views and content are the authors' alone and do not represent the official policy of any government, the editors, the Naval Postgraduate School, or the project's sponsors.

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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.

[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]

[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.

[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]

[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."

[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.

2 The Concept of Nuclear Learning: A Study of the Indian Experience

Happymon Jacob

Introduction

Nuclear learning is a grossly understudied area within the vast literature on nuclear issues. Many of the fundamental questions about the nuclear behavior of states, from a learning perspective, remain relegated to the sidelines of the vibrant debates on the dynamics of nuclear deterrence, weapon yields and nuclear decision-making. Does 'learning' have anything to do with nuclear behavior at all? Is stable nuclear deterrence a result of nuclear learning by nuclear-armed conflict dyads or is it a necessary aftereffect of the possession of nuclear weapons by them? What goes into making a state's 'nuclear behavior' 'appropriate'? Do the expectations, demands, practices, doctrines and behaviors of the new nuclear states increasingly reflect the older nuclear states? If so, has nuclear learning got to do something with it? Do states also learn nuclear lessons from their own nuclear or crisis experiences?

There have been very few scholarly attempts to provide satisfactory answers to these questions. There is also an absence of conceptual clarity regarding the concepts relating to nuclear learning. Hence this paper is an attempt to contribute to the existing literature on nuclear learning. It will, first of all, survey the literature on learning in international relations in general as well as the literature on nuclear learning in particular. It then uses the insights and arguments from the literature to understand the instances of nuclear learning in India.

Part I: Nuclear Learning

The Concept of Learning in International Relations

The concept of nuclear learning should be understood within the larger conceptual debate on learning in international relations. Various leading scholars have attempted to define this concept in a number of useful ways. Jack Levy, for instance, defines experiential learning as a "change of beliefs (or the degree of confidence in one's beliefs), or the development of new beliefs, skills, or procedures as a result of the observation and interpretation of experience."[1] For him "learning is a change of beliefs at the individual level." He further argues that only individuals can learn "reification of learning to the collective level—and the assumption that organizations or governments can be treated as organisms that have goals, beliefs, and memories is not analytically viable. Organizations do not literally learn in the same sense that individuals do. They learn only through individuals who serve in

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

those organizations, by encoding individually learned inferences from experience into organizational routines."[2]

For Joseph Nye, learning takes place "when new knowledge is used to redefine the content of national interest. Awareness of newly understood causes of unwanted effects often results in the adoption of different and more effective means to attain one's ends."[3] This is very much in agreement with what Ernst Hass said seven years before Nye: "We know that learning has taken place when the actors adopt new rules of behavior that make use of new information and knowledge, or adopt ways for the search for such knowledge."[4] Alastair Johnston, however, makes a useful distinction between adaptation and learning. Learning, according to him, occurs "if change in policy is due to shifts in the central paradigm held by policy-makers, either in a more *realpolitick* or more *idealpolitik* direction, as new information about the external environment is internalized by decision-makers."[5] Summed up, Levy, Nye, Hass, and Johnston emphasize the role individual decision-makers play in making learning happen.

For Levy, there is a distinction between causal and diagnostic learning. Causal learning is about "changing beliefs about the laws of cause and effect, the consequences of actions, and the optimal strategies under various conditions," whereas diagnostic learning "refers to changes in beliefs about the definition of the situation or the preferences, intentions, or relative capabilities of others."[6] Nye's conception of simple versus complex learning seems to fall in the same genre. Complex learning for Nye is "recognition of conflicts among means and goals in causally complicated situations, and leads to new priorities and trade-offs."[7]

Another important distinction that scholars have made is tactical versus strategic learning. Philip Tetlock argues that most learning happens at the tactical level, which is different from strategic learning. In the latter kind of learning, " political decision-makers reconsider their basic strategic assumptions and orientation"[8] whereas no such reorientation takes place in tactical learning. Johnston makes a similarly useful distinction between adaptation and learning. Adaptation takes place, Johnston argues, when "change in policy is due to tactical adjustment to changing external conditions." In the latter case, "we should expect no change in paradigm but rather a re-evaluation of the costs and benefits of previous tactics." [9] Paul Sabatier, a sociologist, argues that policy-oriented learning generally involves the following: 1) improving one's understanding of the state of variables defined as important by one's own belief system, 2) refining one's understanding of the logical and

[2] Ibid.
[3] Joseph S. Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," *International Organization* 41, no. 3 (Summer 1987).
[4] Ernst Hass, "Why Collaborate? Issue-Linkage in International Regimes," *World Politics* 32 (April 1980): 390.
[5] Alastair Iain Johnston, "Learning versus Adaptation: Explaining Change in Chinese Arms Control Policy in the 1980s and 1990s," *The China Journal* 35 (January 1996): 31.
[6] Levy, "Learning and Foreign Policy," 285.
[7] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 380.
[8] Philip E. Tetlock, "Learning in U.S. and Soviet Foreign Policy: In Search of an Elusive Concept," in *Learning in U.S. and Soviet Foreign Policy*, ed. George W. Breslauer and Philip E. Tetlock (New York: Westview Press, 1991).
[9] Johnston, "Learning versus Adaptation," 30.

causal relationships internal to a belief system, and 3) identifying and responding to challenges to one's belief system.[10]

Who Learns?

Who or what is the subject of learning? There are multiple contenders for this: individuals, organizations, states, group of states etc. Levy, as pointed out above, does not recognize organizations as subjects of learning; only individuals can be the subjects of learning. Knopf agrees with that: "In practice, only individuals can learn. Learning is a cognitive process, and only sentient beings have cognition."[11] However, none of these scholars discount the importance of organizational learning. While Levy, Knopf, and others argue that only individuals learn, what needs to be highlighted here is that within organizations and tightly controlled groups, individuals' ability to understand and draw lessons from external environments is often very limited. Literature on groupthink would suggest precisely that. As Irving Janis argued, "intense social pressures toward uniformity and in-group loyalty within decision-making groups can build to the point where they seriously interfere with both cognitive efficiency and moral judgment."[12] Indeed, not only do the institutional epistemic structures prevent certain kind of learning from taking place, they also filter and modify the informational from external sources to suit the institution's worldview. More importantly, while the individuals in institutions might learn, it may not always translate into organizational learning in the absence of which there may not be any long-term change. Nye, in this regard, correctly points out, "individual learning is a necessary, but insufficient, basis for organizational learning."[13]

Is joint learning between rival states a possibility? Or put differently, is the creation of common knowledge that can shape new behaviors and policies possible between state parties? Nye argues that during the Cold War the United States and Soviet Union had at least five areas of common knowledge that resulted in the creation of security regimes.[14] He does not, however, say whether it is possible for states to learn together. This is an area that needs to be further explored in the nuclear literature.

State Socialization and Learning

I argue that states are constantly on a learning curve but more often than not it is not possible to pin down the 'learning experience' of a particular individual in a state in order to show that learning has actually taken place. Sometimes it is also impossible to pin down the organizations within the larger government machinery that is the subject of learning. Hence, notions of state socialization and norm

[10] Paul Sabatier, "Knowledge, Policy-Oriented Learning, and Policy Change," *Knowledge: Creation, Diffusion, Utilization* 8 no. 4 (1987): 150-51.
[11] Jeffery W. Knopf, "The Concept of Nuclear Learning," *Nonproliferation Review* 19, no. 1 (March 2012): 87.
[12] Irving Lester Janis, *Victims of Groupthink: A Psychological Study of Foreign-Policy Decisions and Fiascoes* (Boston: Houghton, Mifflin, 1972). As paraphrased by Philip Tetlock, "Identifying Victims of Groupthink From Public Statements of Decision Makers," *Journal of Personality and Social Psychology* 37, no. 8 (1979): 1314.
[13] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 381.
[14] Ibid., 382-83.

diffusion, I would argue, should be sufficiently explored in order to understand how and under what circumstances a) widely held knowledge is 'learned' by states, b) how such learning is negotiated within the domestic political spheres, and c) how learning can result in policy change. It is not just direct experiences that lead to learning by state actors, but also the power of normative contexts that has the potential to persuade actors to learn.

Kai Alderson defines state socialization as "the process by which states internalize norms arising elsewhere in the international system."[15] He also argues that foreign policy learning is different from state socialization for four reasons: 1) while the "learning literature emphasizes how and why individuals change their beliefs," state socialization literature "centers on how and why foreign norms are internalized within a state,"[16] 2) "while learning literature emphasizes changes to beliefs, ranging from notions about how the social and material world works to more complex readings of an adversary or the international situation, state socialization focuses on norms"; 3) "the very notion of learning carries an implicit assumption of progress, a connotation which is absent in the notion of state socialization"; and 4) "socialization has an explicitly political dimension which the psychologically-inspired literature on learning lacks."[17]

None of Alderson's arguments, in my opinion, dissuade us from looking at learning through the lens of state socialization for the reasons I raised above. Even if the two concepts have different foci, there is no reason why we should not see them as complementary. Alderson's understanding of state socialization also does not focus on every individual in the state internalizing international norms in order for observable effects to occur, instead, he focuses on internalizing through institutionalizing. This approach is a very useful way of looking at how groups (states and societies) internalize norms and lessons from experiences. In the context of state socialization, it is also useful to look at elite socialization. Perhaps norms can better explain the context of strategic—opposed to tactical—learning and changes.

What is Nuclear Learning?

How much can we know about nuclear learning? Indeed, as Nye points out it is not easy to 'learn' about nuclear learning because nuclear knowledge itself is very limited: "much of what passes for nuclear knowledge rests upon elaborate counterfactual argument, abstractions based on assumptions about rational actors, assumptions about the other nation's unknown intentions, and simple intuitions."[18] Moreover, nuclear opacity, which typically forms a major feature of most states' nuclear strategies, can also prevent proper learning from taking place.

According to Knopf, nuclear learning has an empirical as well as conceptual component. The former "involves the facts of the case: the doctrines, strategies, and force postures developed by the countries in question, the decisions and actors each has taken during crises, the nuclear diplomacy

[15] Kai Alderson, "Making Sense of State Socialization," *Review of International Studies* 27 (2001): 417.
[16] Ibid., 423.
[17] Ibid., 424.
[18] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 382.

between the countries concerned, and so forth." Knopf also points out that there are two types of learning: factual and inferential learning. "While factual learning involves the learning of basic facts, inferential learning involves broader inferences that are drawn from fundamental facts."[19] In nuclear learning, inferential learning would be learning about the number of warheads needed for deterrence as well as other requirements for achieving a successful nuclear deterrent. This may be considered inferential because often these numbers are decided upon or revised later in the context of what the opponent has.

Should Nuclear Learning be "Correct" Learning?

Knopf argues that learning is inherently normative; he suggests that for learning to be called learning it has to be correct learning.[20] For Stein, "learning is an explicitly normative concept."[21] Learning is an "improvement" in knowledge for the actor concerned—the subject of learning—but it may not be so for others who are analyzing that learning. From the point of view of the United States, mainstreaming Indian nuclear capability by bringing the country into the international non-proliferation regime, even though India is not a signatory to the major treaties of the regime, is "sensible" because it, in a way, strengthens the regime. While for the United States that is learning, a change of belief at that, it may not have the same normative value for Pakistan. For Levy, though, learning is value neutral. Importantly, Nye has made the point about the need to adopt a relative, non-value based understanding of learning: "The question is whether the new information or skills have enabled the actors to achieve their purposes better, regardless of whether the observer likes those purposes or not."[22]

Hence, according to those who argue that learning is inherently normative, if correct learning is what enables an actor to achieve its goals better, then incorrect learning is what prevents the achievement of its defined goals. This line of reasoning, however, becomes analytically difficult especially when the goals are not clearly specified in advance. Often, actors realize the full implications of their policies only after undertaking them; sometimes the result of certain policies may even be unexpected. Post-facto rationalizations of policies adopted tend to kick in under those circumstances. This creates difficulties in distinguishing "correct" from "incorrect" learning. Furthermore, sometimes outcomes are better understood and policies are calibrated accordingly in the course of a policy initiative rather than prior to the undertaking of a particular policy. In such a case, it becomes more of a constructivist exercise than a rational-choice one.

The argument here is not to discount the importance of distinguishing between "positive" and "negative" learning on the basis of an actor's subjective appreciation of what suits his or her goals better, but rather, to point out the potential pitfalls in doing so. One could also differentiate between "positive" and "negative" learning by looking at whether a particular instance of learning by an actor

[19] Knopf, "The Concept of Nuclear Learning," 81.
[20] Ibid., 84.
[21] Janice Gross Stein, "Political Learning by Doing: Gorbachev as Uncommitted Thinker and Motivated Learner," *International Organization* 48, no. 2 (Spring 1994): 170.
[22] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 380.

contributed to a common purpose. This is especially useful in trying to understand whether nuclear learning by a particular state has contributed to stable deterrence within a dyadic nuclear situation. For instance, Pakistan's decision to introduce tactical nuclear weapons (TNWs) into the India-Pakistan standoff, at least partially, resulted from its understanding that such a strategy can offset India's limited war doctrine, (Cold Start). While this may have contributed to Pakistan's ability to achieve its goal of deterring potential Indian aggression, one could make the argument that the introduction of TNWs into the region has led to more instability. The weakness of this distinction is that in looking for instances of such learning, the researcher might end up using a deeply subjective criteria in judging what leads to strategic stability or instability in a nuclearized scenario. Academic objectivity could be a casualty.

One way of rescuing the "normative" content of nuclear learning is to argue that when the nuclear learning of a particular state is seen in consonance with or influenced by the prevailing "global nuclear norms," e.g. nuclear safety and security, such learning can be considered as normative learning. This is important because one often witnesses the impact and influence that global norms have on state actors. In other words, states not only learn from their (and other's) experiences, overwhelming empirical evidence, and analysis by indigenous epistemic communities, but also through international socialization, the acceptance of international norms, and becoming part of treaties, security regimes etc. Hence, there is a normative content to nuclear learning.

How Do They Learn?

Janice Gross Stein talked about "political learning by doing" in the context of Gorbachev's new thinking: "I argue that through inductive trial-and-error learning stimulated by failure, Gorbachev developed a new representation of the "ill-structured" Soviet security problem. Learning by doing must be embedded within the broader social and political context to provide a convincing explanation of how and why Gorbachev was able to learn."[23] Learning by trial and error is closer to our understanding of how decision-makers learn. Yet, trial-and-error is complicated in the nuclear context where there is hardly any space for error in critical areas. That said, one can learn through trial and error in the lower levels of escalation. Iterated brinkmanship such as the 2001-2002 military standoff could be considered a learning experience—especially to learn about the risks, redlines and resolve of the other player involved. While learning about each other's redlines should be considered factual learning, in cases where redlines themselves are not articulated clearly or are ambiguous, learning about those redlines can be considered inferential learning.

According to Levy, individuals also learn to learn. "They learn new decision rules, judgmental heuristics, procedures, and skill that facilitate their ability to learn from subsequent experience."[24] The ability to improvise methodologies to learn is perhaps easier in a "stable" conflict dyad wherein crisis situations tend to repeat. Sociologist Richard Ross has argued that comparing policy programs has a key role to play in lesson drawing: "learning involves scanning programs existing elsewhere, producing a conceptual model of a program of interest, and comparing the exemplar with the

[23] Stein, "Political Learning by Doing," 156.
[24] Levy, "Learning and Foreign Policy," 286.

problems of the existing program which have occasioned dissatisfaction. Once this has been done, various kinds of lessons can be drawn."[25]

Why Do States Learn?

One could argue that states often want to learn so as to achieve material gains—so-called targeted learning—but on other occasions learning happens automatically. Both factual and inferential learning, as coined by Knopf, can be a result of targeted and automatic learning. While targeted learning lends importance to the cognition and subjectivity of individual or collective actors, automatic learning lends importance to the structural constraints that impose certain lessons on states. States (or individuals in them) learn from experiences (successes and failures) and they also learn through socialization in the international community. While socialization reduces the importance of agency, the fact that states sometimes want to mainstream themselves in the system, makes them imitate the norms prevalent in the international arena. India's unspoken allegiance to non-proliferation treaties that it has not signed shows that it is abiding by a set of norms to mainstream itself into the system.

The other important aspect of learning in this context is the issue of what prompts states to learn. This is indeed a difficult question to answer since the motivations for learning can be manifold and we may never get to know them. States are more likely to learn in times of policy failure (sometimes even at the time of success) and regime change. However, while policy failure and success, regime change, and other structural changes can facilitate learning, they may not necessarily result in learning. On the other hand, learning can take place even when none of these factors are present. Apart from victory and defeat, states also learn from brinkmanship. While Pakistan learned a thing or two about Indian resolve during 2001-2002's Indo-Pak standoff, India also learned about the limits of action vis-à-vis Pakistan under the nuclear shadow.

What Does Learning Lead to?

Learning can lead to "better" strategies, different and/or better policy outcomes, and better responses. Learning can also potentially inhibit terrible mistakes. Nye argues that nuclear learning can lead to security regimes, which he argues happened in the Soviet-American case.[26] He says that "over the past four decades, new information about nuclear weapons and experience with their handling has altered prior beliefs. In several areas, it even created a core of consensual knowledge that both countries share to an extent."[27] Nuclear learning can also lead to "negative" knowledge. For instance, nuclear capable states can learn how to bluff other states using the threat of nuclear weapon strikes. They can then use such a bluff to gain tactical advantages over their adversaries. Pakistan's insistence on a low nuclear threshold with simultaneous use of proxies to attack India is seen by India as nuclear blackmail. This Pakistani strategy might as well be a bluff that Pakistan learned during the many crises that it had with India under the nuclear shadow—but, of course, no one knows for sure.

[25] Richard Ross, "What is Lesson-Drawing?" *Journal of Public Policy* 11, no. 3 (1991): 30.
[26] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 398.
[27] Ibid., 382.

Strategic communities and the public at large in nuclear-capable countries are likely to have a great deal of factual learning. That is indeed the first area of knowledge that Nye talks about when he says that "both sides share a greater knowledge about the destructive power of nuclear weapons."[28] Yet, this sort of common popular understanding about the dangers of nuclear weapons seems to be lacking in India and Pakistan, at least for the moment.

Learning and Policy Impact

Does learning necessarily result in policy change and does policy change necessarily mean that learning has taken place? While it is clear that learning does result in cognitive change,[29] there is no certainty about its policy impact. Levy says learning is not necessarily policy change because there are multiple sources of policy change. I would argue that learning does not necessarily need to result in policy changes. Even if correct and desirable lessons are learned by policy makers, they may not always be in a position to implement them. Bureaucratic inertia and organizational pathologies can impede the translation of learning into policy change. Hence, by tying learning to policy change misses out on many important aspects of learning. A related concern in this context is about how to "know" about learning. In other words, how do we know that learning is taking place? What are the appropriate methodologies of knowing whether nuclear learning occurs? One way in which we can learn about nuclear learning is "process tracing," which is especially helpful in understanding radical policy changes adopted at the highest political or individual level. One could also observe policy changes as seen in new policies, declarations, policy documents, treaties, and confidence building measures (CBMs), and then try to relate them with nuclear debates that happen within governments or institutions so as to draw causal inferences to determine whether nuclear learning took place.

Learning and Strategic Culture

Does nuclear learning have anything to do with a country's strategic culture? Does strategic culture influence, bias, prevent, facilitate, or dissuade nuclear learning? Jeannie L. Johnson, Kerry M. Kartchner, and Jeffrey A. Larsen have argued that strategic culture does influence the manner in which weapons of mass destruction (WMD) decisions are made.[30] If one agrees with such a formulation, it would not be out of place to argue that aspects of a country's strategic culture will have an impact on the kind of nuclear learning that a country engages in or is able to execute. If one considers learning to have a certain subjective element, especially when it comes to correct and incorrect learning, then it is all the more pertinent to explore the links between strategic culture and nuclear learning. From perceiving the objective environment in a particular manner, to decoding it, and finally to translating learning into policy changes, strategic culture is likely to play a key intervening role. In other words, no individual or organization is a *tabula rasa*, they are carriers of values, beliefs, and other cultural codes, all of which impact on the learning process.

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[28] Ibid.
[29] Stein, "Political Learning by Doing," 170.
[30] Jeannie L. Johnson, Kerry M. Kartchner, and Jeffrey A. Larsen, eds., *Strategic Culture and Weapons of Mass Destruction: Culturally Based Insights into Comparative National Security Policymaking* (New York: Palgrave Macmillan, 2009).

Part II: Nuclear Learning in India

Is there any evidence of Indian nuclear learning over the years, and if so, what are the sources and nature of such learning? This section will examine the various aspects of nuclear learning that have taken place in the country in the past decade or so. Indeed, only some of the aspects that this section discusses can be characterized as "learning" if one goes by the strict definition of learning as belief change. Some of the aspects highlighted below belong to changes in means to achieve pre-existing goals and hence may be characterized as adaptation rather than learning and yet would still merit consideration. However, despite the analytical complications, it would be useful to examine the full spectrum of nuclear learning in India even though some of it may just be mere adaptation rather than learning.

Normative Learning

First of all, it is necessary to point out that there has been a great deal of normative learning in the Indian nuclear discourse and practice over the past decade or so. India not only decided to come out in the open about its nuclear weapons program but also abide by the expectations of the global non-proliferation order as far as possible. Today, India focuses more on non-proliferation and arms control than the elusive goal of "time-bound global nuclear disarmament." Raja Mohan eloquently conveys the thrust of India's Post-Pokhran II approach to the global non-proliferation order in the following words. "From being a protester against 'discrimination' in the nuclear order, India was now transforming itself into a nation ready to support the existing order and indeed calling for its incremental reform. The essence of the change in India's nuclear policy after Pokharan II rested in the shift from the earlier emphasis on disarmament to a new one on arms control – global, regional and national."[31]

While in the past India used to reject the utility of international non-proliferation treaties such as the Nuclear Non-Proliferation Treaty (NPT) and Comprehensive Test Ban Treaty (CTBT), today it is willing to negotiate with the international community on a better deal for itself within equivalent treaty constraints and obligations. In other words, India today is willing to "negotiate" with the international community on various non-proliferation treaties, which it completely objected to at one time. To quote Raja Mohan again,

> The various policies set in motion by India since the summer of 1998 strongly point to a reorientation of India's premises on the relationship between arms control and national security strategy. This transition was demonstrated with India's dramatic about-face in rethinking the Comprehensive Test Ban Treaty, as well as its readiness to join Fissile Materials Cut-off Treaty negotiations, endorsement of the objectives of the Nuclear Non-proliferation Treaty, willingness to strengthen export control regimes, support to nuclear-free zones elsewhere in the world, its readiness to move towards substantive confidence-building measures with Pakistan and a political will

[31] C. Raja Mohan, "India's Nuclear Exceptionalism," in *Nuclear Proliferation and International Security*, ed. Morten Bremer Maerli and Sverre Lodgaard (London: Routledge Global Security Studies, 2007): 153.

> to support some of the controversial new US-led approaches to managing nuclear proliferation.[32]

India also learned to abide by the international norms on nuclear safety and security and the logic of stable deterrence. The additional protocol that it has signed with the International Atomic Energy Agency (IAEA) is an example. India has undergone a great deal of international socialization in the nuclear field. Having maintained a robust nuclear non-proliferation record, India today has learned to do business with the international community to deal with the concerns that the latter has about nuclear safety and security. That said, we must not believe that Indian nuclear learning, whereby New Delhi mainstreams itself with the global nuclear order, has been without any regard for India's self-interest. On the contrary, perceiving its self-interest in a particular manner has been a cornerstone of India's adoption of global nuclear norms. Self-interest is a powerful motivating factor for nuclear learning for states.[33] While the desire to adhere to global norms and protecting its national interests were the causes of India's normative learning, state socialization provided the context within which this learning could take place.

Crisis Learning

Both India and Pakistan have learned the hard way that they need dialogue in order to avoid getting into conflicts that could escalate uncontrollably. As Basrur puts it, "Kargil convinced them of the unavoidability of talks."[34] This learning was further strengthened by the 2001-2002 crises and the post-26/11 build-up of tensions. After the Mumbai terror attacks, New Delhi severed all ties with Pakistan and broke-off the peace process, with sections of its strategic community vying for military action against Pakistan. While the nuclear overhang dissuaded New Delhi from carrying out punitive actions against Pakistan, there was a two-year break in the bilateral relationship. However, in 2011 New Delhi "learned" that its no-talks policy with Pakistan was not yielding any fruit. With that realization, today, New Delhi and Islamabad are back on a promising dialogue track. While one could argue that India has not yet learned how to deal with Pakistan "to its satisfaction" during a crisis, the realization that India has to talk with Pakistan certainly represents learning.

More specifically, the 2001-2002 standoff and 2008 Mumbai crisis taught India that war against Pakistan is not an option under the nuclear shadow, and, in combination with the lessons from Kargil, demonstrate that regional crises turn international when nuclear weapons are involved. New Delhi has clearly learned that there is no way that it can forge a war against Pakistan. India has learned that it simply cannot change the status-quo as much as it would like to. Perhaps Pakistan is "playing" the nuclear madman in the subcontinent by signaling to India that even limited conventional aggression would invite nuclear retaliation. Pakistan might well be bluffing, but India is not prepared to call this bluff. This explains why the Indian strategic elite or the political class does not take the Cold Start doctrine seriously as a real war-winning, bluff-calling strategy. The question then is what happens if

[32] Ibid., 153.
[33] I am grateful to Jeffrey Knopf for this point.
[34] Rajesh Basrur, "Lessons of Kargil as Learned by India," in *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict*, ed. Peter Lavoy (Cambridge: Cambridge University Press, 2009): 330.

there is a repeat of November 2008. In my opinion, an attack similar to Mumbai would not lead to any Indian punitive action against Pakistan; rather it is likely to lead to further international isolation of Pakistan and even further Pakistani self-destruction. This is something India learned from Mumbai: while you cannot physically attack Pakistan, you can always shame Pakistan, and the international community will happily join the chorus. This learning seems to have worked. Kargil also clearly taught the two sides that the Line of Control and the International Border are sacrosanct: if Pakistan uses force to change the status quo, it will not be tolerated by India, *a la* Kargil. In other words, India and Pakistan have learned from Kargil and other crises thereafter, what is acceptable or unacceptable to each other and to the international community.

While nuclear weapons on the subcontinent do have the capability to instill a certain amount of crisis stability, the potential for sub-conventional aggression to spark off a nuclear crisis cannot be ruled out. In other words, if we can somehow remove sub-conventional aggression from the Indo-Pak equation, we are well on our way to achieving crisis stability and hence stable nuclear deterrence in the region.

Learning to Respond

There has also been partial learning in India regarding responses to external aggression in a nuclearized scenario. First of all, India was unable to militarily respond in a timely fashion during the 2001-2002 crises and after the Mumbai attacks. Now though, there has been some progress in improving response time. The mobilization time has come down to seven days from 21 (as was the case in 2001) for the Indian army to mobilize forces to strike Pakistan,[35] which is an example of learning to respond. Other reports suggest that the Indian army is trying to mobilize in 48 hours.[36] Post-Kargil, India also undertook a number of organizational reforms in order to better respond to crisis situations. India has realized that it is not useful to trust Pakistan during peacetime without verifying its real intentions so that it does not get caught napping. Continuously verifying Pakistan's intentions was seen as a must, and hence, organizational reforms were carried out in the country's intelligence bureaucracy.[37] The current discussion in India regarding the need for a Cold Start doctrine shows that New Delhi has learned that it needs to have flexible response options to respond to Pakistani actions in future. Pakistan in turn developed tactical nuclear weapons to offset Cold Start. When the Indian side realized that Pakistan was developing an assortment of ballistic missiles, India started giving a lot more importance to developing a limited ballistic missile umbrella to safeguard its strategic assets. While this is clearly a strategic arms race between India and Pakistan, this is also nuclear learning of a certain kind.

[35] Vipin Narang (presentation, 2011 Carnegie International Nuclear Policy Conference titled "Nuclear Risk Reduction in South Asia After Mumbai," Washington, D.C., March 28, 2011, http://carnegieendowment.org/files/Nuclear_Risk_Reduction_in_South_Asia_after_Mumbai.pdf.
[36] "Indian Army's Mobilisation Time: 48 hours," *Indian Defence News*, May 17, 2011, http://www.defencenews.in/defence-news-internal.aspx?id=cBIdvoUVqzg=.
[37] Basrur, "Lessons of Kargil as Learned by India," 315.

Learning Nuclear Maturity

I would also argue that it is possible to perceive a certain level of evolving nuclear maturity in India that was not seen immediately after the 1998 nuclear tests. The very fact that there has been a considerable reduction in the Indian nuclear rhetoric over the years (from aggressively defending and flaunting nuclear assets to directly linking the weapons to Indian defense strategies towards China and Pakistan) shows that India's political leadership has managed to abstain from offensive nuclear rhetoric. The Indian side hardly ever emphasizes the nuclear aspect of its military might; nuclear weapons, for the Indian side, are political weapons with no war fighting utility. That is nuclear maturity—learned over a period of time.

Another related aspect is the fact that New Delhi tries to keep its nuclear weapon program and assets immune from domestic public pressures, if not debates. Exposing nuclear issues to public pressure can often be counterproductive due to the prevalence of competitive nationalism in India and Pakistan. In August-September 2009, nuclear scientists such as K. Santhanam and P. K Iyengar started publically pushing for more nuclear tests in order to "evolve an efficient thermonuclear device." Yet, the Indian government did not buy into the growing outcry from some members of the scientific community for more thermonuclear tests. Instead, it merely stated that the country's nuclear security was well taken care of.

India has also tried to send positive and reassuring signals to Pakistan, China, and the international community on the nuclear front—in comparison to the aggressive nuclear pitch it had adopted soon after the 1998 tests. As recently as January 2012, the Indian Army Chief made clear that "Nuclear weapons are not for war fighting, let's be quite clear on it. They have got a strategic capability and that is where it should end.[38] This, in my opinion, is an example of incremental trial-and-error learning of nuclear maturity. India has also been making it clear to the international community that it is serious about nuclear safety and security concerns and that India is taking the necessary steps. In continuation of the spirit with which India signed the additional protocol with the IAEA, the Indian foreign secretary said at the conclusion of the recent Nuclear Security Summit's Preparatory Sherpas Meeting in New Delhi that

> Security of nuclear materials is fundamentally a national responsibility but there is considerable scope for international cooperation to strengthen nuclear security objectives and standards. In this regard, there was considerable emphasis on the leading role of the IAEA in the international nuclear security framework and the need to strengthen multilateral instruments that address nuclear security such as the Convention on the Physical Protection of Nuclear Material and the International

[38] "Nuke weapons are meant for strategic purpose only: Army chief", *The Hindu*, January 15, 2012, http://www.thehindu.com/news/national/article2803688.ece.

> Convention for the Suppression of Acts of Nuclear Terrorism. India is a party to all major international instruments in the field of nuclear security.[39]

There has also been vibrant public debate in India on nuclear safety and security after years of indifference. In the words of Rajive Nayan, "for years, neither the Indian strategic community nor the Indian government paid serious attention to the problem of nuclear terrorism." [40] Today, not only the Indian government is seriously concerned with the issue. A very vibrant debate within Indian strategic community on the subject exists.

Learning to Play the Game of Stable Deterrence

India has been a reluctant nuclear power. This reluctance is exhibited by the evolution of India's nuclear posture: from unwilling to develop nuclear weapons, to becoming a reluctant nuclear weapon state, to insisting on weapons being a minimum deterrent purely for retaliatory purposes. It would therefore be helpful to see India's insistence on credible minimum deterrence as a logical extension of the country's reluctance to have nuclear weapons in the first place. However, what is more important in the context of this paper is that learning the game of stable deterrence through the logic of minimum nuclear posture was easy for India as it sits well with Indian nuclear tradition. It is also important to note in this context that India has learned to deal with conventional, sub-conventional, and nuclear issues at the levels they belong in without confusing one level with the other. As Vipin Narang correctly points out, India's conventional forces and strategic forces commands run parallel, that is, they do not intersect. [41] Thus, there is no linking of the two, in practice or philosophy.

India's insistence on the minimum aspect of its nuclear deterrent is not an indulgence in pious platitudes intended for deception. India's intent is verifiable from the manner in which it has physically separated the various components of its nuclear program. The Nuclear Threat Initiative assessment on India indicates that "nuclear-capable missiles, bombers, non-nuclear warhead assemblies, and fissile cores are maintained in a de-alerted state by their respective custodians—the individual armed services, the DRDO, and the Department of Atomic Energy with plans to reconstitute them rapidly during an emergency or national crisis."[42]

Negative Lessons

Various Indo-Pak crises have taught each side not to trust the other. If for Pakistan the lesson came from India's Siachen encroachment, for India the lessons from Kashmir, Kargil, the attacks on the Parliament, and Mumbai stand in good stead. This lack of trust is seen in the nuclear field as well.

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[39] Government of India Ministry of External Affairs, "Foreign Secretary's media interaction on conclusion of New Delhi Sherpa Meeting," January 17, 2012, http://www.mea.gov.in/media-briefings.htm?dtl/17957/.
[40] Rajiv Nayan, "India's Nuclear Security Policy," Institute for Defence Studies and Analyses, January 5, 2012, http://www.idsa.in/idsacomments/IndiasNuclearSecurityPolicy_rnayan_050112.
[41] Ibid.
[42] "Missile: India Country Profile," Nuclear Threat Initiative, updated November 2011, http://www.nti.org/country-profiles/india/delivery-systems/.

Pakistan has no faith in the Indian 'No First Use' declaration and India knows all too well that Pakistan will make use of its nuclear umbrella for under-the -radar anti-India activities.

While India's conventional superiority has led Pakistan to seek sub-conventional warfare to achieve its objectives, the nuclear overhang that prevents New Delhi from responding to Pakistan's sub-conventional tactics has led it to look for flexible responses (*a la* Cold Start): both are examples of negative learning. Furthermore, India's Cold Start has prompted Pakistan to develop tactical nuclear weapons. This spiral generates negative learning as it does not lead to deterrence stability in the region.

Yet another example of negative learning is the belief that seems to be prevalent in New Delhi, perhaps also in Islamabad, that when things spiral out of control, the United States will intervene and cool things down. That is a negative lesson because it is dangerous to get on to an escalatory ladder, which could potentially lead up to nuclear levels, and assume that a third country would not let it happen. What if the sequence of events turns out to be too quick for U.S. diplomacy to handle—especially given the fact that United States-Pakistan relations may not retain the same warmth forever?

What India Has Not Yet Learned: Doctrinal Ambiguities

Stable deterrence needs to be aided by clearly defined nuclear doctrines. That is, of course, if a dyad wants to have stable deterrence. Pakistan does not have a clearly defined and declared nuclear doctrine, and hence, it would not be unfounded to assume that Pakistan would want to inhibit stable nuclear deterrence, at least not in the way it is understood traditionally. India, on the other hand, seeks to achieve stable deterrence in South Asia. But does India have a completely unambiguous doctrine?

There are a few ambiguities in the Indian doctrine as well. While India has long maintained that it has a NFU policy, official statements have cast doubts on India's NFU claim. The text of National Security Advisor Shiv Shankar Menon's speech at the National Defense College in October 2010 did give mixed signals about India's NFU posture.[43] While the Draft Nuclear Doctrine of 1999 talked about minimum nuclear deterrent, the 2003 official doctrine talks about carrying out 'massive' strikes in response to a nuclear strike against India. They could be seen as contradictory. Such doctrinal dilemmas, minor though they may be, could be seen as eroding the political nature of the weapons. Put differently, as Karthika Sashikumar argues, "an elastic concept of minimum deterrence fosters the temptation to bring nuclear security to bear on politically salient issues, tending to

[43] In the talk, Menon said that India has a policy of "no first use against non-nuclear weapon states" which could potentially be interpreted as having a first use policy against nuclear weapons states. Shri Shivshankar Menon, "Speech by NSA Shri Shivshankar Menon at NDC on 'The Role of Force in Strategic Affairs,' October 21, 2010. Available at http://www.mea.gov.in/Speeches-Statements.htm?dtl/798/Speech+by+NSA+Shri+Shivshankar+Menon+at+NDC+on+The+Role+of+Force+in+Strategic+Affairs. However, Narang has argued that such an interpretation is incorrect. See Vipin Narang, "Did India Change its Nuclear Doctrine?: Much Ado about Nothing," Institute for Defence Studies and Analyses, March 1, 2011. Available at http://www.idsa.in/idsacomments/DidIndiaChangeitsNuclearDoctrine_vnarang_010311.

coercion rather than deterrence."[44] That said, does it actually represent nuclear learning or doctrinal degeneration?

Incomplete Learning of the Mechanics of Deterrence

Has India fully learned the mechanics of nuclear deterrence? Ashley Tellis argues that India seems to have a mechanistic understanding of deterrence.[45] Basrur reinforces the points, "one lesson that India learnt from the Kargil crisis is that the mere existence of nuclear weapons in India would not deter the enemy. India would need to make its nuclear assets usable, credible, and have to have a proper mechanism to use them in order to deter the enemy.[46] Nuclear signaling is not something that India has mastered fully. Still, it is laudable that India has not upped the ante or the level of conflict during a crisis—even though it never lost a war with Pakistan. And yet India has not learned to "use" its nuclear weapons to signal Pakistan (and the international community) that India will keep multiple levels of options open to deal with any threats to its security. In other words, inadequate signaling from the Indian side regarding what is likely to follow in various scenarios, in a way, dilutes the efficacy of Indian deterrence. The success of the Indian deterrent would lie in convincing Pakistan that no level of aggression against India, including the sub-conventional, would be tolerated.

It is this lack of political commitment to thinking through India's deterrence options thoroughly that has given rise to a multiplicity of voices in the country on nuclear deterrence. Often we see Indian service chiefs and nuclear scientists talking in public forums on nuclear deterrence issues in an unsolicited manner and without deference to the civilian leadership. There is also the problem of *incomplete factual learning* in India. In 1999 there was a huge debate in the country as to whether or not India had thermonuclear weapon capability. Mr. K Santhanam, a former nuclear scientist associated with the 1998 tests, surmised that India's thermonuclear test was a failure which was supported by another former chief of the atomic energy commission P. K. Iyengar. Thus serious doubts exist then and today regarding the factual nuclear learning the country has undergone.[47] India is highly unlikely to carry out a nuclear strike first. It also does not expect a nuclear strike on its territory. These beliefs are evident in the manner in which India's nuclear deterrent has been operationalized. There are serious doubts about whether the country's nuclear command and control system is reliable enough to respond quickly and in time. If those doubts are true, this is a serious lack of nuclear learning. This also means that the mutually assured destruction principle is not in full operation.

[44] Karthika Sasikumar, "Learning to Play the Game: Strategic Culture and Nuclear Learning" in Does *India Think Strategically? Institutions, Strategic Culture, and Security Policies*, ed. Happymon Jacob (New Delhi: Manohar Publications, 2014), 44.
[45] Ashley J. Tellis, *India's Emerging Nuclear Posture* (Santa Monica, CA: RAND Corporation, 2001), quoted in Sasikumar, "Learning to play the game," 44.
[46] Basrur, "Lessons of Kargil as Learned by India," 327.
[47] See Seema Guha, "Behind dud test row is nuke deal", *Daily News and Analysis*, August 30, 2009, http://www.dnaindia.com/india/report_behind-dud-test-row-is-nuke-deal_1286240.

New Factors in South Asian Nuclear Learning

What new factors have become more important since the first decade that will affect the learning curve in the future? One of the things that might have an impact on South Asian nuclear learning is the complication that the *intrusion of new technologies* would bring to South Asian nuclear stability. New technologies would mean new complexities, which in turn will make learning more and more complex. While India's conventional defense build-up and modernization might have an impact on what lessons Pakistan would learn, Pakistani reliance on TNWs and consequent fusing of conventional and nuclear aspects of deterrence could make India rethink its strategies.

The other factor that would have an increasing impact on Indo-Pak nuclear learning is the future evolution of the global and regional balance of power, which will determine the influence of extra-regional parties in Indo-Pak conflicts or the lack thereof. Thirdly, domestic politics, epistemic communities, political parties etc., could play an increasing role in the nuclear field in both India and Pakistan. That would bring an additional layer of complexity to Indo-Pak nuclear deterrence. The real challenge in this context for both countries is to maintain the minimum part of their respective deterrents.

Unique Features Informing South Asian Nuclear Learning

What are some of the unique features informing South Asian nuclear learning process? The most important factor is the existence of significant opacity in nuclear matters—while true of both sides, the Indian case is most glaring. Prevailing confusion within the government and strategic community on test yields, weapon characteristics (atomic or thermonuclear), potential targets (universal NFU or NFU against non-nuclear weapons states only), alert states, nuclear safety and security, etc., demonstrate that opacity is an inherent aspect of Indian nuclear learning and is likely to remain so. Such opacity also leads to widespread nuclear ignorance and arrogance, which is why one observes senior officials speaking out of turn on nuclear deterrence and unnecessarily complicating the strategic environment.

There is also a great deal of nuclear nationalism in both the countries. Extreme forms of nuclear nationalism not only prevent proper nuclear learning, it can also infuse a sense of invincibility in the minds of uninformed strategic elites, the public, and the political class. Extreme levels of opacity and high levels of ignorance when combined with dangerous forms of nuclear nationalism induce a widespread sense of invincibility, which surely can prevent proper nuclear learning in the region.

Indo-Pak Joint Nuclear Learning

A great deal of Indo-Pak joint learning has also taken place.. The many peace processes that both sides engage in have led to the introduction of various CBMs. Bilateral nuclear CBMs, crises, and general interactions have compelled each side to learn the other's redlines and approaches toward coping with said redlines. Both sides also learn about the potential responses from the international community. Indo-Pak Track II meetings also facilitate joint learning and the propagation of said learning into the wider nuclear arena. Both the Ottawa Dialogue and the Chaophraya dialogues

undertake dedicated sessions on nuclear issues. Indeed, the Ottawa Dialogue is in the process of developing an Indo-Pak common nuclear lexicon. These Track II engagements regularly brief their respective governments and media, and suggesting that some transfer of ideas takes place as a result seems reasonable.[48] Of particular importance, is the extent to which Track II's have gone further than their official counterparts. For instance, some have discussed the potential for civilian nuclear cooperation in the field of medicine and agriculture. Most plenary sessions of the Ottawa Dialogue bring together Indian and Pakistani scientists to discuss these issues—some of who are developing joint papers. Perhaps these joint assessments present a good direction for further nuclear efforts in South Asia.

Lack of Joint Learning

I would say that India and Pakistan, their wider publics especially, have yet to learn of the disastrous implications that an Indo-Pak nuclear confrontation would entail, which Nye argues the Soviets and Americans did learn. Further, the level of mutual learning regarding each other's C2 systems are also underwhelming, which raises escalation concerns. Crucially, to quote Nye, the two sides have not jointly learned enough about the "volatility of the arms race."

The above dynamics represent just a few examples, however. Another primary reason for the lack of joint learning is the absence of a useful Indo-Pak nuclear dialogue at the official level. In December 2011, the latest round of the India-Pakistan Expert Level Talks on Nuclear CBMs took place and led to two minor achievements: both sides agreed to recommend to their Foreign Secretaries the extension of the "Agreement on Reducing the Risk from Accidents Relating to Nuclear Weapons" (signed in 2007) for another five years and "both sides reviewed the implementation and strengthening of existing CBMs in the framework of [the] Lahore MoU, and agreed to explore possibilities for mutually acceptable additional CBMs."[49] Indeed, since 1999, besides the 2007 Agreement all that the two countries have done at successive meetings is to reiterate the spirit of the Lahore Declaration, and review the existing nuclear and missile-related confidence-building measures.. Simply put, in 12 years nothing substantial has been achieved to bring about nuclear stability on the subcontinent.[50]

The prevalence of competitive Indo-Pak missile testing highlights both states' symbolic reliance on their nuclear weapons and related accessories to cater to domestic audiences. Moreover, the two sides also utilize contentious declaratory statements in parallel to these tests, which only leads to further arms racing dynamics. In other words, arms race stability is something that the South Asian nuclear dyad has yet to learn. These symbolic actions intensify the regional arms race as well as each

[48] For example, see proposals put forward by the various Ottawa Dialogue plenaries: "Ottawa Dialogue makes further recommendations for India-Pakistan nuclear agreements," December 22, 2011, http://ssms.socialsciences.uottawa.ca/vfs/.horde/newsfeed/000301_001324577320_Copenhagen_ENG%20(2).pdf; "Ottawa Dialogue recommends nuclear agreements for India and Pakistan," July 13, 2011, http://www.media.uottawa.ca/mediaroom/documents/ottawa-dialogue-press-release-2370.pdf.
[49] "India, Pak to renew nuclear accident pact," *Times of India,* December 28, 2011.
[50] Happymon Jacob, "A precarious Indo-Pak nuclear balance," *The Hindu*, January 30, 2012, http://www.thehindu.com/opinion/lead/article2832290.ece.

country's material decisions: India would like to deploy partial ballistic missile interception capabilities and develop a nuclear triad; Pakistan seeks to bolster its nuclear capability by increasing arsenal and offensive capabilities, in part for tactical scenarios. Narang has argued that India has been deemphasizing the Pritvi missile—a short-range ballistic missile useful for nuclear and conventional missions—nuclear role "so that there is less potential for miscalculation and misperception in a crisis with Pakistan."[51] Such unilateral actions can contribute to building stable deterrence in the region.

Areas Where Joint Learning Can or Should Take Place

The two areas where there has to be lot more mutual or joint learning in the nuclear field are CBMs and doctrinal understanding. It is not enough for the track-two participants to discuss the possibility of the doctrinal ambiguities and how to resolve them. Officials on both sides have to do so in order to better understand assumptions, redline, and options. What is promising in all this, however, is that the compliance record of nuclear CBMs between India and Pakistan is commendable and this is an indication that what is needed to be done is to put together more nuclear CBMs.

What Inhibits Nuclear Learning in South Asia?

A realistic analysis of the India-Pakistan nuclear balance is hardly reassuring, and yet, there is almost no focus on the need to put mechanisms in place to avoid a nuclear catastrophe in the region. What prevents the achievement of a stable nuclear order in the region? What inhibits the learning of the right nuclear lessons in India and Pakistan? First of all, there is a fundamental mismatch of worldviews in India and Pakistan on the role of nuclear weapons in their national security strategies. Owing to this fundamental conceptual dissonance, the ensuing nuclear learning in India and Pakistan are likely to be divergent. The actors in the respective countries are socialized into starkly different normative settings, assimilate very divergent worldviews, and hence ordain fundamentally different nuclear strategies. The key question to ask here is whether there is a real desire in both the countries to go beyond nuclear muscle flexing for self-assertion and playing to the domestic gallery, and instead move towards stable deterrence—and eventually stop considering the other a nuclear target.

Secondly, it is necessary to point out that partial ambiguity in the South Asian nuclear balance tends to impede the mutually assured destruction principle and under such a scenario it is difficult for any positive learning to take place. More positive nuclear learning is likely to take place in the stable deterrence phase rather than in the unstable deterrence phase or even in the initial stage of a deterrent relationship.

Thirdly, as pointed out earlier, opacity on matters relating to nuclear issues, extreme forms of nuclear nationalism, mechanistic understanding of deterrence, and a dangerously self-defeating sense of invincibility, all contribute to an absence of nuclear learning in the region. Most politicians in the region do not bother with the dynamics of nuclear deterrence and hence are not interested in discussing it. Such things are left to the professional bureaucrats who, for a variety of institutional

[51] Carnegie International Nuclear Policy Conference, "Nuclear Risk Reduction in South Asia After Mumbai."

and bureaucratic reasons, do not think out of the box or think ahead on nuclear issues, thereby not achieving effective nuclear learning.

The trust deficit between the two sides has again meant that there is no joint learning on nuclear issues by the two countries. Joint learning requires that each country view the other as a responsible interlocutor who is unlikely to pull the plug midway through. Such statesmanship is only beginning to appear now. Also important is the fact that India and Pakistan are still in their nuclear infancy, with their doctrines, arsenal, numbers, postures, and knowledge still evolving. A great deal of joint learning is unlikely to happen in the initial phases of the deterrent relationship in the nuclear dyad. In such initial phases, it is not so often that we find informed nuclear commonsense and a resultant urgency to address critical issues in the field.

Conclusions

By way of concluding the paper, I would like to flag four major points. One, it is perhaps more useful to look at nuclear learning in the Indian case within the larger conceptualization of state socialization rather than purely in the context of individual decision makers' belief changes. While it is true that the personal commitment of the Indian Prime Minister, Manmohan Singh, has been responsible to a great extent in mainstreaming India into the global nuclear order, his actions need to be seen as part of a process in which he simply took the next logical step of bringing India closer to the global nuclear order. More importantly, it is necessary to look for elite socialization in the domestic and international normative environments in trying to understand the Indian nuclear learning process.

Secondly, for too long, the goals of India and Pakistan's respective nuclear policies have remained the same, unchanged, and hence most of their nuclear learning could be seen as tactical and not strategic. In other words, we see a great deal of adaptation rather than belief change on nuclear issues in India and Pakistan.

Thirdly, there has not been any substantive joint learning that has taken place at the bilateral India-Pakistan level, primarily due to the divergent visions that each side holds about the utility and the role of nuclear weapons in their national security strategies.

Finally, much of the nuclear learning in India is still in the process of becoming evident. It is not only the longevity of learning that depends on the extent of its institutionalization, but also its practice in real life situations. Once learning is internalized and institutionalized, its longevity increases and it continues to guide action until it is replaced by a new learning. Hence to fully appreciate India's nuclear learning, the Indian case should be periodically surveyed.

3 The Concept of Nuclear Learning: Pakistan's Learning Experience

Naeem Salik

Introduction

The concept of nuclear learning is not widely understood in the nuclear security literature, though many scholars have referred to it in their writings. Nuclear learning is basically a phenomenon through which nuclear armed states learn to manage their respective nuclear capabilities through the development of doctrines, command and control structures, safety and security mechanisms and an understanding of both the technological characteristics of these weapons as well as their politico-strategic ramifications.

Nuclear learning like any other form of learning occurs at different levels of analysis. However, there is not a consensus on this issue, and scholars disagree on which level of learning merits the most emphasis. Similarly, there are differing views regarding whether learning should be normative or value neutral. Due to the cognitive nature of learning, it is always a challenge to measure the degree of learning and all assessments are at best estimates. The only tangible manifestations of learning can be found in the form of new institutions, legislation, and other administrative measures specifically designed to facilitate the management of nuclear assets.

Due to their immensely destructive potential, nuclear weapons have had a profound effect on the way nations devise and pursue their security policies. A day after the first atomic bomb destroyed the Japanese city of Hiroshima, Bernard Brodie, one of the pioneers of nuclear strategy, having quickly glanced through newspaper reports of the event, turned to his wife and remarked that "everything I have written so far has become redundant."[1] In a renowned commentary, he later encapsulated the fundamental changes brought about in strategic thinking regarding the use of military instruments for policy objective achievement, stating that "thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have almost no other useful purpose."[2] The far-reaching impact of the advent of nuclear weapons on the international security landscape has been recognised by other scholars as well. Robert Jervis, for instance, captured the essence of the significance of nuclear weapons with the term "Nuclear Revolution."[3] The term referred to the enormity of the change brought about by the development of nuclear weapons and the need to absorb this reality. Elaborating on the point he said "the fact that nuclear weapons could destroy the world has changed the way people think and the way nations behave. I also believe that a better understanding of their role can make the world safer."[4] Brodie and Jervis's

*A modified version of this paper will form part of my PhD thesis. This draft is not for citation.
[1] Fred Kaplan, *The Wizards of Armageddon* (Stanford, California: Stanford University Press, 1991), 10.
[2] Bernard Brodie, et al., *The Absolute Weapon* (New York: Harcourt Brace, 1946), 76.
[3] Robert Jervis, *The Meaning of The Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, New York: Cornell University Press, 1989).
[4] Ibid., ix.

remarks make it abundantly clear that nations that acquire nuclear weapons also need to undergo a process of learning to be able to readjust their security policies and national objectives in accordance with the constraints imposed by said weapons.

The successful management of nuclear capabilities depends on the efficacy and speed of the learning process. To be able to better understand this movement along the nuclear learning curve by the nuclear weapons states it is imperative to understand nuclear learning and its various dimensions and manifestations. All the recognised nuclear powers underwent this learning experience in the past, and any new nuclear armed nations would also have to tread this path. The experiences of earlier nuclear powers can act as templates, but these cannot be simply superimposed on vastly different security environments. It is therefore imperative for new entrants into the nuclear club to adapt the available models to their own peculiar environments and learn their own lessons in time.

Michael Quinlan has surmised that in the absence of empirical data on the nature and consequences of a nuclear war, we have to depend on untested concepts and draw inferences about a wide range of possibilities. He also points out that the concepts related to nuclear warfare, though radically different from traditional concepts of war, are not too difficult to comprehend and do not need special expertise in any particular academic discipline. A large body of literature is now available on the theory of nuclear deterrence and concepts related to nuclear war fighting, on which nuclear policies can be based but one has to be careful in choosing the appropriate kind of concepts. If the choice of concepts is not sound and policies are based on wrong premises the consequences could be disastrous.[5]

Approaches to Nuclear Learning

Literature related to nuclear learning deals with learning about both the scientific attributes of nuclear weapons as well as their wider implications for national security and foreign policy. The common understanding of the concept of learning implies a positive outcome. Scholars who emphasize the normative aspect of learning believe that learning has to measure up to certain criteria and must advance the achievement of policy objectives.[6] This approach, however, is contrary to the traditional approach of social scientists, who usually objectively analyse empirical evidence without letting personal beliefs and values influence the conclusions. Scholars such as Jack Levy argue that learning should be devoid of any value judgements; and, in his view, any changes in understanding or perception—irrespective of their nature—should therefore be considered as learning.[7] There is a third line of argument, which considers any changes in understanding or perception as learning, as long as it helps in the achievement of policy objectives. Joseph Nye, for instance, believes that both negative

[5] Michael Quinlan, *Thinking About Nuclear Weapons: Principles, Problems, Prospects* (Oxford: Oxford University Press, 2009), 14-15.
[6] Jeffery W. Knopf, "The Concept of Nuclear Learning" *Nonproliferation Review* 19, no. 1 (March 2012).
[7] Jack S. Levy, "Learning and Foreign Policy: Sweeping a Conceptual Minefield," *International Organization* 48, no. 2 (Spring 1994).

as well as positive learning can take place.[8] In order to maintain objectivity and balance in analysing the process of learning, none of these approaches can be ignored and all must be taken into account.

In essence, learning could either mean recognition of the need to change the 'means' employed for the achievement of an 'end' or a realisation of the necessity to alter the end itself. These two variants of learning have been described in different ways by different analysts. Joseph Nye, for instance, has categorised these as simple and complex learning. According to Nye, *simple learning* entails a modification of the means being employed to achieve a particular objective without any attempt to modify the end itself, while *complex learning* involves a re-evaluation of the ends-means relationship that would cause a state to reconsider its basic policy objectives.[9] Others such as Ernst Haas make a distinction between real or genuine learning and simple adaptation in accordance with the changes in the existing environment.[10] Such a distinction, however, would never be easy to make and would generally be subjective in nature. Joseph Nye contends that "learning is to develop knowledge by study or experience" and that the availability of new information brings about changes in existing beliefs and perceptions. According to Nye, "learning often involves a shift from overly simple generalisations to complex integrated understandings grounded in realistic attention to detail."[11] Robert Jervis tends to agree with this notion and—basing his argument on research by psychologists—has stated that learning usually moves from simple to more complex learning.[12] Both these arguments, however, seem to imply that the process of learning follows a linear progression from simple learning to complex learning without taking into account the possibility that both simple as well as complex learning could also start simultaneously and progress along parallel paths, though the progress in each case may not be equal in magnitude.

Levels of Analysis and Nuclear Learning

Issues related to levels of analysis involved in the process of learning have also been subjected to discussion. Jeffery Knopf has identified five tiers at which learning takes place, starting with *individual learning* and going through to *institutional/organisational learning*, *governmental learning*, *state learning*, and finally *international learning*.[13] However, this classification would be difficult to sustain in many practical situations where the boundaries between institutional learning and governmental learning on the one hand and governmental learning and state learning on the other blur and overlap with each other. The choice of one or more levels of analysis will depend on the purpose for which the analysis is being carried out. If, for instance, the objective is to trace the physical and intellectual developments in a particular state for management of its nuclear capabilities, the institutional/organisational level of learning would be more important. However, if the purpose were to determine the state of strategic stability or the ability to manage crises between

[8] Joseph S. Nye, Jr., "Nuclear Learning and U.S.-Soviet Security Regimes," *International Organizations* 41, no. 3 (Summer 1987), 378.
[9] Ibid., 378.
[10] Ernst B. Haas, *Where Knowledge is Power: Three Models of Change in International Organizations* (Berkeley, University of California Press, 1990).
[11] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 378.
[12] Robert Jervis, *Perceptions and Misperceptions in International Politics* (Princeton, New Jersey: Princeton University Press, 1976), 235.
[13] Knopf, "The Concept of Nuclear Learning."

two rival states, then international learning would be more important.[14] Additionally, if the purpose is to reassure the other side against the possibilities of theft, accidents, or unauthorised use of nuclear weapons, the focus would be greater on safety, security, and command and control aspects of learning.

There also seems to be no agreement on the issue of levels of analysis and different scholars have shown preferences for particular levels. Jack Levy has argued in favour of the individual level of analysis,[15] while Andrew Bennet and Amandeep Gill have shown their preference for organisational learning.[16] Joseph Nye, while acknowledging the importance of individual learning, considers it an insufficient basis for organisational learning. He also emphasises the significance of *institutional memory* and *procedures* for organisations since these provide guidelines for both the old hands and new entrants in the organisation.[17] James Rosenau has termed these as "pools of habits."[18] Robert Jervis has also elaborated on organisational learning, arguing that "when an event affects the perceptual predispositions of many members of an organisation, we can speak of organisational learning."[19] This, however, is a very complex phenomenon, which is not easy to quantify because learning amongst individual members of an organisation would neither be equal, nor would they necessarily learn the same kind of lessons. Learning by an organisation is not equal to the sum total of learning on the part of its individual members.

What Determines the Preferred Level of Analysis?

As pointed out earlier, the preferred level of analysis would ultimately be determined by the purpose of the study. The organisational level of analysis and, to some extent, the individual level of analysis, for instance, would be important if the objective is to study the phenomenon of nuclear learning within a state or within the various institutions of the state. However, if the purpose is to analyse issues related to strategic stability amongst states then international learning and the role of non-state actors will assume greater significance. Since it is not possible to adequately cover all levels of analysis within the scope of one study, the focus of this paper remains on the institutional/organisational level of learning. Bennet, Gill, Nye, and Jervis subscribe to the significance of organisational learning and Jervis has specifically related it to military organisations, stating that "Lessons become working assumptions and form the basis for future planning. In the military they involve not only strategic and tactical thinking but the conduct of manoeuvres, formal instructions and standing orders."[20] Scott Sagan, on the other hand, basing his arguments on

[14] Ibid. Also see Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 378.
[15] Levy, "Learning and Foreign Policy."
[16] Andrew Bennett, *Condemned to Repetition? The Rise, Fall, and Rerise of Soviet – Russian Military Interventionism, 1973-1996* (Cambridge, Massachusetts, MIT Press, 1999). Also see Amandeep S. Gill, "Nuclear Learning Revisited," (presentation, CISAC social science seminar, Stanford University, June 4, 2009), both quoted in Knopf, "The Concept of Nuclear Learning."
[17] Nye, "Nuclear Learning and U.S.-Soviet Security Regimes," 381.
[18] James N. Rosenau, "Learning in East-West Relations: The Superpowers as Habit-driven Actors," (Los Angeles, Institute for Transnational Studies, mimeo, 1986), quoted in Nye, "Nuclear Learning and U.S.-Soviet Security Regimes."
[19] Jervis, *Perceptions and Misperceptions in International Politics*, 238.
[20] Ibid.

organisational theory,[21] is very sceptical of the capacity of military organisations to behave in a rational manner. In his view, professional military organisations usually have rigid routines, professional biases, and vested group and sub-group interests, which inhibit their ability to act in a manner appropriate to, and required by, rational nuclear deterrence. Such proclivities on part of the military organisations can lead to deterrence failure. He also takes a dim view of the capacity of military organisations to learn the right kind of lessons from a given event due to *bounded rationality*.[22] He argues that large organizations—militaries included—focus more on coordinating actions amongst various units and sub-units for which they devise standing operating procedures, and rules, at the cost of well-reasoned decision making to deal with different situations.[23] It is widely known that militaries are conservative by nature and there is a well-worn out cliché that militaries train to fight the last war. For instance, Jervis has referred to the Royal Navy's obsession with the Battle of Jutland at the cost of ignoring the lessons from the 1917 U-boat campaign and its failure to take due cognisance of the value of air reconnaissance. He has also cited an incident from the Allied operations on the Italian Peninsula wherein the bitter memory of a recent event was applied to a very different situation.[24] These examples amply illustrate the tunnel vision often displayed by militaries. There is, however, a big question mark on the applicability by analogy of empirical evidence gained from conventional warfare to nuclear warfare for which no historical evidence exists. Another important difference in conventional and nuclear war strategies is the fact that right from the very early days the theorisation of nuclear strategies has been dominated by civilian scholars and analysts, though the custody and employment of weapons has been in the military domain.

Sagan's pessimistic assessment is based on his study entitled "Limits of Safety" wherein he traced instances where nuclear accidents actually happened in the U.S. military as well as examples of near misses.[25] He also employs Charles Perrow's *Normal Accidents Theory* in which Perrow has argued that large organisations have a limited ability to fully understand the complexities of highly technical systems and that "boundedly rational" organisations are bound to have accidents overtime due to "high interactive complexity" and "tight coupling" amongst their various components.[26] Sagan is a well-known proliferation pessimist and his views are coloured by a firm belief in the negative

[21] Scott D. Sagan, "The Perils of Proliferation, Organization Theory, Deterrence Theory, and the Spread of Nuclear Weapons," *International Security* 18, no. 4 (Spring 1994): 66-107.
[22] Ibid. According to Bryan D. Jones, "Like comprehensive rationality bounded rationality assumes that actors are goal-oriented, but bounded rationality takes into account the cognitive limitations of decision makers in attempting to achieve these goals…..The fundamental premise underlying organisational studies in political science is that behaviour of organisations mimics the bounded rationality of the actors that inhabit them. This correspondence is not simply an analogy among phenomenon at different levels; the relationship is causal. This premise characterised behavioural organisations theory generally, along with the insistence that organisational science be grounded in observation of behaviour in organisational settings. The most important components of the political theory of organisations were the concepts of limited attention spans, habituation and routine and organisational identification. Behavioural organisation theory unlike the subjective expected-utility approach, viewed uncertainty not as simple probabilities attached to specified outcomes, but as infecting the very specification of outcomes themselves." See Bryan D. Jones, "Bounded Rationality," *Annual Review of Political Science* 2 (1999).
[23] Sagan, "The Perils of Proliferation, Organization Theory, Deterrence Theory," 71.
[24] Jervis, *Perceptions and Misperceptions in International Politics,* 238.
[25] Scott D. Sagan, *The Limits of Safety: Organizations, Accidents and Nuclear Weapons* (Princeton, New Jersey: Princeton University Press, 1999).
[26] Sagan, "The Perils of Proliferation, Organization Theory, Deterrence Theory," 94-5.

repercussions of nuclear proliferation, which have been well-documented in the form of his long running debate with Kenneth Waltz.[27]

Sagan seems to have stretched the argument when he contends that weapon system crews often have different priorities than their commanders and field units have different priorities than command headquarters. Anyone with a modicum of experience in military service would find it very difficult to agree with his contention. However, his argument related to inter-services rivalries and varying interests of individual military services is borne out by the prevailing reality in many militaries across the world.[28] Sagan claims that new proliferants (mainly comprising third world countries) will undergo a much longer and more difficult transition compared with established nuclear powers in achieving a secure retaliatory capability, and thus will be more prone to temptations for preventive war and accidental nuclear weapons launch because of the dominant role of militaries in many of these countries. In this context he has given the specific example of Pakistan, where the military is known to have played a dominant role in security policy making related to conventional and nuclear forces. Waltz, however, disagrees with him on this account and believes that new nuclear powers will do everything to ensure the safety and security of their arsenals and will have strong incentives to avoid accidental nuclear war.[29]

Given the post 9/11 international security environment, and especially the prevailing situation in South Asia, a new but very critical factor has emerged regarding the level of analysis. This factor is commonly referred to as the non-state actor and does not seem to have been dealt with in the available studies and literature related to nuclear learning. Non-state actors, however, do not easily fit into any traditional level of analysis framework and will have to be reckoned with as an independent variable. It is important to take into account this factor due to its ability to trump any learning on the part of organisations, governments, or states. These non-state actors have already precipitated two serious crises between India and Pakistan and their ability to do so again cannot be underestimated—irrespective of the lessons that may have been learnt by the two countries from the previous crises.[30]

Cognitive Nature of Learning and its Implications

Learning by its very nature is a cognitive process. It may not sound logical to ascribe this trait to abstract and non-thinking entities such as institutions, governments, or states. Institutions, governments, and states, however, are nothing but a collection of individuals who drive cognitive thinking within organizations. To evaluate learning one has to rely mainly on a comparative analysis of the behaviour of individuals, performance of institutions, or conduct of states over a certain period of time. To achieve this purpose one has to improvise and develop certain benchmarks, criteria, or performance parameters to act as reference points or yardsticks for an evaluation of the levels of

[27] Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate Renewed* (New York: W.W Norton and Company, 2003).
[28] Sagan, "The Perils of Proliferation, Organization Theory, Deterrence Theory," 73.
[29] Ibid., 93.
[30] Terrorists belonging to Lashkar-i-Tayyeba and Jaish-i-Muhammad have been accused of carrying out attacks on the Indian Parliament in December 2001 and on targets in Mumbai in November 2008, which created serious military and political crises between India and Pakistan that could only be defused through diplomatic intervention by the United States and other major powers.

learning. Realistically speaking, however, the results of such an exercise will at best be estimates, which may be more or less accurate depending on the rigour of the analytical tools devised to measure the degree of learning.

Two types of learning take place that are specific to the nuclear realm. First, there is learning about the scientific and technical characteristics of nuclear weapons, called *factual learning*. Robert Jervis has used the term *productive learning*, which according to him encompasses the acquisition of knowledge about some general characteristics of an object and the methods involved,[31] but the terms factual and productive learning in essence denote the same concept. The second type is learning regarding the broader implications of nuclear weapons for the security policy of a state, which can be termed *inferential learning*.[32] Knopf argues that factual learning is important for the public as well as the ruling elite. For instance, a populace educated via print and electronic media as well as other means of public education such as academic institutions and think tanks serve a very useful purpose, especially during crises. If the masses are fully aware of the terrible consequences nuclear war entails they will not generate undesirable pressure on policymakers to take precipitate decisions in crisis situations. On the other hand, it is imperative that the leadership is not only cognizant of the destructive potential of nuclear weapons but also has a good grasp of the wider implications posed by them and their adversaries' possession of nuclear capabilities.[33]

Learning from History and the Effect of Perceptual Dispositions

Looking at the factors that affect the process of learning, the first and foremost is history but its lessons are not always straightforward. The real lessons of history are deeply ingrained, but there is a general tendency to more readily learn the superficial lessons. However, if one loses sight of the context of historical events and fails to appreciate the changed circumstances of the present, there is every possibility of drawing incorrect inferences and analogies from history. Robert Jervis opined that "some events like wars leave such an impression that equally dramatic developments are required to displace them."[34] This unduly strong influence of traumatic events makes decision makers "insensitive to incoming information,"[35] which hampers their ability to identify differences between the two situations and leads them to draw and apply inappropriate analogies to widely differing conditions.[36] According to Jervis, there is a direct linkage between the events, lessons learnt from these, and the future behaviour of the decision makers and sometimes this precludes the learning of what may appear to be very apparent lessons. In Pakistan's case, the traumatic experience of the 1971 war wherein it lost its eastern wing due to a combination of internal political strife and direct military intervention by India has weighed heavily on the way the Pakistani leadership perceives its national security. Pakistan learnt a few crucial lessons from this event. First, it learnt the limited utility of alliances and found out that none of the friendly powers would come to rescue it

[31] Jervis, *Perceptions and Misperceptions in International Politics*, 227.
[32] Knopf, "The Concept of Nuclear Learning."
[33] Ibid.
[34] Jervis, *Perceptions and Misperceptions in International Politics*, 218.
[35] Kenneth W. Thompson, *Political Realism and the Crisis of World Politics* (Princeton, New Jersey: Princeton University Press, 1960), 36, quoted in Jervis, *Perceptions and Misperceptions in International Politics*.
[36] Jervis, *Perceptions and Misperceptions in International Politics*, 220.

from a difficult situation, meaning it would have to learn to stand on its own feet and fend for itself in any future crisis. Second, it realised that in view of the ever widening gap in the military capabilities vis-à-vis India, it was in dire need of an equalizer. This latter realization, coupled with India's burgeoning nuclear program, led to the decision by Prime Minister Z.A. Bhutto to authorize the pursuit of a military nuclear option in early 1972. The impact of 1971 has not diminished and continues to influence Pakistani threat perceptions to this day.

An important factor which affects the ability of any actor to learn the right kind of lessons from past events is his perceptual disposition. Although it is not easy to objectively determine how much influence has been exerted by predispositions on an individual's perceptions. However, if the reading of the past is obviously largely inaccurate, it is likely influenced by the existing predilections of the individual concerned. According to Jervis, "decision makers usually fail to strip away from the past event those facets that depend on the ephemeral context. They often mistake things that are highly specific and situation bound for more general characteristics because they assume that the most salient aspects of the results were caused by the most salient aspects of the preceding situation;" more importantly, "people pay more attention to what has happened than why it has happened."[37] Joseph Nye, while cautioning that new information can sometimes be misleading or be used incorrectly, makes a somewhat similar argument saying that "new information affects prior beliefs, but its reception and interpretation are also affected by those prior beliefs. The extent and accuracy of learning depends upon the strength of the prior beliefs and quantity and quality of the new information."[38]

The studies by psychologists pertaining to the way people receive and convert available information into opinions suggest that these opinions are continuously modified in light of new information. Psychologists argue that our perceptions are subjective in nature and usually at variance with the objective reality. We, therefore, delude ourselves into seeing what we want to see rather than what exists in reality. Understanding this psychological phenomenon is important if we want to understand the decisions made by leaders in different situations because it is not the way the situation exists but the way they perceive it that affects their decision-making.[39]

Pakistan's nuclear weapons programme started in earnest in the mid-1970s after India conducted its so-called *peaceful nuclear explosion* in May 1974. As a consequence, the industrialised Western world started erecting barriers against the transfer of nuclear technology to would-be proliferators. Pakistan, therefore, like India, followed a surreptitious approach and adopted an official stance of denying any nuclear weapons effort. This policy of denial of any weapons-related activity and insistence on the peaceful nature of its nuclear research and development programme helped deflect international pressure and sanctions. However, the downside of this policy was that issues related to prospective nuclear doctrine and strategy, command and control, and safety and security could not be discussed in public. This emphasis on secrecy even discouraged in-house deliberations on these

[37] Ibid., 228.
[38] Jervis, *Perceptions and Misperceptions in International Politics*, 379.
[39] Robert O. Mathews, et al., *International Conflict and Conflict Management* (Scarborough, Ontario: Prentice Hall Canada Inc., 1989), 11.

issues in the military as well as civilian institutions. The nuclear programme was even considered a taboo subject for the media and academia. Therefore, in May 1998 after multiple nuclear tests, there was no institutional memory or pool of habits to fall back on and Pakistan was required to learn its nuclear lessons quickly in order to establish its credentials as a responsible nuclear power. While the specifics and the nature and extent of nuclear learning in Pakistan cannot be discussed within the scope of this study, it would suffice here to refer to a few academic works that deal with the subject.

Peter Lavoy has written that, before May 1998, "nuclear weapons had not been integrated into Pakistani military plans, the armed forces had no nuclear doctrine to speak of, and command and control over the nuclear arsenal and delivery systems was only vaguely defined and loosely organised."[40] He also points towards three critical developments within a few years of Pakistan's overt nuclearization, which on the one hand created severe complications for Pakistani decision-makers and accelerated the learning process on the other. He has cited 9/11, the 2001-2002 military stand-off with India, and the revelations of the activities of the AQ Khan proliferation network in this regard.[41]

However, well before these crises Pakistan had faced a serious military crisis with India in the Kargil region of the disputed state of Jammu and Kashmir in the summer of 1999. According to Hasan Askari Rizvi, Pakistan's response to the Kargil crisis was disjointed and dysfunctional, and there was a serious lack of coordination amongst various organs of the state. In his opinion, Pakistan plunged itself into the Kargil crisis because its national security decision-makers had not fully absorbed the implications of the 1998 nuclear tests. He goes on to suggest that Pakistan's conduct during the 2001-2002 crisis was better than in 1999, due to the fact that firstly, President Musharraf had both military and civilian institutions under his control and this unity of command facilitated better coordination, and secondly, the lessons learned during the Kargil crisis came in handy.[42]

Robert Jervis has argued that most of the available literature about crises is based on the Soviet-American interactions or the pre-World War I crises, making it difficult to relate these to differing strategic environments, different sets of actors, and particular national styles of the countries involved. However, he is convinced that since existing theories are not very precise or specific, these can be easily applied to these varying situations. The problem in his view is the lack of available evidence to determine whether India and Pakistan learnt from the Soviet-American experience by emulating them or if the demands of the situation compelled them to behave in a particular manner. Though, he contends that India's behaviour and indeed much of its rhetoric resembled that of the United States during the Cuban Missile Crisis of 1962.[43] He concludes with the observation that "It would be difficult but interesting to try to determine how Kargil influenced the crisis in 2002, and to

[40] Peter R. Lavoy, "Islamabad's Nuclear Posture: Its Premises and Implementation," in *Pakistan's Nuclear Future: Worries Beyond War*, ed. Henry D. Sokolski (Carlisle, PA: Strategic Studies Institute, 2008), 129- 165.
[41] Ibid.
[42] Hasan-Askari Rizvi, "The Lessons of Kargil as Learned by Pakistan," in *Asymmetric Warfare in South Asia – The Causes and Consequences of the Kargil Conflict*, ed. Peter R. Lavoy (Cambridge, UK: Cambridge University Press, 2009), 333-52.
[43] Robert Jervis, "Kargil, Deterrence and International Relations Theory," in *Asymmetric Warfare in South Asia*, ed. Lavoy, 377-96.

see if behaviour was more or less dangerous because of it."[44] This amply highlights both the difficulty of evaluating learning as well as the importance of learning for states and institutions.

Michael Wheeler believes that lessons from past events, even from a different setting, can be usefully applied to present or future situations and argues that the Cuban Missile Crisis had a salutary effect on the U.S. and Soviet behaviour and both India and Pakistan can learn some useful lessons from that and other Cold War experiences—which would enhance nuclear stability in South Asia.[45] Michael Quinlan has emphasised the importance of learning the nuclear jargon because employed terms have specific concepts behind them. Therefore, careful use of language is critical to get the right message across to the other side.[46] He is convinced that the lessons from the 1999 and 2001-2002 crises between India and Pakistan have imposed caution on them, comparing these crises to the Berlin Crisis of 1961 and the Cuban Missile Crisis of 1962.[47] He is also of the view that the Pakistani government found the AQ Khan episode very embarrassing and has since taken requisite measures not only to dismantle that network but to prevent similar activities in future.[48] Quinlan argues that in both India and Pakistan, strategic communities have enhanced their understanding about the management of their respective capabilities since the nuclear tests in 1998.[49]

Learning from Success

A very important aspect of learning regards the matter of how we look at past events and classify them as either a success or failure. An outcome is usually viewed as a success when the actor involved is perceived to be better off following the event. Once a policy is deemed to be successful, there is no incentive for a post-facto analysis of its pros and cons. No one pauses to think that alternative courses of action might have been more successful or that it was not the policy per se but a combination of other factors including sheer good luck that might have contributed to a successful outcome. Consequently, policies that are seen as having been efficacious would be more readily repeated in the future sometimes with disastrous outcomes. The other side of the coin is that, in the absence of a thorough analysis, policies that failed in the past would be avoided.[50] Jervis has very aptly turned around Santayana's maxim that "those who forget the past are condemned to make the same mistakes" into "those who remember the past are condemned to make the opposite mistakes."[51] He has also cited the commonly known cliché that, "nothing fails like success" to reinforce his argument.[52]

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[44] Ibid.
[45] Michael O. Wheeler, "What was done to achieve Strategic Stability during the Cold War/ Lessons for South Asia," in *The India-Pakistan Military Standoff – Crisis and Escalation in South Asia*, ed. Zachary S. Davis, (New York: Palgrave Macmillan, 2011), 99-126.
[46] Quinlan, *Thinking About Nuclear Weapons*, 15.
[47] Ibid., 135.
[48] Ibid., 137.
[49] Ibid., 141.
[50] Jervis, *Perceptions and Misperceptions in International Politics*, 234-5.
[51] Ibid., 267.
[52] Ibid., 278.

In a recent study primarily related to the field of business management, Francesca Gino and Gary P. Pisano have made a similar argument. In an article with an evocative title, "Why Leaders Don't Learn From Success: Failures Get a Post-Mortem, Why not Triumphs?" they argue that success can breed failure by impeding the ability of both individuals and organisations to learn appropriate lessons.[53] They point out that individuals and institutions develop mechanisms for analysing failures with a view to learning from them, but no one bothers to create the capacity for a similar soul searching in the case of success. In their view, we have a tendency to assume that our skills and our existing strategies have resulted in success, without pausing to think that luck, chance, and extraneous factors may have been responsible for this outcome. This proclivity results in making what they call "fundamental attribution errors." The second obstacle to learning in their opinion is what they refer to as "overconfidence bias," which makes individuals believe that no change is required in the existing system. Third, is what they call "the failure to ask why syndrome," which prevents a systematic analysis of the reasons behind good performance.[54] They have amplified their arguments by citing the example of Alan Greenspan who was considered to be the most brilliant Federal Reserve Chairman in the U.S. history until the economy nearly crashed in 2008. It was evident that Greenspan and his team had been the victims of the over confidence bias and a belief in the infallibility of their economic models. Such overconfidence can afflict organisations, whether civilian or military, bureaucratic or commercial, resulting in their lack of receptivity to new and innovative ideas.[55] People in leadership positions also develop a tendency to keep away those who bring in the bad news.

Gino and Pisano have tried to build a simple model of learning while recognising the fact that learning is an extremely complex, cognitive and organisational process. They accept the fact that individuals and organisations have concepts, models, and rules of business that govern their conduct. These precepts are sometimes very refined and based on logic and long term experience while on other occasions these are superficial and followed through instinct. They argue that learning is nothing more than updating our concepts to understand why things happen in a particular way and why certain decisions yield certain types of results. They infer that "when we succeed, we just focus on applying what we already know to solving problems. We don't revise our theories or expand our knowledge of how our business works," and go on to advise that we should "celebrate success but examine it….when a win is achieved, the organisation needs to investigate what led to it with the same rigor and scrutiny it might apply to understanding the causes of failure."[56]

Interestingly, Gino and Pisano, unlike Scott Sagan, are appreciative of the military's practice of systematic debriefing of each combat mission or training exercise, irrespective of their success or failure, through what are termed after-action reviews (AARs), which produce useful information that can help improving future performance. These reviews raise some fundamental questions. What did

[53] Francesca Gino and Gary P. Pisano, "Why Leaders Don't Learn From Success – Failures Get a Postmortem, Why Not Triumphs?" *Harvard Business Review* (April 2011): 68-75.
[54] Ibid., 69.
[55] Ibid., 71.
[56] Gino and Pisano, "Why Leaders Don't Learn From Success," 72-3.

we set out to do? What actually happened? Why did it happen? What are we going to do next time?[57] Answers to these questions must be sought by all organisations in order to continue to succeed. The fact that these reviews are confidential in nature, are carried out within the organisation, and are not available in the public domain may explain the scepticism on part of scholars like Sagan who are critical of militaries' lack of transparency and tendency to paper over mistakes.

Learning from Failure

On the other side of the spectrum is learning from failure. Amy C. Edmondson argues that we are taught from very early on that failure is bad and that conviction hinders organisations from learning from their mistakes.[58] There is a general agreement about the value of learning from mistakes. However, in most cases it is not done in the right spirit and in the manner it should be done due to the stigma associated with failure. According to Edmondson, "every child learns at some point that admitting failure means taking the blame. That is why so few organisations have shifted to a culture of psychological safety in which the rewards of learning from failure can be fully realised."[59] Due to this fear, failures are not reported and obviously the lessons that could have been learnt, if these were highlighted, are also not utilised by making necessary course corrections. Again, minor routine failures are bound to occur in large and complex organizations, but these should be addressed in order to avoid systemic failures at some later stage.[60]

It is even more important to accept and learn from mistakes that are a consequence of experimentation with new ideas and cutting-edge technologies because of the significance of the information that can be gleaned from those. Such failures have been called "intelligent failures."[61] It is the responsibility of the leadership to inculcate a culture of reporting and learning from mistakes and failures within their organisations by encouraging and rewarding those members of their teams who display the courage to report failures instead of shooting the messenger that brings the bad news.[62] Once the mistakes are detected or reported, they should neither be brushed aside nor subjected to superficial investigation. A deeper and comprehensive inquiry should be undertaken, even if egos are hurt in the process, so as to discover the root causes of failure for the greater good and for the long term health of the organisation.[63]

Given the special characteristics of nuclear weapons, one could argue that failure in a nuclear organisation is simply unacceptable because the consequences of such a failure could be so disastrous that one may not live to learn any useful lessons from the episode. This is, however, an extreme view and all failures are not of disastrous proportions and do not necessarily lead to a systemic failure. There can be routine, minor failures that could be either procedural or technological

[57] Ibid., 73.
[58] Amy C. Edmondson, "Strategies for Learning From Failure," *Harvard Business Review* (April 2011).
[59] Ibid., 49.
[60] Ibid.
[61] The term "intelligent failure" has been coined by Duke University Professor of Management, Sim Sitkin.
[62] Edmondson, "Strategies for Learning From Failure," 51-2.
[63] Ibid., 54.

in nature. If such minor glitches can be identified and rectified in time, these can help in the prevention of major disasters.

Conclusion

It is evident from the foregoing discussion that the concept of nuclear learning is neither commonly understood nor is it easy to evaluate the amount of nuclear learning that might have taken place in a country with any degree of certainty. India and Pakistan are in the early part of their second decade of nuclear learning, which is not long enough a time period, given that historically, nations slowly learn and adapt to changes in their security environments. Unfortunately for the two countries, their respective processes of learning have faced serious distractions in the form of U.S. and NATO operations in Afghanistan and the impact of the growth of international terrorism, with its ability to precipitate warlike crisis between states. It is to the credit of the two South Asian countries that they have moved up the nuclear learning curve rather quickly compared with progress made by earlier nuclear powers at similar stages of evolution of their thinking about nuclear weapons. One can only hope that they will not only continue to learn at institutional and state levels, but will graduate to international learning in order to stabilize the strategic environment in the region and make it impervious to shocks that may be caused by the actions of misguided non-state actors.

4 Military Modernization and Technological Maturation, an Indian Perspective: Stabilizing the Instability-Stability Paradox?

Vipin Narang

India and Pakistan are only now reaching the point in their strategic modernization programs where both can reasonably calculate, and therefore accept, that the other side has a secure second strike capability—both because of the increasing quantity of forces and increasingly survivable basing modes—which renders any thoughts of neutralizing the other's arsenal, no matter how remote they may have been before, simply infeasible. Thus, military modernization and the technological maturation of India and Pakistan's nuclear forces are only now beginning to generate stability at the strategic level. This is the good news, for now. The biggest threat to stability at the strategic level would be the development of a workable ballistic missile defense system (BMD). For a variety of reasons, such as the quantity of forces needed to saturate or evade BMD systems and the increasing penetrability with MIRVs, I argue that a condition of strategic stability is likely to exist for quite a while as both India and Pakistan's forces and command and control architectures mature. Although conflicts can nevertheless escalate uncontrollably, there will be declining rational incentives to initiate a strategic nuclear exchange, irrespective of how intense a conflict has already erupted.

On the other hand, a growing array of capabilities at the lower-end of the use spectrum, by both countries, including tactical missile systems, cruise missiles, miniaturized warheads, systems at higher states of readiness, also amplify the tactical instability of the relationship. This suggests not only that conventional conflict may be increasingly possible under the umbrella of strategic stability, but that *limited or tactical nuclear use* may also be possible since such use would theoretically be *war terminating* since, under a condition of strategic stability, the receiving side of limited nuclear use still has no rational incentive to retaliate with full strategic nuclear force. Thus, technological maturation of both sides' nuclear forces are simultaneously stabilizing the strategic level of the relationship *and* destabilizing the tactical and operational levels of the nuclear relationship. These developments and the growing stability of the strategic nuclear balance, paradoxically, actually amplify the probability of major conventional conflict and even tactical nuclear use as the relationship moves forward.

When the strategic balance was unstable or just emerging, limited or tactical nuclear use was inhibited or deterred because the instability of the strategic nuclear balance generated nontrivial probabilities of further escalation to the strategic level. As technological maturation stabilizes the strategic nuclear balance, this condition will reverse itself. That is, over time with the maturation of nuclear forces structures on both sides, the probability of *strategic nuclear exchange has and will decline*, but the probability of *limited or tactical nuclear use* may increase. Figure 1 provides a very crude conceptual depiction of how this relationship operates, with some hypothetical probabilities in the event of a major India-Pakistan conflict. The important point here is to recognize the inverse relationship between strategic and tactical nuclear stability):

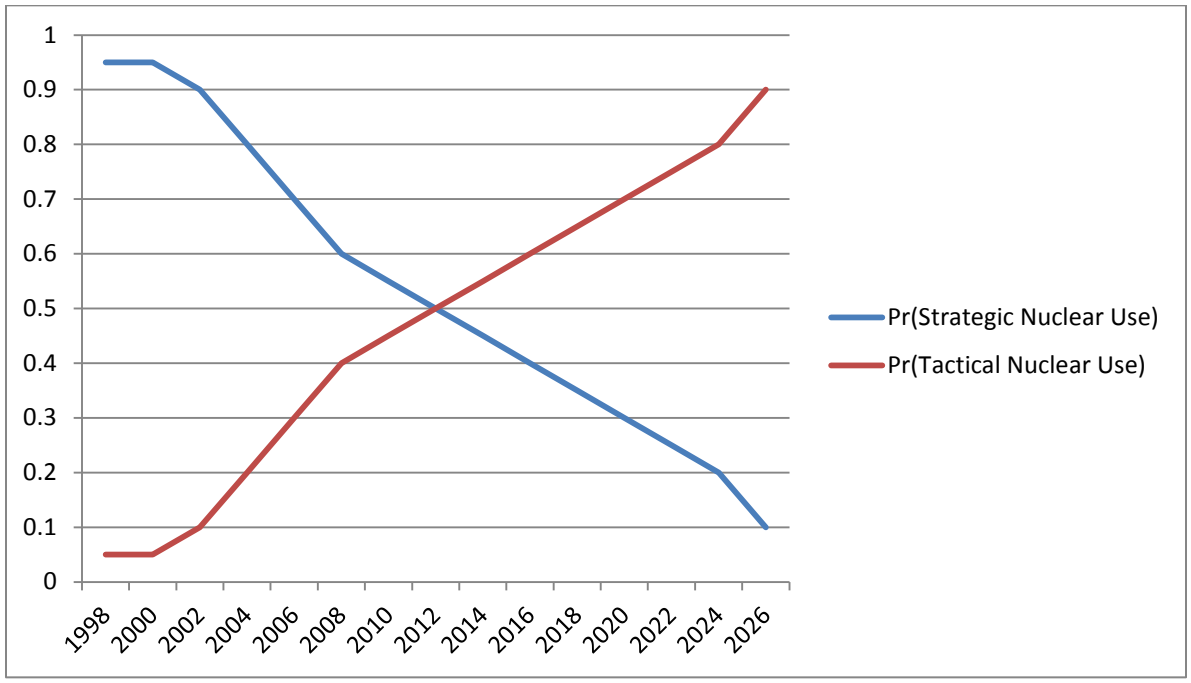

Figure 1. Relative relationship between Strategic and Tactical Nuclear Stability in the event of nuclear conflict. *The actual magnitudes of Pr(x) are not meant to be realistic*.

The key point is that the driving variable for this relationship is the modernization of both sides' nuclear force structures, particularly incontrovertibly secure second-strike capabilities, and the development of lower order use options by both sides, particularly Pakistan which has explicitly assigned nuclear roles to its battlefield capabilities, e.g. the Nasr. Of course, India could do the same eventually with the Prahaar and cruise missiles. The central argument of this paper is that nuclear force modernization in South Asia will have a key tradeoff: the probability of strategic nuclear exchange will fall, which is certainly a positive development, but the probability of limited nuclear use will correspondingly rise in the event of a major ground engagement. This dynamic assumes that there is a meaningful distinction between tactical and strategic nuclear use in South Asia.

Clarifying the Stability-Instability Paradox

There is a significant amount of conceptual sloppiness when referring to the so-called stability-instability paradox, a term first coined by Glenn Snyder in 1965, and further unpacked by scholars such as Robert Jervis and, in the South Asian context, Paul Kapur. The general referent in the stability-instability paradox is the mutual nuclearization of a conflicting dyad. That is, once two rivals acquire nuclear weapons, the terrifying prospect of their use caps conventional escalation beyond a certain point, thereby freeing both sides to engage in lower levels of conflict at higher frequencies than prior to nuclearization. However, a key qualification of the stability-instability paradox often forgotten is that it takes more than simply the mutual possession of nuclear weapons to

generate stability at the nuclear level. There must be a condition of mutual secure second-strike capabilities in order for a state of strategic stability—when neither side has an incentive to initiate a strategic nuclear exchange—to obtain. Without this qualification, the strategic balance is unstable since one or both sides may calculate that a strategic nuclear war is 'winnable', either through a pre-emptive counterforce strike, or some combination of preemption and damage limitation measures. Only when the strategic balance is such that both sides are mutually vulnerable despite iterative attempts at disarming strikes, can A dyad be termed stable.

In 1965, Glenn Snyder famously wrote the following about the condition known as the stability-instability paradox, which is worth reproducing here verbatim: "[T]he greater the stability of the 'strategic' balance of terror, the lower the stability of the overall balance at its lower levels of violence. The reasoning is that if neither side has a 'full first-strike capability,' and both know it, they will be less inhibited about initiating conventional war and the limited use of nuclear weapons, than if the strategic balance were unstable. Thus firm stability in the strategic nuclear balance tends to destabilize the conventional balance and also to activate the lesser nuclear 'links' between the latter and the former."[1]

The stability-instability paradox is often characterized incorrectly as: mutual nuclearization creates stability at higher levels of violence, thereby generating instability at lower levels of violence. This is largely an incorrect reading of the concept. What Snyder, and Jervis after him, indicated to was that nuclear stability at the strategic level can generate instability at both lower conventional and nuclear rungs of the escalation ladder. That is, the stability-instability paradox does not simply obtain when two adversaries merely acquire nuclear weapons, it obtains when they both achieve secure-second strike forces and both sides are aware of this condition, thereby neutralizing any incentive to disarm the adversary with a first strike, which is what Snyder and Jervis classify as nuclear instability at the strategic level. This distinction is incredibly important in the context of regional nuclear powers where achieving secure second-strike forces and a correspondingly survivable command and control infrastructure is not necessarily a trivial matter.

There is a wide space for rival nuclear states to have highly unstable strategic nuclear balances, for example, when one or both have arsenals vulnerable to being completely disarmed. Snyder very explicitly notes that only once a state of mutual stable strategic nuclear balance is achieved might two rational states experience higher incidences of conventional conflict, or even limited nuclear use, since neither party would have an incentive to escalate the conflict to the full strategic level. The balance of conventional forces actually has little to do with the theoretical logic of the stability-instability paradox, except to suggest that the conventionally inferior side—NATO during the Cold War and Pakistan in the India-Pakistan dyad—has incentives to manipulate nuclear risk; but whether it does so at the tactical or strategic nuclear level depends on the degree to which there is strategic nuclear stability.

[1] Glenn Snyder, "The Balance of Power and the Balance of Terror," in *The Balance of Power*, ed. Paul Seabury, (San Francisco, Chandler Books, 1965), 199.

This reading, correct in my view, of the stability-instability paradox generates several observable implications for the India-Pakistan dyad. First, the true stability-instability paradox has not yet been applicable to India and Pakistan. As Brigadier Gen (Ret.) Feroz Hassan Khan has argued, because of this strategic instability, Pakistan in the 2000s could not afford a strategy of graduated escalation since it risked being disarmed by an Indian retaliatory strike, which put Pakistan's strategic forces in a "use them or lose them" situation, and therefore demanded a full release against Indian targets, including population centers and C2 nodes, if it anticipated Indian nuclear use.[2]

If one or both sides believes the other does not have a secure-second strike capability, and there is instability at the strategic nuclear level, Paul Kapur's insightful 'instability-instability' paradox ought to result (though he does not specify why it is unstable, just that there is a risk of nuclear escalation).[3] I would actually refine this characterization slightly as the 'instability-stability-instability' to refer to the three levels of conflict: nuclear-conventional-subconventional. Here, the instability at the nuclear level enables one party with revisionist intentions to engage in low-level subconventional attacks at the other, knowing that a full-scale conventional conflict ought to be inhibited for fear of escalation to the tactical and subsequently strategic nuclear level, since instability at the strategic level increases the probability of such an exchange. This is the condition that India and Pakistan found itself in for the first ten years after nuclearization, as Kapur argued. Instability at the nuclear level created stability at the conventional level, which both in turn created instability at the subconventional level. But it was a tenuous stability at the conventional level and the Subcontinent was one aggressive decision away from strategic nuclear exchange. In short, instability at the strategic nuclear level made every crisis in South Asia a potential nuclear tinderbox.

What ought to happen as India and Pakistan establish stability at the strategic nuclear level, augment their nuclear force structures and establish increasingly survivable deployment modes and procedures? In this case, stability at the highest level should, logically, generate instability at each lower order level of the conflict spectrum. That is, stability at the strategic nuclear level allows escalation all the way up to limited nuclear use, but no further. Therefore, South Asia might find itself in a condition of stability (strategic nuclear)-instability (tactical nuclear)-instability (conventional)-instability (subconventional); or what Snyder and Jervis would recognize as simply a stability-instability paradox.

The upside is that the probability of strategic nuclear exchange should fall as both accept mutual vulnerability at that level, thereby providing high-order stability to the Subcontinent. The downside is that it becomes rational for conventional conflicts to be initiated by one or both sides, which can escalate all the way to limited nuclear use as a war-termination strategy. The most likely scenario for this would be Pakistani limited nuclear use against an Indian armored offensive operating on Pakistani soil in retaliation to some real or perceived provocation, which would terminate the conflict at that level, with either a tit-for-tat limited nuclear response or simply war termination since a full

[2] Feroz Hassan Khan, "Challenges to Nuclear Stability in South Asia," *Nonproliferation Review* (Spring 2003): 59-74.
[3] S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Stanford, CA: Stanford University Press, 2007), 62.

Indian strategic retaliatory response ought to be deterred by Pakistan's survivable second-strike capabilities. Therefore, as argued earlier, the achievement of strategic stability at the nuclear level ought to immunize South Asia's cities from nuclear use, but at the price of an increased risk of serious conventional conflict and limited nuclear use on military targets.

The critical point is not that the overall risk of nuclear escalation has changed, but that the type of escalation that is risked has changed as India and Pakistan establish true strategic nuclear stability with mutually accepted second-strike forces. In the first decade, the risk of nuclear escalation was all the way up to full strategic nuclear exchange. This led to a cap on conflict at the sub-conventional level, since conventional conflict could very quickly lead to strategic nuclear use. Going forward, when the two states establish a level of strategic stability that deters strategic nuclear use, the cap on escalation actually rises to the tactical nuclear level. That is, conventional conflict can proceed, as well as tactical nuclear use, without triggering a full strategic nuclear exchange. Thus, in the coming decades, there is still a risk of nuclear use, and it may even be probabilistically higher. This is the key tradeoff as the nuclear force postures of the two states mature in the years to come.

Getting to Stability

Nuclear states in the early phases of post-nuclearization have historically struggled to establish secure second-strike forces, even when the primary adversary had few counterforce options. The establishment of secure second-strike forces is not automatic. Indeed, the United States did not accept the surety of a Soviet second strike until the late 1960s when the number of Soviet ICBM/IRBM/MRBMs finally reached a level that made a successful American counterforce strike infeasible. Similarly and objectively, India and Pakistan did not have strategic nuclear stability when they tested nuclear weapons in 1998. Both sides had limited fissile stockpiles, few warheads, few delivery vectors and survivability in the event of a serious conflict would have had to be a serious concern for nuclear planners on both sides. Obviously, both erected procedures to enhance survivability of whatever assets they possessed—dispersion, concealment, movement, deception—but the sheer numerical limits and the absence of an obviously survivable deployment mode e.g. an SSBN, meant that both sides could have been vulnerable to a disarming conventional or nuclear strike.

Several developments over the past fourteen years are increasing the stability at the strategic nuclear level between India and Pakistan. The critical point is that in addition to learning processes which may inherently stabilize the India-Pakistan relationship, there is an increasing condition of strategic stability, such that neither state would have a rational incentive to initiate a strategic nuclear strike. The following is by no means an exhaustive treatment of these capabilities, but captures some of the critical stabilizing developments.

Numbers

The first major development is just the quantitative increase in warheads and delivery vehicles each side possesses. With nuclear weapons, at certain thresholds around, say, three-digits, quantity really

does have a quality all of its own. Just the sheer expansion of each country's fissile material stockpile and warhead numbers, which has doubled or tripled the number of assets each would have to destroy in order to neutralize the other's nuclear warheads, is critical. The numbers are hard to establish in the open source—and this ambiguity, if shared at the classified level, reinforces stability—but if both had around 30 nuclear weapons, they now both stand close to 100+. Furthermore, Pakistan's likely shift to plutonium warheads with increasing Khushab Pu production/reprocessing will also enable a steady expansion of the arsenal, and toward miniaturized warheads with higher yield. Both sides enhance the survivability of these nuclear forces through deployment procedures that emphasize dispersion, movement, concealment, and deception that increases the number of components to be neutralized in order to fully disarm the adversary and makes it impractical for the adversary to have real-time intelligence about locations regarding nuclear assets.

Survivable Modes

Second, the expansion and deployment of a greater number of strategic delivery vectors that are road or rail mobile and solid-fuel, increases their readiness as well as their survivability by reducing the logistics required for old liquid fuel missiles e.g. the *Prithvi*. Pakistan has a growing array of strategic ballistic missiles that provide coverage against major Indian targets—a capability which it did not have in any meaningful numbers in the early 2000s. Prior to the development of the *Shaheen* family of missiles, Pakistan was dependent on a highly vulnerable air vector (F-16 A/Bs and possibly Mirages and F-16C/Ds) to deliver nuclear weapons against Indian strategic targets in the south. The *Shaheen* family of solid-fuel missiles, however, will provide coverage at 500-km and 2000+-km (*Shaheen* II) which, as the production of these capabilities ramps up and they become fully operational, will provide a true land-based deterrent against Indian strategic nuclear use by putting most major Indian cities at risk.

India dedicated a better part of the past decade in production and operationalization of the mobile solid-fuel *Agni* I/II (eventually the III and V), as well as the mobile cannesterized *Shaurya* missile. The 800-km *Agni* I was deployed with the 334 missile brigade in 2004, which put most Pakistani strategic targets in range from Western India. The further development and operationalization of the *Agni* II/III provides more survivable deployment modes as they are mobile and can be launched from Southern and Eastern India against Pakistani strategic targets, making them less vulnerable to conventional counterforce attempts.

For India, the true achievement of survivable second-strike capabilities and an assured retaliation nuclear posture is the SSBN. The *Arihant* prototype is still in development, and the *Sagarika* SLBM is still in the early phases of testing. Realistically, India is at least half to a full decade away from being able to field an SSBN capability. Even when it does, the noise levels and command and control considerations for a wholly 'cannesterized' system leave its deployment modes open: will India have a continuous deterrent patrol model like the United States or a more ad hoc model like the Soviets, which kept armed SSBNs closer to port and dispersed them as a crisis unfolded? The former model maximizes survivability if it can be obtained; the latter maximizes centralized control of the arsenal. Which end of the spectrum India chooses to emphasize remains an open question, but fielding any

SSBN capability might be a significant leap in the survivability of India's nuclear forces. As of this writing, it is unclear what Pakistan's plans for an SSBN capability are, though it would make logical sense for it to develop one, since of the two nations, it is Pakistan that has a thin geography which would—like with Israel—complicate land-based survivability.

There is an additional command and control piece to improving survivability and the assurance of retaliation. That is, both India and Pakistan are likely developing responsive and survivable command and control infrastructures that would enable each to calculate that the other could initiate a retaliatory strike after a first-use with certainty. Much of this is unknown in the public domain but would likely include characteristics such as decapitation contingencies, hardened infrastructure to survive a nuclear attack, redundancy, etc.

All of these capabilities and corresponding deployment modes are moving India and Pakistan toward what I characterize as enhanced strategic nuclear stability. That is, both are approaching conditions of 'assured retaliation', which has two critical components: (1) the ability to survive iterative attempts to disarm one's nuclear forces and (2) the ability to retaliate with certainty against the adversary's strategic targets following such attempts. They are approaching numerical thresholds at which survivability of forces is less of a concern, and they are developing capabilities that can increasingly cover and penetrate to each other's major population centers and strategic targets. Once the condition of mutually assured retaliation is achieved and accepted by both parties, the risk of strategic nuclear exchange on the Subcontinent should fall precipitously. This is the good news.

Toward Lower Level Instability

The bad news is that both India and Pakistan are modernizing their forces at lower ends of the conventional and nuclear use spectrum, perhaps unintentionally, in anticipation of the stability umbrella provided by strategic invulnerability. These forces, and the strategic condition of nuclear stability at the highest levels, create very real risks of limited nuclear use because now such capabilities can be employed with *higher confidence* that there will not be escalation to full strategic nuclear exchange. The categories of capabilities emerging and their potential impact on the risk of lower-order nuclear use are listed below. Furthermore, the C2 infrastructure being erected to enhance the assurance of retaliation could also be employed to make tactical nuclear use more credible as well—though some of these features, notably delegative nodes, might be distinguishable from the infrastructure designed to support retaliatory missions. Again, the following list is not exhaustive but highlights the growing trends at the lower end of the use spectrum.

Tactical Missiles

Pakistan's development of the *Nasr* (*Hatf*-9) 60-km SRBM, based on a mobile MLRS, is explicitly designed to provide nuclear use options at lower ranges for battlefield or theater contingencies. Then Director General of Pakistan's Strategic Plans Division, Lt. Gen (Ret.) Kidwai, noted after the April 2011 test of the Nasr that it "carries nuclear warheads of appropriate yield with high accuracy and

shoot-and-scoot attributes. This quick response system addresses the need to deter evolving threats."[4] Unnamed strategic planners similarly averred that it "is a low-yield battlefield deterrent, capable of deterring and inflicting punishment on mechanized forces like armed brigades and divisions."[5] Presumably, a miniaturized plutonium warhead with a yield on the order of tens of kilotons or lower could be mated with the Nasr. The development of plutonium warheads thus contributes both to strategic stability and lower level instability by providing warhead options for shorter range and lower throw-weight systems. As the *Nasr* undergoes further testing and operationalization, Pakistan will truly have a system explicitly designed for limited nuclear use in the theater of envisioned conflict. With stability at the strategic nuclear level, Indian decision-makers may be tempted to test Pakistani resolve on lower order nuclear use options and authorize conventional operations that risk crossing these lower order thresholds. And the Pakistan Army may be tempted to employ limited nuclear use options in the event of a conventional breakdown, knowing the strategic nuclear deterrent ought to inhibit full scale Indian nuclear retaliation.

India is similarly developing battlefield support capabilities, most notably the *Prahaar* 150-km ballistic missile. DRDO claims that "the missile with a pay load of 200 kg has a fast reaction time, which is essential for the battle field tactical missile. The missile is launched from a Road Mobile System, which can carry six missiles at a time and can be fired in salvo mode in all directions covering the entire azimuth plane."[6] Such a capability has not been assigned a nuclear role, and India's Strategic Force Command presently denies that it has any intention of developing tactical nuclear capabilities. The *Prahaar*, however, can be used to support conventional offensives, which carry its own risks, but could easily be tipped with a miniaturized 200kg nuclear warhead. This development would eventually provide India's Strategic Forces Command and political leadership with more flexible nuclear options, including a lower-order tit-for-tat capability should a nuclear-Nasr ever be used on Indian forces. The critical point here is that role assignment to conventional or nuclear is extremely flexible in the future, as the missile itself is only restricted by payload weights; whether that payload is conventional or nuclear is largely irrelevant to the development process, provided a nuclear warhead of that payload exists.

Cruise Missiles

Higher accuracy air breathing capabilities that are not vulnerable to potential theater missile defenses—such as cruise missiles—may provide additional lower order nuclear use options to India and Pakistan. Pakistan has explicitly declared the *Babur (Hatf- 7)* cruise missile as nuclear capable and it has an operational envelope of 700km. Pakistan's Inter Service Public Relations (ISPR) stated that "the three-tube MLV [Multiple Launch Vehicle] enhances the targeting and deployment options in the conventional and nuclear modes. With its shoot-and-scoot capability, the MLV provides a major force multiplier effect for target employment and survivability."[7] Similarly, the beyond visual

[4] Lt. General (Ret.) Khalid Kidwai, "Pakistan Test-fires Hatf-IX", *The News*, April 20, 2011.
[5] Ibid.
[6] Defense Research and Development Organization, "Prahaar: New Surface to Surface Tactical Missile Successfully Launched," July 21, 2011. Available at: http://drdo.gov.in/drdo/English/PressReleasePraharnew.pdf.
[7] "N-Capable Hatf VII Missile Test-Fired," *Dawn*, October 28, 2011.

range *Ra'ad* (*Hatf*- 8) air-to-surface cruise missile, which has been successfully fired from Mirages, is also dual-capable. According to ISPR, "the state-of-the-art *Ra`ad* Cruise Missile with stealth capabilities is a low altitude, terrain-hugging missile with high maneuverability, and can deliver nuclear and conventional warheads with great accuracy…*Ra`ad* gives Pakistan `greater strategic standoff capability` on land and at sea, which implies that it can be used against targets both at sea and on land while keeping the launching platform undetected by enemy air defense systems. *Ra`ad* is designed to launch aerial strikes against fixed enemy installations including enemy command centers, radars, surface-to-air missile launchers, ballistic missile launchers, and stationary warships."[8] These capabilities are designed to provide additional flexibility at lower order nuclear use options, with the explicit aim of evading detection and any potential defenses, such as theater BMD should India successfully field it.

India has similarly developed a range of cruise missiles, including the *BrahMos* and *Nirbhay*, both of which could potentially be nuclear-capable. *BrahMos* has already been operationalized into several regiments and there are land, air, and naval variants. Many news outlets rightly refer to the weapon as nuclear-capable since it can carry a 300kg payload—even though it has not been assigned a nuclear role insofar as public sources indicate. As these capabilities mature and become further operationalized, it is within the realm of possibility, depending on the nature of the India-Pakistan and India-China balance, that they will start to be assigned nuclear roles for the same reasons as mentioned above with respect to tactical missiles.

Ballistic Missile Defenses

The impact of reasonably effective BMD on the balance between India and Pakistan has largely received rudimentary treatment. It is unlikely that either side would be able to erect midcourse ballistic missile architectures that would neutralize each other's strategic deterrents. The investment, technological sophistication, number of capabilities required detecting, tracking, and intercepting a midcourse phase warhead is probably prohibitive at this point for India. It is likely, however, that in the next decade, India will be able to field high-altitude (*Prithvi*-based) and terminal phase (*Ashwin*-based) BMD systems. These will likely be thin though. DRDO claims it can protect two cities, e.g. Delhi and Mumbai. Thus, they could be saturated by a full strategic Pakistani launch or evaded by nuclear capable cruise missiles. Should India be capable of fielding a BMD architecture that threatens Pakistan's second-strike capability, the Subcontinent would revert back to strategic nuclear instability but one where India could use conventional power at its perceived will, since it would have a monopoly on strategic nuclear use. Even at limited levels, a theater BMD system might support Indian ground offensives by threatening to credibly neutralize Pakistan's lower order nuclear ballistic missile capabilities. Again, however, the *Nasr, Babur,* and *Ra'ad* might be capable of defeating such a system. The balance of BMD is a critical area to watch as both countries' architectures modernize and mature. These systems can have a very sharp impact in supporting offensive action at lower rungs of the escalation ladder or, worse, destabilize the strategic nuclear balance back toward making nuclear exchange 'winnable.'

[8] "Nuclear-Capable Cruise Missile Test-Fired from Mirage Fighter," *Dawn*, April 30, 2011.

MIRVs

After India's test of the *Agni* V in April 2012, DRDO Director General Dr. V.K. Saraswat noted in post-test media appearances that India is several years away from being able to deploy MIRVs on the *Agni* V and possibly the *Agni* III. Although he conceded that it is not Government of India policy to deploy MIRVs on any of its nuclear assets, the capability is nevertheless being developed. If deployed, MIRVs could be a serious threat to strategic nuclear stability as India could theoretically multiply its ability to target Pakistani nuclear systems, thereby achieving enhanced penetrability and, more critically, a potential damage limitation capability that may make a strategic nuclear exchange 'winnable' for India. Although this might be developed with China in mind, it would nonetheless have serious implications for the strategic nuclear balance between India and Pakistan. This is a development to closely watch over the coming years. South Asian observers will need to watch for any Indian appetite to MIRV any of its land or sea-based missiles, even for defensive purposes (e.g. to retain sufficient throw weight in the event that a pre-emptive Chinese or Pakistani conventional or nuclear strike disabled a significant number of *Agnis*).

Conclusion

This paper argued that technological modernization and maturation in the Indian and Pakistani nuclear force postures and command and control infrastructure will carry with it a key tradeoff between strategic and tactical nuclear stability. The extent of that tradeoff will vary depending on the types of systems fielded. Some developments, such as the numerical growth of forces and increasingly survivable basing modes, will enhance strategic stability. Others such as BMD and MIRVs could undermine strategic stability. Meanwhile, the increasing sophistication of tactical and cruise or beyond visual range missiles enable both India and Pakistan to, as Glenn Snyder put it, activate "lesser" nuclear links under conditions of strategic nuclear stability. Thus, going forward, the dyad may shift from a condition of a tenuous stability at the conventional level to one at the highest strategic nuclear level. This development would open the possibility for significant conventional conflict and even lower order nuclear-use as a war termination strategy but ought to eliminate the risk of a full strategic nuclear exchange by either party.

5 Trends in Technological Maturation and Strategic Modernization: The Next Decade

Mansoor Ahmed

The past decade and a half has seen the operationalization of Indian and Pakistani nuclear capability, followed by the consolidation and growth of their strategic forces, operational doctrines and force postures.. Even as technological innovation has been a source of their strategic modernization, it is primarily influenced by the dynamics of evolving force postures in the region—from minimum credible deterrence to credible minimum deterrence and now full-spectrum deterrence—all designed to meet a complex pattern of perceived challenges. This paper explores the impact of technological maturation and innovation on the nuclear learning process in South Asia.

The technological maturation curve is visible through a steady expansion of fissile material production infrastructure and evolution of a triad of strategic delivery platforms for an assured second-strike capability. This process has remained steady where India has been allocating far greater resources to conventional and nuclear force modernization given its rapid economic growth, compared to Pakistan, with the latter attempting to maintain a semblance of strategic balance through innovation and modernization of its strategic forces.

Despite acute resource constraints, Pakistan has been resolutely improving and modernizing its nuclear deterrent, acting as a balancer against India's conventional superiority and nuclear threat. This capability has helped Pakistan to reduce its defense spending since 1998 from 5.3% of GDP ($3.2 billion) to 3.0% ($5.2 billion) in 2010, which amounts to a net decrease in real terms.[1] Nuclear weapons are thus largely viewed as the only affordable option to maintain a credible deterrent against a threat, which is perceived as real and existential. One of the two most significant signs of the evolution and modernization of strategic forces in South Asia is the palpable expansion of fuel cycle facilities—plutonium production and reprocessing and uranium enrichment, designed to produce fissile material for nuclear weapons.

South Asia's Fissile Material Race

Pakistan's expansion of fissile material production infrastructure is largely driven by India's existing advantage in fissile material stockpiles, and is therefore aimed at reducing a yawning gap, particularly in plutonium stocks.[2] In my assessment, a huge disparity with Pakistan exists in

[1] Ian S. Livingston and Michael O'Hanlon, *Pakistan Index: Tracking Variables of Reconstruction and Security* (Brookings Institution: Washington DC: November 29, 2011), 6. Available at http://www.brookings.edu/~/media/Programs/foreign%20policy/pakistan%20index/index20111129.pdf.

[2] India is believed to enjoy a huge advantage in weapon-grade plutonium stocks. Estimates show that as of 2011, India may have accumulated about more than 11.5 tons of potentially weapon-usable unsafeguarded reactor-grade plutonium, with none on the Pakistani side. See Zia Mian, et. al., "Fissile Materials in South Asia and the Implications of the U.S.-India Nuclear Deal," *Science & Global Security* 14, no. 2 (2006), https://www.princeton.edu/sgs/publications/articles/Fissile-Materials-South_Asia-SGS-2006.pdf.

potentially weapon-usable (unsafeguarded) reactor-grade plutonium over and above the weapon-grade plutonium stocks.[3] Further, India is doubling its plutonium production capacities with the construction of new reactors and reprocessing plants.[4] This asymmetry is exacerbated with the rapid expansion of India's centrifuge program for uranium enrichment.[5] Soon India is approaching near-parity with Pakistan in the weapon-grade enriched uranium holdings as well.[6] Pakistan's traditional threat perception is further accentuated by the Indo-US nuclear deal, which allows India to exclusively divert its domestic uranium resources for military program. Consequently, these developments have served to aggravate Pakistan's strategic anxieties, leading up to a corresponding expansion of its fissile material [plutonium] production capacity—at the Khushab production and the New Labs and Chashma reprocessing plants. The country's security anxiety is clearly visible at the Conference on Disarmament in Geneva, where Pakistan is holding out and not participating in negotiations on finalizing a Fissile Material Cut-off Treaty. [7]

Pakistan is calling for the accounting of existing stockpiles of fissile materials before it could agree to a future cut-off in production. In the absence of accountability, existing disparities would freeze to the disadvantage of countries with relatively meager stocks. Pakistan's plutonium production infrastructure was dormant for most part of its nuclear history and it was only able to activate it at relatively late stages in its nuclear operational development. This is because the requirements of an

[3] Although Indian reactor-grade plutonium largely remains in spent reactor fuel and has yet to be reprocessed (and is claimed to have been retained for future use as fuel for India's breeder reactors), it is factored in Pakistani calculations, as reflected by its position on the FMCT. The eight heavy water power reactors designated to remain outside the scope of safeguards under the Indo-US nuclear deal would allow India to add 1250 kg per year of reactor-grade plutonium while three out of six Indian heavy water plants would remain unsafeguarded. If India's (11.5 tons + 4.3 tons = 15.8 tons) of reactor grade plutonium is not put under safeguards, it could theoretically offer India the option to make several hundred warheads (assuming 10 kg per weapon for reactor-grade plutonium). The 500 MW Prototype Fast Breeder Reactor (PFBR) and four additional planned PFBRs are also kept outside safeguards, the PFBR alone can produce 135 kg of WG Pu/year, sufficient for about 25-30 weapons These estimates are based on Ibid and Zia Mian and Alexander Glaser, "Global Fissile Material Report 2011: Nuclear Weapon and Fissile Material Stockpiles and Production," *International Panel on Fissile Materials* (2011), http://fissilematerials.org/library/gfmr11.pdf.

[4] Another unsafeguarded 100 MWt Plutonium Production Reactor (Dhruva-2) is nearing commissioning and another unsafeguarded commercial-scale reprocessing plant at Tarapur was commissioned in January 2011. In addition, plans for building two more reprocessing plants during the next decade were also announced which would also include "a fairly large [reprocessing] facility" at Kalpakkam. Ibid.

[5] Zia Mian, "India developing new centrifuges and increasing enrichment capacity," *IPFM Blog*, June 4, 2010, http://fissilematerials.org/blog/2010/06/india_developing_new_cent.html. In addition to expansion at the RMP, India is also known to be building another enrichment plant at Chitradurga for producing 1.1 percent enriched uranium to fuel India's Pressurized Heavy Water Reactors. This industrial-scale production enrichment facility, like the RMP, would not be placed under safeguards and would meet civil and military needs thus keeping the option open for it to be used for producing weapon-grade HEU. Pavel Podvic, "Some details of India's Nuclear Program," *IPFM Blog*, November 26, 2011. http://www.fissilematerials.org/blog/2011/11/some_details_of_indias_nu.html.

[6] According to a 2004 estimate, the enrichment capacity of the Rattehalli Rare Materials centrifuge plant (RMP) was about 4000 Separative Work Unit or SWU/year. This corresponds to the facility producing about 40-70 kg/year of 45% to 30% enriched uranium respectively. This enrichment capacity could yield 20 kg/year of weapon grade uranium (93% U-235). Hence, the capacity at the end of 2009 is an estimated 14,000 to 31,000 SWU/year, enough to produce one or two submarine-reactor cores per year, or 100-200 kg/year of weapon-grade HEU. Ibid.

[7] Zia Mian and A. H. Nayyar, "Playing the Nuclear Game: Pakistan and the Fissile Material Cut-off Treaty," *Arms Control Today*, (April, 2010). http://www.armscontrol.org/act/2010_04/Mian.

operational deterrent have compounded the urgency to augment plutonium stocks for the production of deliverable missile warheads.[8]

However, this new focus on plutonium production is not to suggest that Pakistan has, or might stop the production of highly enriched uranium. Pakistan continues to expand its uranium hexafluouride production capacity at its Chemical Plants Complex, Dera Ghazi Khan and new generation gas centrifuges at Kahuta are added or replaced without any visible expansion of the Kahuta plant itself.[9]

Nonetheless, in spite of obvious trends in expansion in Pakistan's fissile material infrastructure, there are limitations to the extent to which existing and planned production capacities can be utilized, which could impact the country's force goals. Some studies have speculated that Pakistan will begin to face shortages of natural uranium ore from 2020 onwards,[10] which have increased the urgency to continue to produce fissile material, particularly plutonium, before uranium constraints begin to affect production timelines.

Once the country begins to feel the effects of these shortages, it might have to scale down fissile material production. In this case, Pakistan is likely to prioritize all available uranium ore for making fuel for the Khushab reactors, and keep the HEU program on the backburner, pending fresh discoveries of uranium deposits.[11] However, the construction of the Khushab-IV reactor and the expansion at CPC suggest that Pakistan has confidence in future uranium prospection and processing of additional indigenous uranium resources. The expansion of the Khushab Complex demonstrates that plutonium production has secured priority over HEU production as the preferred fissile material. This is likely to limit production of HEU due to the possible under-utilization of more powerful P3 and P4 centrifuges due to diversion of natural uranium ore in the production of fuel for the Khushab

[8] Commissioned in 1998, the Khushab Nuclear Complex—comprising the 50 MWt plutonium production reactor (K-I/KCP-II) and the heavy water production plant (KCP-I), can on average produce 9-11.5 kg of weapon-grade plutonium in a year. Khushab-II and III, commissioned in 2009 and 2011 respectively, are also believed to be of the same capacity, whereas construction of Khushab-IV is reportedly almost-complete and is likely to be commissioned in the next few years. The latter could also produce around 9-11.5 kg of weapon-grade plutonium. Khushab-I went critical in 1997 and was commissioned the following year. Since then, it would have theoretically produced around 150 kg of weapon-grade plutonium. Khushab-II was commissioned in early 2011. Since then, if it was operated at a similar burn-up and capacity as Khushab-I, it would have yielded another 11.5 kg of weapon-grade plutonium. The New Laboratories reprocessing plant has a reprocessing capacity of handling spent fuel of two 50 MWt Khushab reactors and was inactive since its completion in 1981 for want of unsafeguarded spent fuel. The larger Chashma plant having more than twice the size of New Labs (40-100 kg Pu-239/year) was left half complete by the French in 1978. It has now believed to have been commissioned to handle spent fuel from additional Khushab reactors to reprocess plutonium. IPFM Reports, 2010, 2011.

[9] David Albright, Paul Brannan, and Robert Kelley, "Pakistan Expanding Dera Ghazi Khan Nuclear Site: Time for U.S. to Call for Limits," *Institute for Science and International Security*, May 19, 2009. http://isis-online.org/uploads/isisreports/documents/PakistanExpandingCPC_19May2009.pdf.

[10] See for example Zia Mian, et. al., "Exploring Uranium Resource Constraints on Fissile Material Production in Pakistan" *Science & Global Security*, Vol.17, No.2 (2009). http://www.princeton.edu/sgs/publications/sgs/archive/17-2-3-Mian-Nay-Raj.pdf.

[11] At present, Pakistan has 2.0 to 2.75 tons of HEU and is expected to add 150-200 kg/year of HEU between now and 2020. Each 50 MWt production reactor at Khushab, operating at 70 percent capacity, requires 13 tons of natural uranium fuel each year. This amounts to 52 tons fuel requirement each year for the Khushab Complex alone and is likely to consume the entire estimated annual natural uranium ore production of Pakistan. Ibid.

reactors instead of its processing and conversion into uranium hexafluoride feedstock for enrichment.[12]

Nevertheless, available estimates suggest that Pakistan's current domestic uranium ore production of 40 tons/year is only sufficient for three production reactors at Khushab.[13] With these three reactors, Pakistan could accumulate approximately 450 kg of weapons-grade plutonium by 2020.[14] This stockpile would be sufficient for perhaps 100–240 simple fission weapons based on HEU and 90 plutonium-based weapons, assuming 25 kg of HEU or 5 kg of weapon-grade plutonium per weapon. Pakistan could produce additional number of weapons if it is able to mine more uranium or develops hybrid/composite core designs, combining the plutonium and highly enriched uranium, and once boosted with deuterium-tritium, would require less fissile material.[15]

A theoretical/hypothetical assessment of fissile material stockpiles for India and Pakistan as of early 2013 is as under:

	Weapon-Grade Plutonium (kg)	Reactor-Grade Plutonium (kg)	Highly Enriched Uranium (kg) (@90%)	Warhead*** Worth HEU 20 kg/warhead	Warhead Worth Weapon-Grade Plutonium 4 kg/warhead**	Warhead Worth Reactor-Grade Plutonium (unsafeguarded) 8 kg/ warhead
India	700-890	15800	800*	40	175-222	1975
Pakistan	150	0	1600-2500	80-125	37	0

* Although India's HEU program is aimed at producing fuel for its nuclear submarine reactor, the HEU percentage can be quickly raised from 45% to 90% weapon-grade enrichment. This analysis/table is based on analyses of three reports [https://www.princeton.edu/sgs/publications/articles/Fissile-Materials-South_Asia-SGS-2006.pdf;http://fissilematerials.org/library/gfmr11.pdf; http://fissilematerials.org/library/gfmr13.pdf] with inconsistencies and sharp variations.

** http://www.ricin.com/nuke/bg/bomb.html. This assumes the use of a good neutron reflector. Boosted fission weapons and/or boosted composite cores can further reduce the amount of material required.

*** All warhead estimates are notional.

[12] In the absence of Khushab-IV, Pakistan could have explored the option to "alternatively move to an arrangement where it use[d] its 40 tons a year of natural uranium production to fuel the three Khushab reactors, and then enriche[d] the reprocessed uranium from their spent fuel to make HEU. This [could] be accomplished with an enrichment capacity of 30,000 SWU, for tails of 0.3 percent. This arrangement could in principle [have] last[ed] for the lifetime of the [three] Khushab reactors, as long as Pakistan can produce at least 40 tons of uranium a year, and would [have] yielded 35 kg of plutonium and 140 kg of HEU per year. In this scenario, much larger enrichment capacities would remain underutilized." Ibid., 101.
[13] Ibid.
[14] Ibid.
[15] Ibid.

The aforementioned estimates reflect the current levels of stockpiles that reflect potential contours of Pakistani and Indian force goals at present. Warhead guestimates can vary considerably depending on the type, sophistication level and their anticipated operational role whose numbers may either increase with the availability of more fissile material in the near future or become static with material constraints. Nonetheless, any force goals would include the development of strategic and non-strategic/tactical/miniaturized warheads (especially in Pakistan's case) which would need to be distributed amongst the nine different types of missile delivery systems along with the air force and the navy.

Pakistan's Strategic Force Posture

A hypothetical estimate of current Pakistani Nuclear Force Requirements shows that the country has diversified its strategic forces consisting of various types of ballistic and cruise missiles—from short-range to medium-range systems with the former built for counter-force targeting and the latter mainly as counter-value delivery systems. These include the *Hatf-1A, Hatf-II (Abdali), Hatf-III (Ghaznavi), Hatf-IV (Shaheen-1, Shaheen-1A), Hatf-V (Ghauri), Hatf-VI (Shaheen-2), Hatf-VII (Babar), Hatf-VIII (Raad) and Hatf-IX (NASR).*[16] The *Raad* is the air-launched version of the *Babar* Land Attack Cruise Missile (LACM) while its naval version is also believed to be under development. If each one of the aforementioned systems were theoretically allocated ten warheads, it would require a total of ninety warheads. This would leave another thirty warheads for the NASR and the SLCM/LACM each that would consume the near-total allocation for the estimated warheads which Pakistan can currently produce from its existing stockpile of fissile material. Considering the ongoing diversification of Indian delivery platforms and an emerging Indian triad, Pakistan's response options could be:

- Build a deterrent force comprising at least 250-300 triad-based warheads.
- Accumulate enough plutonium for 200 nuclear (and some thermonuclear) weapons of 20-200 kilotons. This is needed for ballistic and cruise missiles and/or future development of Multiple Independently Targetable Re-entry Vehicles (MIRVed) missiles in the wake of Indian Ballistic Missile Defense (BMD) plans.

Thus a 200-warhead force requires a weapon-grade plutonium stockpile of at least 800 kg and a 100-warhead force would probably need 400 kg between now and 2020. The same force, if boosted by tritium, may require less than half weapon-grade plutonium, i.e. 200-400 kg.

India's Strategic Triad and Modernization

India is known to be actively developing a BMD system and is vigorously erecting a nuclear triad. The flight test of the 5000 km Agni-V solid-fuelled ballistic missile in April 2012 was dubbed as an Intercontinental Ballistic Missile (ICBM), expected to be operational by 2015. It would also be

[16] For details, see Feroz Hassan Khan, *Eating Grass: The Making of the Pakistani Bomb* (Palo Alto: Stanford University Press, 2012), 250.

equipped with MIRVs, designed to defeat enemy missile defenses.[17] India also carried out a maiden test of its 290-km range, supersonic SLCM *Brahmos,* which was declared to be "ready for fitment on submarines in vertical launch configuration."[18] India also has plans to develop submarine launched ballistic missiles (SLBMs)—the 750 km-range K-15 *Sagarika*, whose development trials were completed in January 2013 with the twelfth test carried out "from an underwater pontoon simulating a submarine launcher." It is designed to carry a 1000 kg nuclear warhead from the *Arihant* SSBNs[19], each boat capable of carrying12 K-15 missiles which would later be replaced by the 3500 km-range K-X SLBMs. Three additional *Arihant*-class SSBNs are under construction— one at Visakhapatnam and two in Vadodara, India.[20] The first nuclear powered vessel of this class was launched in July 2009 at Visakhapatnam by Prime Minister Manmohan Singh with great fanfare, with talk of India joining the elite club of nations equipped with nuclear submarines.[21]

Pakistan's Quest for a Credible Deterrent

In view of the growing Indian nuclear, missile and offensive capabilities, Pakistan is likely to opt for an affordable and effective response. It does not have access to missile defense technology, nor is likely to acquire it from a foreign supplier. Therefore, it is expected to resort to the development of indigenous capabilities to neutralize any Indian missile shield, which could undermine the strategic balance in the region. Such systems include the *Babar* and *Raad* LACMs/SLCMs; maneuverable warheads for single-warhead ballistic missiles and/or decoy equipped solid-fuelled (*Shaheen-IA*, *Ghaznavi*, *Abdali*); and MIRVs for a possible future version of Shaheen-3 long-range ballistic missile.

Counter-force targeting using the 700 km-range *Babar* and 350 km-range *Raad* land and air launched cruise missiles is assuming added significance for Pakistan since they can be launched from stand-off ranges, out of reach of Indian air defenses.[22] Between 1998 and 2012, India and Pakistan have carried out a total of 60 and 55 flight tests of nuclear-capable missiles respectively—32 ballistic and 28 cruise missile tests for India and 42 ballistic,13 cruise missile tests.[23] Pakistan's cruise missile development program—whose tests commenced in 2005—appears to have been influenced by

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17 Raja Pandit, "Agni-V, India's first ICBM test-fired successfully," *The Times of India*, April 19, 2012. http://articles.timesofindia.indiatimes.com/2012-04-19/india/31367147_1_agni-v-mirv-payload-targetable-re-entry-vehicles.

18 Press Trust of India, "India test-fires submarine-launched version of BrahMos missile," *Times of India*, March 20, 2013. http://articles.timesofindia.indiatimes.com/2013-03-20/india/37871259_1_underwater-pontoon-brahmos-missile-cruise-missile.

19 Nuclear Powered Ballistic Missile Submarine

20 "Indian Navy's K-15 SLBM successfully completes development trials," January 29, 2013, Naval-Technology.com. http://www.naval-technology.com/news/newsindian-navys-k-15-slbm-successfully-completes-development-trials.

21 "PM launches INS Arihant at Visakhapatnam," *The Economic Times*, July 26, 2009. http://articles.economictimes.indiatimes.com/2009-07-26/news/27650185_1_indigenously-built-nuclear-powered-submarine-ins-arihant-naval-dockyard.

22 Toby Dalton and Jaclyn Tandler, "Understanding the Arms Race in South Asia," *The Carnegie Nuclear Policy Papers* (Washington DC: Carnegie Endowment for International Peace, September 2012), 7. http://carnegieendowment.org/files/south_asia_arms_race.pdf.

23 Ibid.

India's Cold Start doctrine and plans to acquire and deploy ballistic missile defenses. Although an Indian BMD shield would largely be ineffective against cruise missiles, it would primarily be aimed at intercepting Pakistani ballistic missiles, which constitute the country's counter-value and first-strike capability.

To meet the growing challenges of missile defense and naval nuclearization, Pakistan has apparently embarked upon its own program for placing nuclear warheads on its naval platforms. In 2003, Pakistan's Chief of the Naval Staff, Admiral Shahid Karimullah declared that even as no immediate plans for deploying nuclear warheads onboard ships and submarines existed, Pakistan would not hesitate to act on that line if it felt so compelled. Amid long-standing rumors of an indigenous nuclear powered submarine (SSN), the Pakistan Naval Strategic Force Command Head Quarters was inaugurated on May 19, 2012, which was termed as the "Custodian of Second Strike Capability."[24] In view of acute resource constraints, short of building a prohibitively expensive SSBN, Pakistan appears to be aiming at relatively less expensive and doable solutions. The country's Navy is likely to seek achieving deterrence at sea by way of equipping Agosta-90 B /Type-041 Class Air Independent Propulsion (AIP)-equipped conventional attack submarines (SSKs) with cruise missiles armed with miniaturized nuclear or two-stage warheads. In March 2011 Pakistan's cabinet approved the purchase of six new diesel-electric submarines from China, most likely the improved version of the Type-041.[25] Each one of these AIP-equipped boats would have greater submerged endurance than ordinary SSKs and is believed to be capable of carrying three CJ-10K submarine-launched, 1,500-kilometer-range cruise missiles, which could be mated with single boosted fission plutonium warheads.[26]

In this respect, the Pakistan Navy carried out flight tests of various long-range "land-attack" cruise missiles from different naval platforms on December 19 and 21, 2012 in the north Arabian Sea. While the official statement refrained from mentioning the naval version of the Babar cruise missile, it point out that "the test included firings of a variety of modern missiles including the maiden Land Attack Missile (LAM)" and the test "reaffirms credibility of deterrence at sea."[27] Other missiles involved in the test may also have included a land attack variant of the 120 km-range Chinese C-802/CSS-N-8 Saccade anti-ship missile. The C-802 can be launched from different Pakistani surface ships and submarines, while the naval version of the Hatf-VIII cruise missile could be container/cylinder or canister-launched from similar platforms.[28]

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[24] Usman Ansari, "Pakistan Acknowledges Sea-Based Nuclear Deterrent," *Defense News*, May 23, 2013. http://www.defensenews.com/apps/pbcs.dll/article?AID=2012305230004.
[25] Farhan Bokhari, "Pakistan to Start Formal Talks with China to Buy Submarines," *Jane's Defence Weekly*, March 18, 2011.
[26] Iskander Rehman, "Drowning Stability: The Perils of Naval Nuclearization and Brinkmanship in the Indian Ocean," *Naval War College Review*, Vol. 65, No. 4 (Autumn 2012), 75. http://www.usnwc.edu/getattachment/187a93e1-db4c-474e-9be8-038bb7a64edb/Drowning-Stability--The-Perils-of-Naval-Nucleariza.aspx.
[27] Usman Ansari, "Pakistan Navy test-fires Land Attack Missile," *Defense News*, December 21, 2012. http://www.defensenews.com/apps/pbcs.dll/article?AID=2012312210004.
[28] Ibid.

That Pakistan had developed and tested the naval version of the Babar cruise missile was further authenticated by the presence at of the Chairman of the National Engineering and Scientific Commission (NESCOM)—the strategic organization charged with the development of almost all the cruise and ballistic missiles for Pakistan since 2001—at the live firing exercises along with the Chief of the Naval Staff.[29]

However, before Pakistan is able to claim a naval deterrent as part of its strategic triad, several formidable challenges related to command and control and integration of weapon systems would have to be overcome..[30]

Pakistan is also seemingly pursuing the ability to defeat upcoming Indian missile defenses as a potential destabilizer of the balancer of terror appears to have been factored into its missile modernization plans. This is evident from the development of an air, land and naval version of the *Babar* LACM. Equally important has been the testing of the 1000-1300 km range *Shaheen-IA* solid-fuelled ballistic missile on April 25, 2012. This is an improved version of the 750 km-range *Shaheen-1* ballistic missile and is believed to be equipped with maneuverable warheads capable of defeating enemy missile defenses. Although this test came shortly after India tested its 5000 km-range *Agni-V* missile, the much shorter range reflected a focus by Pakistan on improving the accuracy and survivability of its strategic forces than engaging in a tit-for-tat response. [31] Yet another improved version of the *Shaheen-1* missile was tested with an improved range of 900 km over the 600-750 km for previous versions. These missile tests are "part of an ongoing process of ensuring the survivability and effectiveness of its strategic forces in order to diversify its response options through a nuclear triad that provides assured deterrence for all levels of the threat spectrum."[32]

Both India and Pakistan claimed to have tested sub-kiloton warheads in May 1998, thus keeping the option open for developing battlefield nuclear weapons. Hydrodynamic/ Hydro-nuclear and sub-critical testing coupled with availability of weapon-grade plutonium and tritium has opened the way for Pakistan to design and develop miniaturized warheads for use on cruise missiles, maneuverable

[29] Ibid.

[30] The most critical question in this respect remains whether Pakistan's National Command Authority would continue to exercise assertive command and control over nuclear-armed ships or submarines through the Naval Strategic Force Command or would be willing to delegate such authority to individual platforms at sea. Perhaps a greater challenge would be ensuring foolproof communications between the submerged submarine and the shore-based command. An electromagnetic pulse following a nuclear burst could disrupt the earth's electromagnetic spectrum, resulting in a partial or complete breakdown of communications, including shore-submarine. This problem is compounded by the absence of domestic communication satellites. "A very-low-frequency (VLF) communications system can provide an answer. Satellite imagery taken in early 2013 shows the construction of an Extremely Low Frequency (ELF) communications facility in Tamil Nadu, India……which can withstand a nuclear attack comprising hardened command and control bunkers and is expected to be operational by 2015. The ELF station would be used to communicate with nuclear submarines submerged for long periods at sea when normal communication channels break down." Also see James Hardy, "India makes headway with ELF site construction," *Defense and Security Intelligence and Analysis: IHS Jane's*, April 3, 2013. http://www.janes.com/products/janes/defence-security-report.aspx?ID=1065976790.

[31] Usman Ansari, "Pakistan Test-fires Improved Shaheen-1 missile," *Defense News,* April 25, 2012. http://www.defensenews.com/apps/pbcs.dll/article?AID=2012304250005.

[32] Usman Ansari, "Pakistan Tests Improved Shaheen Missile," *Defense News,* April 20, 2013. http://www.defensenews.com/article/20130410/DEFREG03/304100018/Pakistan-Tests-Improved-Shaheen-Missile.

warheads for ballistic missiles, miniaturized warheads for short-range ballistic and cruise missiles such as the 100 km range *Hatf-1A*, the 180 km-range *Abdali* and the 280 km range *Ghaznavi*—all solid fuelled, road-mobile systems along with sub-strategic or battlefield nuclear weapons. Some of these short-range ballistic missile systems supplemented by cruise missiles indicate a doctrinal shift in Pakistan's strategic thinking about the role of nuclear weapons, particularly battlefield nuclear weapons. However, the development of these missile systems and their batch testing and induction by the strategic forces commands of the three services have been driven by the availability of weapon-grade plutonium suitable for lightweight, yet powerful warheads requiring at least five times less fissile material per weapon as opposed to highly-enriched uranium.[33]

Nevertheless, the most important milestone in this regard has been the development of the 60 km-range, solid fuelled and multi-tube/four barreled *Nasr* short-range ballistic missile system, which was tested on May 29, 2012. *Nasr* "is designed for counterforce targets. In this respect, it symbolizes Pakistan's resolve to develop nuclear weapons and delivery systems for use at the sub-strategic level, designed to deter India from exploiting Pakistan's nuclear thresholds and attempting limited war or pro-active military operations."[34] Moreover, *Nasr* is "particularly aimed at augmenting Pakistan's conventional deterrence at the tactical level for eventual employment in case of collapse of conventional defenses on any vulnerable theater of operations."[35] The development of *Nasr* has been perceived as the direct consequence of India's Cold Start Doctrine, which called for exploiting gaps in Pakistan's nuclear thresholds and carrying out limited conventional war without triggering an escalation to all-out war, thus precluding chances for escalation. Also, a growing technological and quantitative imbalance in conventional forces with India will justify Pakistan's development of TNWs to provide all-aspect deterrence capability. [36]

Proactive Military Operations and Battlefield Nuclear Weapons

One of the most important milestones in Pakistan's technological maturation has been the development of the 60-km range, solid fuelled and multi-tube/four barreled *Nasr* short-range ballistic missile system, which was tested on May 29, 2012. *Nasr* "is designed for counterforce targets. In this respect, it symbolizes Pakistan's resolve to develop nuclear weapons and delivery systems for use at the sub-strategic level, designed to deter India from exploiting Pakistan's nuclear thresholds and attempting limited war or pro-active military operations."[37] Moreover, *Nasr* is "particularly aimed at augmenting Pakistan's conventional deterrence at the tactical level for eventual employment in case of collapse of conventional defenses on any vulnerable theater of operations." [38]The development of *Nasr* has been perceived as the direct consequence of India's Cold Start Doctrine, which called for exploiting gaps in Pakistan's nuclear thresholds and carrying out limited conventional war without

[33] Mansoor Ahmed, "Why Pakistan Needs Tactical Nuclear Weapons," *Weekly Pulse*, May 6, 2011. http://www.weeklypulse.org/details.aspx?contentID=563&storylist=9.
[34] Usman Ansari, "Pakistan Missile Test Underscores Need for Deterrence," *Defense News*, June 1, 2012.http://www.defensenews.com/apps/pbcs.dll/article?AID=2012306010001.
[35] Ibid.
[36] Ibid.
[37] Ibid.
[38] Ibid.

triggering an escalation to all-out war, thus precluding chances for escalation. Also, a growing technological and quantitative imbalance in conventional forces with India will justify Pakistan's development of the TNW's to provide all-aspect deterrence capability.[39]

The testing of *Nasr* demonstrated that, "Pakistan is developing miniaturized warheads of appropriate counter-force yields. Because the test was carried out using a new four-round box launcher layout, *Nasr* will probably be used to salvo-launch low-yield nuclear weapons on an incoming enemy armored column that breaks through the conventional defenses."[40] Interestingly, India also tested a short-range ballistic missile *Prahaar* following the *Nasr* test. Though it was not claimed that it could carry nuclear warheads, it is well understood to have the capability to striking targets between 50-150 km with great accuracy and is therefore a counter-force weapon system.[41] The relatively short time in which India conducted *Prahaar's* test following that of *Nasr* indicates that this system must have been in development long before Nasr was tested.

Nonetheless, given the fissile material constraints, *Nasr* cannot be deployed in large numbers for war fighting and will most likely be used to supplement conventional defenses in limited numbers only to buttress theatre-level deterrence.[42] Once a decision is taken by the NCA for its eventual employment as a last resort, it would be the first among other strategic weapons in the country's arsenal that would be used in a mix of counter-force and counter-value strikes in the face of collapsing conventional defenses or triggering of the country's military, territorial, economic or integration thresholds. While the introduction of battlefield nuclear weapons are seen by some as force multipliers, critics argue that they are highly destabilizing because of the risks associated with escalation of the conflict from limited counter-force strikes to massive retaliation by the enemy. This is particularly the case in South Asia where India's nuclear doctrine clearly threatens such a response against the employment of any weapon of mass destruction of any magnitude on Indian forces, even outside Indian territory. Yet another complicating factor with the deployment of systems like *Nasr* in times of crises is effective command and control and security of the missile systems coupled with the risk of a pre-emptive strike. Pakistan's first use doctrine and the deployment of a 60 km range short-range ballistic missile system close to the international border would require the fissile core to be mated with the trigger package, and the assembled nuclear warhead to be mounted onto the missile, thus giving rise to fears of a pre-emptive attack in case of early detection.

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[39] Ibid.
[40] Ibid.
[41] Vivek Raghuvanshi, "India Tests New Tactical Missile," *Defense News*, July 21, 2011. Available at: http://www.defensenews.com/apps/pbcs.dll/article?AID=2011107210309.
[42] Mark Fitzpatrick, "Overcoming Pakistan's Nuclear Dangers," *Adelphi Paper 443,* (London: International Institute for Strategic Studies, March 2014), 34, https://www.iiss.org/en/publications/adelphi/by%20year/2014-de9e/overcoming-pakistans-nuclear-dangers-7ef0. In this respect, it is pertinent to mention that, "Pakistan has no plans to move toward battlefield weapons. The introduction of Nasr is a purely defensive measure meant to bolster conventional deterrence by creating strong barriers that will deter assaulting forces at the tactical level. The Pakistani strategic command authorities do not think that Nasr is a tactical nuclear weapon in the classic sense. Any system, in their belief, that is capable of carrying a nuclear warhead cannot be dubbed tactical. Should a nuclear warhead system be used in a tactical role, it will still have strategic impact; regardless of terminology it crosses the threshold from the conventional to the nuclear realm. This warrants the highest level of command and control and use authorization from the National Command Authority (NCA)." Khan, *Eating Grass*, 394.

However, any such deployment by Pakistan would most likely be as a last resort and it would strive to ensure suitable camouflage and centralized command and control by the NCA through the "Strategic Command and Control Support System." Pakistan has consistently maintained that it will continue to exercise assertive command and control over all strategic and sub-strategic nuclear weapon systems under all circumstances, thereby barring the possibility of premature or unauthorized use. "The short-range nuclear weapons will not be deployed to forward positions, nor will its use be delegated to the field commanders."[43] Thus, *Nasr* appears to be designed to plug the perceived gap below Pakistan's nuclear thresholds that signifies Pakistan's newly acquired ability to miniaturize warheads for possible battlefield use, ranging from 0.5 to 10 kilotons. *Nasr* is believed to have a diameter of around 300 mm (11.8 inches), which appears to be close to the design of the U.S. W-80, W-84 and B-61 nuclear warheads.[44] The W-80 is a small thermonuclear warhead yield varying between 5 to 150 kilotons and weighs around 132 kg. The W-84 is almost similar to the W-80 with a range of 10-50 kilotons.[45]

Doubts have also been raised on whether Pakistan's claims of developing miniaturized warheads for the *Nasr* without hot tests are credible. [46] Similarly, questions were raised in India in 2009 by one of the scientists involved in the 1998 tests who claimed that the thermonuclear test along with a few fission tests had fizzled.[47] This may have been designed to test reactions of various interest groups and decision-makers regarding prospects of a possible round of fresh Indian tests. From a technical standpoint, Pakistan also needs to conduct hot tests for validating new weapon designs. However, a new round of testing is highly unlikely in the region under the overhang of debates on global zero and possible US ratification of the Comprehensive Test Ban Treaty—all of which would bring international isolation for India or Pakistan if anyone were to test again.

Outlook for the Future

Strategic Stability in South Asia would in all probability depend on force postures, doctrines and mutual perceptions of military capabilities that are invariably the product of technological maturation and innovation. India and Pakistan are also likely continue their to move on the path of pursuing—an assured in case of India—and a reliable second strike capability for Pakistan, by building a triad-based deterrent". In this respect, the size and shape of their respective strategic forces would depend

[43] "The no pre-delegation decision is explained by geographic logic. Because Pakistan's territory is relatively narrow, the TNWs will only have to be moved a short distance to be readied for battlefield use. For strategic use, nuclear weapons might be deployed 200 km away from the border. For battlefield use, they might be stationed 60–100km away from the border. The short-range systems reportedly can be moved from storage sites to forward locations within a few hours, not days. Thus, it is claimed that there is no need for pre-delegation of firing authority and therefore no possibility of misuse by a field commander." *Adelphi* Ibid, 90.
[44] Rodney Jones, "Pakistan's Answer to Cold Start," *The Friday Times* 23, no. 13, May 13-19, 2011. http://www.thefridaytimes.com/13052011/page7.shtml.
[45] Chuck Hansen, *U.S. Nuclear Weapons: The Secret History* (Arlington, Texas: Aerofax Inc, 1988), 201-203.
[46] Michael Krepon, "Tac Nukes in South Asia," *Arms Control Wonk*, April 18, 2012: http://krepon.armscontrolwonk.com/archive/3419/tac-nukes-in-south-asia; Jeffrey Lewis, "Pakistan's Nuclear Artillery," *Arms Control Wonk*, December 12, 2011. http://lewis.armscontrolwonk.com/archive/4866/pakistans-nuclear-artillery.
[47] Daniel Horner, "Indian Scientist Triggers Debate on Testing," *Arms Control Today*, October 2009. http://www.armscontrol.org/act/2009_10/India.

on the number of nuclear warheads made available through additional fissile material production. Pakistan is likely to continue this production with India expanding its existing production capabilities, with a fissile material race in the making. At the same time, emerging Indian ballistic missile defenses would inevitably push Pakistan to increasing the payload/range/accuracy of its ballistic missiles while putting greater emphasis on its cruise missile program. Concurrently, an increasing technological and quantitative imbalance in conventional forces will justify Pakistan's development of battlefield nuclear weapons.

Considering the pattern of developments in military technology and integration of new weapon systems in South Asia, it is evident that India is seeking power projection through long-range missile systems, SSBNs, and an ambitious military space program geared towards strong Intelligence, Surveillance and Reconnaissance capabilities. This modernization spree has had the effect of nullifying India's claims of pursuing a minimum deterrent. Pakistan's modernization is primarily aimed at ensuring the survivability and credibility of its deterrent by acquiring second-strike capabilities and improving the accuracy and effectiveness of its strategic forces with an emphasis on survivability and diversification. This in turn is guided by the demands of "full-spectrum deterrence," designed to deter aggression at all levels of the threat spectrum—by developing and if necessary, deploying triad-based strategic forces along with battlefield nuclear weapons to deal with limited war/pro-active military operations.[48] Once this is achieved, corresponding developments across the border would not be seen as inherently destabilizing (*Agni*-V verses *Shaheen*-1A test is an example.) Till such time that both countries ensure the survivability of their respective nuclear forces, current modernization trends are likely to follow a predictable trajectory with the credibility of deterrent postures gaining clear priority in order of preference over any declared minimum levels.

Secondly, it is palpable that doctrinal shifts in both countries are being shaped by the exigencies of operational requirements, such as battlefield nuclear weapons in the case of Pakistan and sea-based strategic nuclear forces along with inter-continental range ballistic missiles in the case of India, which are driven by their respective threat perceptions. Clearly, a technological arms race is in full swing in South Asia which has rendered all claims of pursuing minimum deterrent postures meaningless. Emerging capabilities and spin-offs of technological innovation and modernization such as miniaturization of warheads has opened the door to further possibilities such as the introduction of MIRVs and battlefield nuclear weapons—the latter seen by critics to be as de-stabilizing as BMDs even though they are meant to augment Pakistan's conventional defenses. Technologies and the products of the military industrial complex in South Asia have generated their own momentum for demand of new weapon systems, aimed at consolidating existing capabilities, which invariably impacts on force postures and leads to subtle shifts in doctrines.

While economic growth and the availability of financial resources are necessary for poverty alleviation, it also helps fuel huge spending on military modernization and the acquisition of high-tech and big-tech weaponry from potential suppliers. This is especially true for India. In a complex,

[48] Baqir Sajjad Syed," NCA Stresses Full-spectrum deterrence, *Dawn*, September 9, 2013: http://dawn.com/news/1040865/nca-stresses-full-spectrum-deterrence.

polarized and crisis prone strategic environment as South Asia, demand is automatically created for large acquisitions with an aggravated conventional asymmetry in the region.[49] Therefore, it is imperative for the future of South Asian stability and maintaining a measure of strategic balance that the big powers and suppliers of high-tech conventional military hardware and civilian nuclear technologies with potential applications for weapon-related nuclear programs ought to prioritize between their commercial interests and preventing a technological arms race in the region. Nuclear Learning in the next decade appears to be a gradual process and is dependent on the vision, foresight and pragmatism of the political leadership of India and Pakistan and the confidence, which they and their advisors might have, in their own respective deterrent capabilities that would be sufficient and necessary to prevent a future crisis. Technology and military modernization can only add to the credibility of the adversary's deterrent capabilities but is no substitute for rational decision-making.

[49] In 2013, India remained the world's biggest arms importer, ahead of China for a third consecutive year. Please see: K. K. Sruthijith, "India remains top arms importer while China becomes fifth largest exporter," The Economic Times, May 18, 2013. http://articles.economictimes.indiatimes.com/2013-03-18/news/37815093_1_top-arms=importer-largest-importer-weapons-importer.

6 The Evolution of Pakistan's Nuclear Doctrine

Naeem Salik

Preamble

A doctrine is the foundation on which organizational and force structures are built. It provides the guidelines for force configuration and the nature, type and number of weapons and delivery systems that would be needed to implement the doctrine. Nuclear weapons are unique since the development of these weapons and even their first employment in war preceded any nuclear doctrine. An alternative view has been articulated by Lawrence Freedman who has argued that strategy for the employment of nuclear weapons existed in the form of the Strategic Bombing Doctrine being followed during the Second World War.[1] Nuclear weapons are generally believed to be weapons of deterrence rather than weapons of war. Interestingly, however, the first use of nuclear weapons was not for the purpose of deterrence but for war termination. Basically, the dropping of nuclear bombs at Hiroshima and Nagasaki was seen as an extension of the strategic bombing campaign. In the immediate post-war period there was a feeling of revulsion towards considering these terrible weapons as useful military instruments and no serious effort was made to incorporate nuclear weapons in the overall military strategy. Whatever, weapons were available were under the control of the Strategic Air Command (SAC) and in the absence of any political guidelines it was left to the discretion of the SAC to formulate a targeting list.[2]

Some serious developments in the international arena such as the Berlin Crisis (1948), the first Soviet nuclear test (August 1949), victory of the Chinese Communists (October 1949), the Korean War (1950-1953) forced a rethink. The Eisenhower Administration's New Look Policy was aimed at avoiding an economic meltdown as a result of the heavy expenditures involved in building up and maintaining large conventional forces to meet the Soviet threat to Europe and other areas of vital US interests. It was decided to exploit the advantage the US enjoyed in nuclear weapons as long as it lasted as the nuclear weapons were seen as a more cost effective option compared to the conventional forces.[3] However, it was not until early 1954 when Secretary of State John Foster Dulles announced the Massive Retaliation Doctrine.[4] As the nuclear powers moved along the nuclear learning curve and the Academic debate on the issue gathered momentum the nuclear doctrines also evolved and became more sophisticated and nuanced than the massive retaliation. The doctrines however, remained dynamic continuously adjusting to the developments in technology as well as the changing nature of the relations between the two superpowers.[5]

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[1] Lawrence Freedman, 'The First Two Generations of Nuclear Strategists," in *Makers of Modern Strategy from Machiavelli to the Nuclear Age*, eds. Peter Paret, Gordon A. Craig, and Felix Gilbert (Oxford: Clarendon Press, 1986), 736.
[2] Colin McInnes, "Nuclear Strategy," in *Warfare in the Twentieth Century- Theory and Practice*, eds. Colin McInnes and G.D. Sheffield (London: Unwin Hyman, 1988), 146.
[3] Freedman, 'The First Two Generations of Nuclear Strategists," 740.
[4] Ibid.
[5] McInnes, "Nuclear Strategy."

In selecting the type of doctrine whether conventional or nuclear the freedom of choice does not lie entirely with the concerned states as they are constrained by their geography, the size of their populations, economic resources including strategic raw materials and the industrial potential. Pakistan for instance, is constrained by its geographical shape, size, location and orientation to adopt a forward defensive posture vis-a-vis India as it does not have the luxury to trade space to gain time especially due to the fact that some of its politically significant cities and strategic communication arteries lie very close to its border with India. Again in terms of adopting a nuclear posture and nuclear use doctrine Pakistan is mindful of India's advantages in the size of conventional forces. As a natural corollary of the desire to deny India the opportunity to exploit this advantage it makes perfect sense for Pakistan to refuse to adopt a 'no first use' nuclear posture.

Peculiarities of South Asian Nuclear Environment

South Asian deterrence situation does not lend itself to an easy comparison with the traditional deterrence model that developed between the NATO and the Warsaw Pact led by the United States and the Soviet Union respectively during the Cold War years. It may be pertinent here to highlight some key characteristics of the South Asian environment which have provided the backdrop to and influenced the doctrinal development of both India and Pakistan. Some of these features are:

- Unlike the US - Soviet rivalry during the Cold War years, India and Pakistan share common borders, have fought three major wars and some minor border skirmishes and have unresolved territorial disputes.
- Both India and Pakistan share common borders with China, another nuclear armed state. This triangular security environment would become more complicated if Iran acquires nuclear weapons.
- There is a considerable disparity in terms of area, size of population, resource base and the size of conventional as well as nuclear forces.
- Indian and Pakistani nuclear forces are still evolving, and would remain vulnerable to a pre-emptive strike either with conventional or nuclear which would enhance uncertainty during a crisis situation and may lead to temptation for such a strike at least in the short term future. It would be immaterial as to whether such a strike would be efficacious or not.
- India has a fairly advanced space program though it is nowhere near the real time capabilities like the US. Pakistan has also re-energized its own space effort especially with the expertise gained through a successful missile program. Pakistan can, therefore, be expected to acquire a limited space surveillance capability in the near to medium term. Despite these efforts, both countries lack real time surveillance, early warning and target acquisition capabilities at present. In the near term this lack of realm time ISR will impact not only on their employment options but could have an adverse impact on crisis stability.
- The command, control, communications and intelligence infrastructure will remain susceptible to the threat of a decapitating strike given the fact that the two capitals as well as other major cities and key bases and installations are within reach of either side's land based missiles and aircraft. This vulnerability can be very destabilizing especially during periods of heightened tensions and may give rise to pre-emptive tendencies.

- Both India and Pakistan are striving hard to develop an assured 'second strike' capability. In the short term, deterrence instability will be the likely norm in the region.
- India's well known efforts to acquire Anti- ballistic missile systems, and the strong Pakistani perception that India's fissile material production capacity will get a boost as a consequence of the implementation of the US-India nuclear cooperation agreement, are likely to disturb the evolving strategic balance and could lead to an undesirable nuclear/missile arms race.
- Contiguity of the two countries and short flight times of ballistic missiles are likely to result in hair trigger postures, and may lead to the adoption of Launch-on-Warning strategies once the respective strategic forces are operationally deployed. Due to technical deficiencies in the surveillance and early warning systems this increases the chance of launching of weapons in response to inaccurate or misinterpreted information. The need for the adoption of confidence building and restraint measures therefore. Assumes great significance.
- South Asians have peculiar value systems, emotive tendencies and a proclivity for risk taking. Such tendencies coupled with politically weak governments, can create an explosive mix resulting in uncertainties of responses during crises, highlighting the need for mutually agreed and institutional risk reduction mechanisms. Absence of institutional crisis management mechanisms is likely to result in impulsive decision-making.
- There is a general lack of awareness of the devastating effects of a nuclear conflict amongst the masses on both sides. This ignorance of the gravity of the situation will generate undesirable public pressure on decision makers during crises.
- In Pakistan the military is fully integrated into nuclear command and control, and decision making mechanisms, while in India the armed forces are still kept out of the loop. This may create problems when they are asked to take over the operational responsibility in a crisis situation.
- The non-state actors have also emerged as a factor with a considerable potential to upset the strategic stability given the tendency to hold the governments or governmental institutions culpable for the acts of individuals beyond their control.
- The two sides have not adopted a common strategic lexicon and the leadership in both states have the tendency of making loose statements that may have serious repercussions because it could be easily misperceived by the other side. This kind of miscommunication could be detrimental to peace and stability in an environment already fraught with acute trust deficit.[6]

Development of Pakistan's Nuclear Doctrine

Though Pakistan had the advantage of hindsight and a whole body of literature available especially on the development of US and NATO nuclear doctrines its doctrinal development lagged far behind its nuclear weapons development. Thinking on issues related to nuclear doctrine, command and control and safety and security etc was virtually non-existent until after the nuclear tests in May 1998. Given the covert nature of the nuclear program and Pakistan's official stance of denying efforts to produce nuclear weapons, the lack of public discourse on the nuclear issues is understandable. However, absence of any internal debate either within the military or in the civilian bureaucracy is

[6] Naeem Salik, *Genesis of South Asian Nuclear Deterrence* (London: Oxford University Press, 2010): 235-37.

totally inexplicable. Even academic publications or analyses on the subject were missing in the covert period of Pakistani nuclear program.

Pakistan moved very quickly after demonstrating its nuclear capability to formulate its nuclear doctrine and put in place an effective command and control system in a very short span of time. Contrary to the popular belief that Pakistan does not have a nuclear doctrine, in fact it had its doctrine ready well before the Indians had pronounced their draft nuclear doctrine in August 1999.[7] For a variety of reasons, Pakistan has chosen not to publicly pronounce its doctrine. One possible explanation is that Pakistan believes that ambiguity adds to the value of deterrence. Pakistan is the weaker power both conventionally as well as in terms of nuclear assets, so it is in its interest to maintain this ambiguity. One could argue that given Pakistan's geo-strategic environment, ambiguity is desirable. However, it could have declared the broad contours of its nuclear policy that in any case have been stated by Pakistani leaders from time to time. After all India's nuclear doctrine issued by its Cabinet Committee for Security in January 2003 consists of only one page and describes only broad contours of India's policy. [8] Nobody is expected to declare the targeting policy or identify the targets intended to be engaged or when and how the nuclear weapons would be employed in actual operational environment. Maintaining secrecy about these factors would still preserve the ambiguity. That is, however, a political decision which Pakistan may take when circumstances become more conducive.

Another explanation which supplements the first one is as follows. The doctrine was, in fact, ready and had received the concurrence of the military leadership and while the political leadership was also briefed about it in the early part of 1999, the formal government approval was awaited when the whole process was interrupted by the Kargil interlude. Close on the heels of the Kargil Crisis came the pronouncement of the Draft Indian Nuclear Doctrine in August 1999. Despite public urgings by many security analysts in Pakistan it was decided to hold back the announcement lest it be seen as a tit for tat reaction to the Indian announcement. Then the military takeover in October 1999 introduced new dynamics and though the doctrine and the command and control structure were formally approved it was decided to announce the details about the Command and Control Structure only. In 2001, after the 9/11 incident the international environment was not conducive to announce a nuclear doctrine. In 2004, the disclosure of the AQ Khan network brought Pakistan under tremendous pressure that has now turned into a concerted campaign in the Western media. To date, doubts about safety and security of Pakistan's nuclear assets refuses to die down. The continuing war in neighbouring Afghanistan and the deteriorating internal security environments over the past few years have provided no respite. But for this series of adverse happenings Pakistani leadership might have decided in favour of a formal announcement of its nuclear doctrine and lift the veil of ambiguity.

On one issue, though, Pakistan does not believe in keeping any ambiguity. It has stated in clear terms that its nuclear deterrence is India-centric and is driven predominantly by its security concerns. Other

[7] Author's personal recollection of the post-May 1998 developments.
[8] Jawed Naqvi, "Vajpayee takes over nuclear command," *The Dawn*, January 5, 2003. Also see, C. Raja Mohan, "Nuclear Command Authority Comes into Being," *The Hindu*, January 5, 2003.

advantages such as enhanced political prestige that accrue from the possession of nuclear weapons are peripheral and of secondary importance. Pakistan initiated its nuclear program in order to avoid a possible nuclear blackmail by India. The most critical factor leading to the decision to develop a nuclear weapons capability was the traumatic loss of the Eastern wing of the country as a consequence of the 1971 war with India. Pakistan had entered into the US led alliance systems such as SEATO and CENTO in the mid 1950s, had signed a bilateral defence agreement with US in 1959.[9] Pakistan, however, had deluded itself into believing that its allies would come to its assistance when its security and survival is under serious threat. During the 1965 war between India and Pakistan, China did exert indirect pressure on India, however. In the 1971 war the anticipated assistance from China or United States never materialized. In the aftermath of 1971 tragedy, Pakistan's security managers realized that they can no more rely on any outside assistance and have to stand up on their own feet to defend their sovereignty. They also concluded that in view of the growing disparity in the conventional military capabilities of India and Pakistan it will be well nigh impossible for Pakistan to preserve the integrity and security of the remainder of Pakistan with conventional means.[10]

Any lingering doubts about the efficacy of nuclear deterrence as equalizer were blown away by India's first nuclear weapon test in May 1974.[11] Pakistan has, therefore, sought to achieve the twin objectives of deterring the threat of use or actual use of nuclear weapons by India while at the same time using its nuclear capability as an equalizer against India's conventional military advantage thereby preventing it from initiating any kind of aggression against Pakistan. In this backdrop it is nothing but logical for Pakistan to have refused to espouse a 'no first use' nuclear doctrine because doing that would have negated the purpose of deterring a conventional attack by India. However, it would also be fallacious to believe that Pakistan would start contemplating the use of its nuclear weapons the moment the hostilities commence. Pakistan has enough confidence in its conventional military strength and would therefore not be compelled to decide on an 'early use' of nuclear weapons. But in case the current conventional military balance is disturbed and further tilted in India's favour Pakistan's reliance on its nuclear capability would increase and its nuclear threshold would be lowered which would be a dangerous development.

Another critical factor is Pakistan's economic vulnerability and it could only get embroiled into a costly and debilitating arms race with India at the peril of its economy. It therefore, decided to eschew a nuclear or missile race with India leading to the adoption of a 'minimum deterrence' doctrine. The calculations for Pakistan which clearly has India in its sights are relatively simple compared to India which has been talking of the Chinese nuclear threat as well as nuclear armed navies of the major powers patrolling the Indian Ocean as part of its security calculus. But the problem for Pakistan is that despite India's pronouncement of a 'Credible Minimum Nuclear

[9] Kail C. Ellis, "Pakistan's Foreign Policy: Alternating Approaches," in Dilemmas of National Security and Cooperation in India and Pakistan, ed. Hafeez Malik (London: Palgrave McMillan, 1993), 131-3.
[10] Ibid., 141-42.
[11] *World Armaments and Disarmament: SIPRI Yearbook 1974,* Stockholm International Peace Research Institute, 16.

Deterrent' the possible size of its deterrence would be 'maximum deterrence' as far as Pakistan is concerned.

Adding to Pakistan's discomfort are India's well known intentions to acquire and deploy Ballistic Missile Defence Systems, the likely boost to India's fissile material production capacity as a consequence of the US-India nuclear cooperation agreement and its fast breeder program. India has also pronounced an aggressive conventional war doctrine called the 'Cold Start Doctrine'.[12] Many Pakistani analysts view India's efforts to acquire a nuclear triad as an attempt to gain overwhelming advantage in nuclear forces in addition to the numerical edge it enjoys in terms of conventional forces balance. They are, therefore, not very comfortable with a Pakistani minimum deterrence if it is maintained at static levels and they reiterate the dynamic nature of the minimum deterrence which is capable of adjusting its size in line with the changes in the strategic environment. This aspect comes out vividly in a joint article published by three senior retired Pakistani officials, former Foreign Minister Agha Shahi, ex Foreign Secretary and future Foreign Minister Abdul Sattar and former Air Chief Zulfiqar Ali Khan. These veteran officials, though they were not privy to the actual policy formulation post 1998, recognized that Pakistan should not fritter away its limited resources on building up an unnecessarily large arsenal by entering into a futile arms competition with India which it cannot hope to win arguing that:

> Deterrence was the sole aim and a small arsenal was considered adequate. At no time did Pakistan contemplate use of nuclear weapons for war fighting or seek to develop capability for a pre-emptive attack. Apart from the obvious constraint of resources, it was not so unrealistic as to entertain such thoughts. India is too large and too well armed to be vulnerable to a disabling strike. Besides, any such attempt would provoke retaliation with disastrous consequences.[13]

This line of argument clearly indicates a rational and realistic approach to deterrence, discarding any notions of a futile arms race with India or the temptation to build up an arsenal in excess of Pakistan's legitimate security needs. However, these analysts have refrained from suggesting any numbers to quantify the size of Pakistan's nuclear forces. In fact, they believe that 'minimum deterrence' is not an abstract number, which remains constant for all times to come, but rather a dynamic concept capable of changing with the changing circumstances. They believe that the efficacy of Pakistan's deterrent can only be maintained by keeping the size of the force flexible, explaining that:

> Minimum deterrence has been and should continue to be the guiding principle of Pakistan's nuclear pursuit. Of course minimum cannot be defined in static numbers. In the absence of mutual restraints, the size of Pakistan's arsenal and its deployment

[12] Walter C. Ladwig, "A Cold Start for Hot Wars," *International Security* 32, no. 3 (Winter 2007/2008), 158-90.
[13] Agha Shahi, Zulfiqar Khan and Abdul Sattar, "Securing Nuclear Peace," *The News International*, October 5, 1999. P.R. Chari et al., 190–92.

> pattern have to be adjusted to ward off dangers of pre-emption and interception. Only then can deterrence remain efficacious.[14]

Later, speaking at a seminar at Islamabad in November 1999, Abdul Sattar, who was then serving as Foreign Minister in the Government of General Pervez Musharraf, elaborated that Pakistan was compelled to go nuclear to deter aggression and prevent war, and to safeguard its peace and security. Its decision was in no way motivated by any pretensions to great power status or desire for regional domination. He emphasized Pakistan's determination not to get embroiled in a nuclear arms race with India, repeating his earlier statement that:

> Minimum nuclear deterrence will remain the guiding principle of our nuclear strategy. The minimum cannot be quantified in static numbers. The Indian build up would necessitate review and reassessment….. But we shall not engage in any nuclear competition or arms race.[15]

A few months later, at an international seminar on the subject of Command and Control of Nuclear Weapons held at Islamabad in February 2000, Agha Shahi, a former Foreign Minister and a senior retired diplomat, invoked the traditional 'action-reaction syndrome' that has dominated Indo-Pakistan relations for more than half a century, arguing that since India wants to keep the size of its minimum deterrent flexible and subject to change with changing circumstances, Pakistan will inevitably have to keep its deterrent dynamic in the same way.[16]

Later speaking at the National Defence College in May 2000, Foreign Minister Abdul Sattar stated that:

> For the past decade or so, nuclear capability has been the bedrock of our defence and security policy...its sole purpose is to deter and prevent war. Unlike some other countries, Pakistan neither aspires to great power status or permanent membership of the Security Council nor nourishes any design for regional dominance…We support a global, non-discriminatory international regime of nuclear and missile restraints, voted for the CTBT, will participate in negotiations for FMCT, and are prepared to strengthen our existing stringent controls against export of strategic weapons technology. Our policy of Minimum Credible Deterrence will obviate any strategic arms race…the idea of no-first-use of nuclear weapons needs to be expanded into a no-first-use of force, lest the former should be interpreted to sanction first use of conventional weapons.[17]

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[14] Ibid.
[15] "Pakistan Responds to India's Nuclear Doctrine," *Disarmament Diplomacy*, 41 (November 1999), http://www.acronym.org.uk/41pakis.htm.
[16] Ibid., 55.
[17] Abdul Sattar, "Foreign Policy After the Cold War," address at the National Defence College, Islamabad, May 24, 2000.

As mentioned earlier though Pakistan has not formally announced a nuclear doctrine, the above statements by Abdul Sattar clearly allude to the salient aspects of Pakistan's nuclear policy which can be summarized as follows:

- Pakistan's policy will be based on a minimum credible deterrence.
- It will avoid getting embroiled in a strategic arms race with India.
- It will continue to support international arms control regimes, which are non-discriminatory in nature.
- Pakistan's nuclear policy will be conducted with 'restraint' and 'responsibility'.
- It will participate in the FMCT negotiations.
- It will refrain from further nuclear testing. However, this commitment is subject to change in case India decides to resume testing.
- Pakistan will strengthen existing controls on the export of nuclear technology through administrative and legal mechanisms.

On other occasions, responsible officials and those at highest levels of leadership have also alluded to some key points of Pakistan's nuclear policy. Former President Musharraf also used the term 'Minimum Defensive Deterrence', which apparently is meant to convey the same meaning as 'Credible Minimum Deterrence', but with an emphasis on the defensive nature of Pakistan's nuclear deterrence.

Pakistani officials have repeatedly stated that Pakistan's nuclear policy is built around the twin principles of *'restraint'* and *'responsibility'*, and driven by its security concerns in contrast to India's pretensions to a global power status. Inam-ul-Haq, Former Minister of State for Foreign Affairs, further magnified this contrast in the goals and ambitions of the two countries when he declared that: 'Instead of a triad of nuclear forces Pakistan seeks a triad of peace, security and progress.'[18] He went on to suggest a Strategic Restraint Regime involving measures for nuclear and missile restraints, as well as conventional balance. He expressed Pakistan's readiness to enter into reciprocal arrangements with India to agree on:

- Non-deployment of ballistic missiles.
- No operational weaponization of nuclear capable missiles.
- Formalization of the existing understanding on pre-notification of missile flight tests.
- Declaration of a moratorium on the development, acquisition or deployment of ABM systems.

In Inam-ul-Haq's view the three pillars of South Asian peace, security and progress, namely, 'a high level dialogue to resolve Jammu and Kashmir, mechanism to promote trade and economic cooperation, and a 'strategic restraint regime' would complement, sustain, support and reinforce each other.[19] The underlying message in Inam-ul-Haq's statements clearly points to the fact that Pakistan wants to avoid a situation where the strategic forces of both India and Pakistan are operationally deployed and are in a high state of readiness and also takes the destabilizing potential of any

[18] Inam ul Haq, former Foreign Secretary of Pakistan (statement in the Conference on Disarmament, Geneva, January 25, 2001).
[19] Ibid.

acquisition and deployment of ABM systems very seriously. It is also clear that Pakistan aims to achieve this objective through reciprocal restraints accepted by the two countries through an institutionalized restraint regime.

A Brief Comparison of Indian and Pakistani Doctrines

India's Cabinet Committee for Security issued a brief one page document on 4th of January 2003 which outlined broad contours of India's Nuclear Command and Control and as well salient features of India's Nuclear Doctrine. The brief document reiterated some of the key points already included in the Draft Nuclear Doctrine announced in August 1999. However, it is silent on the status of the Draft Nuclear Doctrine and in case it has been superseded by the new document have those articles of the Draft Doctrine which do not figure in the new document also been abandoned. It may be pertinent here to list the main elements of India's Nuclear Doctrine and then compare these with the publicly stated salient aspects of Pakistan's Doctrine. The January 2003 Indian document enunciates[20]:-

- Building and maintaining a credible minimum deterrent.
- A posture of 'No First Use': nuclear weapons will only be used in retaliation against a nuclear attack on Indian territory or on Indian forces anywhere.
- Nuclear retaliation to a first strike will be *massive* and designed to inflict unacceptable damage.
- Nuclear retaliatory attacks can only be authorized by the civilian political leadership through the Nuclear Command Authority.
- Non-use of nuclear weapons against non-nuclear weapon states.
- However, in the event of a major attack against India, or Indian forces anywhere, by biological or chemical weapons, India will retain the option of retaliating with nuclear weapons.
- A continuance of strict controls on export of nuclear and missile related materials and technologies, participation in the Fissile Material Cutoff Treaty negotiations and continued observance of the moratorium on nuclear tests.
- Continued commitment to the goal of a nuclear weapons-free world, through global, verifiable and non-discriminatory nuclear disarmament.

A quick look at the salient features of the two doctrines makes it abundantly clear that while there are many commonalities in these, there are major differences in some important aspects. For instance, both talk about 'Credible Minimum Deterrence', non-use of nuclear weapons against non-nuclear weapon states, participation in FMCT negotiations, subscribing to non-discriminatory arms control and disarmament agreements, unilateral moratoriums on nuclear testing and strengthening of nuclear export controls. In terms of differences the Indian Doctrine emphasizes 'A No First Use' policy although it has been greatly watered down by asserting the right to retaliate with nuclear weapons against any use of chemical or biological weapons against India or its forces anywhere. However, Pakistan doesn't subscribe to the No First Use idea and has kept its options open. Again by introducing the clause about massive retaliation against a Nuclear First Strike against Indian territory or Indian Forces anywhere the geographical scope of India's retaliatory strikes has also been

[20] Naqvi, "Vajpayee takes over nuclear command"; Mohan, "Nuclear Command Authority Comes into Being."

expanded. The word 'punitive' retaliation against any nuclear strikes against India in the Draft Nuclear Doctrine has been replaced in the new document by 'massive' retaliation. It is difficult to ascertain the reason behind this change since massive retaliation in a mutual deterrence situation does not make much sense unless it is being used as a bluster in conjunction with the qualifier – attack against Indian forces anywhere, to prevent Pakistan from contemplating any nuclear use even against the Indian which have intruded into its territory.

Objectives Sought to be Achieved by Pakistan Through Its Nuclear Doctrine

Mindful of its relative disadvantage vis-a-vis India in terms of conventional forces Pakistan has sought to achieve the twin objectives of not only deterring any nuclear threat from India but also to deny India the opportunity to exploit its conventional advantage. In fact, many Indian security analysts think that by undertaking the Shakti series of tests in May 1998 and providing an opportunity to Pakistan to test and demonstrate its own nuclear capability, India has itself nullified its superiority in conventional forces. This conclusion has, therefore, led to the debate in India on the possibility of fighting a 'limited conventional war' under the nuclear umbrella.[21] The failure to actualize this concept during the 2001-2002 military stand-off led to further debate within the Indian military which in turn led to the enunciation of the 'Cold Start Doctrine'.[22] However, the implementation of this doctrine is also fraught with serious risks and provides no escape from the omnipresent danger of nuclear escalation.

Another advantage which Pakistan can derive from using its nuclear weapons to deter aggression at all levels will be that it would not be forced to stretch its already strained economic resources to catch up with India's conventional force levels as long as it can maintain a manageable ratio of forces. Manifestation of this economic dividend is already visible since Pakistan's defence expenditure in terms of percentage of GDP has declined over the years from over 5% to around 3.5% during the last decade.

By keeping its nuclear use options open and refusing to subscribe to the Indian offer of a 'no first use' Pakistan has sought to curtail India's conventional force options and countered India's no nuclear first use offer by proposing a no use of force agreement.[23] Many respected analysts have also discounted the value of any 'no first use declaration'. Bharat Karnad, a former member of India's National Security Advisory Board (NSAB) that formulated India's Draft Nuclear Doctrine, has characterised the 'no first use doctrine' as merely a hoax, commenting that, *'it is one of those restrictions which countries are willing to abide by except in war.'* Karnad went on to corroborate his views with quotes from Herman Kahn who had stated that, *'No first use just stops where war begins'* and from another highly regarded strategic expert Michael Quinlan who calls it, *'political posturing*

[21] V.P. Malik, (presentation at Strategic Stability in South Asia, Center for Contemporary Conflict, Naval Postgraduate School, Monterey, California, June 29-July 1, 2004).
[22] Ladwig, "A Cold Start for Hot Wars."
[23] Sattar, "Foreign Policy After the Cold War,".

that cannot alter strategic reality'.[24] In the light of the foregoing arguments, besides the conventional military balance, would it be fair or even realistic to expect Pakistan to espouse a 'no first use doctrine' especially when India never gave any credence to a similar declaration by China.

Many Indian and Western security analysts as well as some Pakistani scholars have also ascribed another objective to Pakistan's nuclear doctrine and believe that Pakistan has used its nuclear capability as cover under which it could conduct sub-conventional war against India in Kashmir. They argue that planners of the Kargil conflict had calculated that India's options to respond to this action would be constrained by Pakistan's newly acquired nuclear capability. This line of thinking gained support from senior US government officials such as Bruce Riedel who explained in an article written for the Center for Advanced Study of India at University of Pennsylvania, that Pakistani Prime Minister Nawaz Sharif was confronted with information gathered by the American intelligence agencies that Pakistani military was preparing its nuclear weapons behind his back. [25] This author with his personal knowledge of the situation at the time considers this claim as outlandish and incredible and the same has been rubbished by highly placed officials in the Pakistani nuclear establishment.[26]

There are many cogent reasons for debunking these claims. Firstly, Kargil happened too soon after the nuclear tests in May 1998 and the leadership both military and civilian on both sides had yet to absorb the implications of overt nuclearization of India and Pakistan. Secondly, the nuclear forces had not been operationalized on either side by that time. This argument can be corroborated by the fact that India conducted the test of its *Agni*-2 medium range missile after almost a decade's hiatus in April 1999 and Pakistan responded within days with the second test firing of its *Ghauri* MRBM followed by the first flight test of its solid fueled *Shaheen* missile.[27]All this was happening while operation in Kargil was already underway and clearly shows that key nuclear delivery systems were still being tested and were nowhere near induction in the strategic forces. Thirdly, a very small proportion of the respective armies were engaged in operations in Kargil, while a part of Indian Air Force took part in the operations Pakistan Air Force did not participate in the operations. The strike forces had not been mobilized on either side and there was no reason for anyone to press the panic button and start moving nuclear forces assuming they were operationally ready. Finally, it is also very doubtful as to whether the nuclear factor had weighed in the calculus of the planners of the operation since the senior military leadership was briefed on the nuclear doctrine and the proposed command and control structure in February 1999.[28] It is obvious that the planning for Kargil had preceded this briefing and had they taken into account the nuclear factor they would also have anticipated the very strong and adverse reaction of the international community.

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[24] Bharat Karnad, "A Thermonuclear Deterrent," in *India's Nuclear Deterrent*, ed. Amitabh Mattoo (New Delhi: Har-Anand Publications, 1999), 113-26.
[25] Bruce Riedel, "American Diplomacy and the 1999 Kargil Summit at Blair House," Center for Advanced Study of India Working Paper (May 2002), 12-13, http://www.ciaonet.org/wps/rib02/.
[26] In an interview with the author in 2002 after the publication of the Riedel story, Lt General (ret) Khalid Ahmed Kidwai, DG SPD, rubbished the idea of any nuclear moves as ridiculous.
[27] Nasim Zehra, "Pakistan has no choice but to bolster its security," *Gulf News*, April 16, 1999.
[28] Author's recollection of the events.

Likely Targeting Policy and Delivery Systems

Since Pakistan relies heavily on ambiguity in its nuclear posture to keep the other side guessing it would be too much to expect from Pakistan to give any clues to its targeting philosophy. However, given the likely size of its arsenal, limitations of the target acquisition and surveillance capabilities and given the historical precedence of the policies of major nuclear powers at similar stages of development it can be assumed that the targeting policy would be predominantly 'counter value' or 'counter city'. However, a mix of some 'counter force' targets should also be expected for achieving maximum effect as well as to complicate the calculations of the other side.[29] Pakistan has made great strides in terms of development of its missile systems and possesses ballistic missiles with ranges from 100 kilometers to over 2000 kilometers. It has also successfully developed ground launched as well as air launched cruise missiles. It has thus achieved the reach and flexibility in the choice of launch platforms required to engage targets anywhere in India. Pakistan also has aircraft capable of undertaking nuclear delivery missions but ground based missiles are likely to be the primary carriers of nuclear warheads.

Ultimately, every nuclear power would strive to have a triad of nuclear delivery systems in order to achieve an assured second strike capability. But that is not a simple matter of wishing to do something and would be dependent on success in mastering a number of sophisticated technologies such as development of nuclear powered submarines which require miniaturization of nuclear power plants – a no mean task and the development of Submarine Launched Ballistic Missiles (SLBMs) with requisite range and payload capability. Though India has succeeded in building an indigenous nuclear powered submarine named '*Arihant*' after an effort spanning over a decade, it will take some years before the submarine currently undergoing sea trials would become operational. India has also started testing the SLBMs for deployment on *Arihant* but these are still at an early stage of development. Similar Pakistani efforts are also likely to be protracted and costly. As and when these efforts bear fruit these would enhance the credibility of Indian and Pakistani deterrent capabilities by providing them assured second strike capabilities on the one hand while on the other they would pose a serious challenge to the assertive and centralized command and control system currently being practiced by the two countries.

Nuclear Posture, Force Configuration and Strategy for Conduct of Nuclear Operations

The doctrine also dictates the posture and size of the arsenal which in turn will determine the kind of nuclear operations that could or would be carried out. Since Pakistan has not adopted a 'no first use' policy and has espoused a 'Credible Minimum Deterrence' doctrine, these factors will determine the nuclear posture and operational strategy. Rejection of a no first use policy would mean that while Pakistan may not adopt a hair trigger posture it would have to maintain a comparatively higher degree of readiness of its forces. From the logic of conventional force ratios as well Pakistan is more likely to be the first to be forced to contemplate the use of its nuclear assets in a major conventional war with India. Minimum deterrence would mean that the overall size of the arsenal would remain

[29] This conclusion is purely theoretical and has nothing to do with the actual operational planning or targeting philosophy.

modest though the qualifier 'credible' would mean little more than minimum to achieve a comfort level. However, the technological deficiencies in terms of real time surveillance and target acquisition coupled with a small nuclear force would dictate the adoption of a strategy of deterrence as opposed to a war fighting strategy. In such circumstances it is natural to opt for a counter city policy, however, engagement of some critical counter force targets will have to be part of the targeting list for greater effectiveness, degradation of enemy's response capability and complicating its calculations.

Pakistan like India has refused to declare the size of its minimum deterrence force but that does not mean that it has not quantified the size of force it is striving to achieve and for the purposes of operational planning. As discussed earlier whatever developmental goals Pakistan determined for itself and production targets it assigned to its strategic organizations are bound to be subjected to a constant process of review and adjustments where needed to meet the ever changing security and strategic landscape. In any case 'Minimum Deterrence' is a very abstract concept and there is no clear definition or a yardstick to measure the size of any country's minimum deterrence force since there are many imponderable factors and is liable to be influenced by the developments taking place on the other side of the fence. For instance, Pakistan is convinced that the US-India nuclear cooperation agreement will allow India to substantially increase its fissile material production capacity which will compel Pakistan to review its earlier calculations. Similarly, if India goes ahead with its planned acquisition and deployment of Anti Ballistic Missile systems Pakistan will certainly need to take qualitative as well as quantitative measures to respond to this development. India also has a declaratory policy of minimum nuclear deterrence but unlike Pakistan it has not identified the threat at which this minimum deterrence is aimed at. Even if it is minimum deterrence both China and Pakistan the size of the force would still be relatively modest. The question however, is that will India's global power ambitions be satisfied with a force smaller than China's nuclear forces. Ashley Tellis has argued that if India increases the size of its nuclear force to catch up with China it should not be seen as a negative development rather US should be facilitating such a development.[30] Indian analysts such as Bharat Karnad advocate even more ambitious goal of a force based on 400 thermonuclear warheads and ICBMs capable of reaching the US mainland and able to deter even the United States.[31] The question may arise as to whether such a force structure would still fall in the realm of 'credible minimum deterrence' or would it be far in excess of that. Karnad has, in fact, ridiculed the notion of minimum nuclear deterrence citing Herman Kahn's statement that, '*It is a new kind of Maginot mentality'* in support of his argument. [32]

Conclusion

During the last decade as Pakistan has visibly made substantive progress in terms of development of institutional mechanisms and structures for the effective management of its nuclear capability and has invested a lot of effort including collaboration with foreign countries and international agencies

[30] Ashley Tellis made these remarks during a debate with George Perkovich in 2006 at the Carnegie Endowment for International Peace, Washington, D.C. on the issue of the U.S.-India Civil Nuclear Cooperation Agreement.
[31] Karnad, "A Thermonuclear Deterrent."
[32] Ibid., 136.

in improving the custodial controls and security of its strategic assets. It has also put in place legislative and administrative measures to strengthen its export control mechanisms. In parallel to these developments a lot of institutional learning has taken place in the form of thinking and in-house discussions on doctrinal and operational issues including war gaming of various scenarios and enhanced cooperation between the three services and the National Command Authority.

The military training institutions have during the past decade laid greater emphasis in educating the officers in issues related to nuclear deterrence and nuclear strategy. The fact that the Pakistani nuclear doctrine has not been made public does not mean that it has not evolved over the years. In reality, the doctrinal thinking has matured over the years and the lessons learnt from the experiences of the Kargil conflict and the 2001-2002 military stand-off have been taken into account. A decade plus is not long enough to completely resolve intricate issues which could never be satisfactorily resolved by the Super powers during the four decades of the Cold War. In any case doctrines do not remain static and have to be dynamic to adapt themselves to ever changing security environments as well as technological developments. One thing is for sure, however, that though Pakistan is still on the nuclear learning curve, it has covered a lot of ground since May 1998.

7 Conceptualizing the Relationship Between Nuclear Learning and Doctrinal Thinking: Understanding the Pakistani Perspective and Assessing Deterrence Stability

Sadia Tasleem

A doctrine is an embodiment of ideas—stated or unstated—meant to address, how, under what circumstances, and for what purposes a state would use—or consider using—its nuclear weapons.[1] A doctrine addresses the use of nuclear weapons at two levels: the policy and operational level. At the policy level, a doctrine is meant to reflect upon the objectives that would invoke nuclear use. At the operational level, it is meant to explain how nuclear weapons would be used and thus involves elaborate thinking on issues of deployment patterns, targets, quantification of weapons, variety, ranges etc.

Since nuclear doctrines are critical for deterrence stability, they have long received enormous scholarly attention. Pakistan, however, presents a particularly challenging case in this regard. Given the ambiguity that shrouds Pakistan's nuclear doctrine, its study is a pressing task. Yet, a reasonable number of attempts have been made to explore what Pakistani doctrinal thinking looks like, what motivations drive Pakistan's nuclear policy, what possible political objectives Pakistan might try to achieve through its nuclear weapons, and what exactly would be the operational plan for using nuclear weapons.[2]

There are very few areas where Pakistan has a stated position regarding its doctrinal thinking.[3] The unstated nature of doctrine keeps most of the analysis interpretive and at times even speculative.

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[1] Bhumitra Chakma, "Pakistan's Nuclear Doctrine and Command and Control System: Dilemmas of Small Nuclear Forces in the Second Atomic Age," *Security Challenges* 2, no. 2 (July 2006), 115. Also see Rifaat Hussain, "Nuclear Doctrines in South Asia," *SASSU Research Report*, no. 4 (December 2005), 4.

[2] Ibid.; F.S. Lodhi, "Pakistan's Nuclear Doctrine," *Defence Journal*, available at http://www.defencejournal.com/apr99/pak-nuclear-doctrine.htm; 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; Rajesh Basrur, "Two Decades of Minimum Deterrence in South Asia: A Comparative Framework," in *The Politics of Nuclear Weapons in South Asia*, ed. Bhumitra Chakma (Cornwall, UK: Ashgate, 2011), 11-28; S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Stanford, CA: Stanford University Press, 2007); Scott D. Sagan, "Evolution of Pakistani and Indian Nuclear Doctrine," in *Inside Nuclear South Asia*, ed. Scott D. Sagan, (Stanford, CA: Stanford University Press, 2009), 219-63.

[3] Minimum credible deterrence again has been one such idea that has received enormous amount of attention both in policy positions as well as academic writings. Much, however, is left unsaid when it comes to explain what would constitute a "minimum deterrent." See for instance, Sadia Tasleem, "Towards an Indo-Pak Nuclear Lexicon – II: Credible Minimum Deterrence," *IPCS*, No.3330 (11 February, 2011) available at http://www.ipcs.org/article/pakistan/towards-an-indo-pak-nuclear-lexicon-ii-credible-minimum-deterrence-3330.html. Besides, Pakistani leadership has categorically stated that it would retain the right to use its nuclear weapons first, what exactly would be the red-lines is however, much a matter of speculation. On other issues like targeting policy, there is no clearly outlined plan.

Consequently, more recent developments in Pakistan's nuclear weapons and missile capabilities have generated some debate as to how these developments will affect Pakistan's doctrinal thinking. Are these developments an indicator of shifting trends in Pakistan's doctrinal thinking? For instance, is Pakistan moving away from a minimum credible deterrence posture and to a nuclear war fighting one?[4] It is hard to have a yes or no answer to this question due to the fluidity of the situation but more so because there is hardly any evidence available to testify that recent developments actually indicate a shift. It has yet to be proven that whatever was said and thought true in the past was actually accurate. There are serious gaps to be filled in this regard—gaps that would need archival evidence to set the record straight.

The purpose of this paper, however, is not to address any of the above mentioned questions. Neither does this paper make an attempt to elaborate on what exactly is Pakistan's doctrinal thinking. Rather, it asserts that the existing discourse on Pakistan's nuclear doctrine is either based on an assessment of Pakistan's conventional and nuclear capabilities or a somewhat static understanding of Pakistan's political objectives. Mostly the available discourse does not take into account the process of nuclear learning and its impact on doctrinal thinking.

This paper aims to focus on nuclear learning as a source that largely informs and influences a state's doctrinal thinking.[5] It claims that an effort to understand the relationship between nuclear learning and doctrinal thinking needs to take into account the following factors.

- Nuclear learning is neither linear nor irreversible,
- Learning occurs at the individual as well as organizational level,
- Nuclear doctrine operates at policy and military strategy levels. As a result, the doctrine may not always be as coherent as expected.[6]

The interaction and intersection between the levels of learning and levels of doctrine present a challenging puzzle to solve. The idea here is to first revisit the existing works on nuclear learning with reference to Pakistan, then build a framework of analysis to explore the relationship between nuclear learning and doctrinal thinking, and later analyze Pakistan's case in this light. In the end it aims to briefly discuss the impact of existing and emerging doctrinal trends on deterrence stability.

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[4] Naeem Salik, "India – Pakistan Nuclear Competition: Implications for Regional Stability" (paper presented at *APSA Annual Conference 2011*, Seattle, Washington, September 26-28, 2011), 11, available at law.anu.edu.au/COAST/events/APSA/papers/248.pdf.

[5] It assumes that "state" per se does not learn. It is the key individuals, decision-makers or organizations that go through the process of learning. The word "state" would therefore be used interchangeably for decision-makers and organizations. It is also important to mention here that this is a preliminary attempt to develop basic ideas and offer food for thought to conduct further research on this subject. It therefore by no means claims to be a definitive work on the subject. It is however hoped that a study like this might help develop a framework that would be useful to conduct further study.

[6] Sagan notes, "… nuclear doctrine in new nuclear states, such as India and Pakistan, is a moving target, as political and military leaders are seeking to develop plans and procedures in new and unfamiliar strategic conditions." Sagan, "Evolution of Pakistani and Indian Nuclear Doctrine," 227.

What We Know: Pakistani Doctrinal Thinking

Literature on Pakistan's nuclear behavior is scant. Besides, what little has come out in the form of published work focuses only on crisis periods.[7] The opinion of scholars on the question of learning therefore remains heavily divided. In addition, the ongoing debate either remains inconclusive or depends heavily on assumptions rather than empirical evidence and an elaborate conceptual framework. P.R.Chari, for instance, claims that the leadership in India and Pakistan has learnt nothing and forgotten nothing over the course of their rivalry.[8] While Hasan Askari Rizvi highlights the possibility of learning by noting that "…Pakistani security institutions may be reevaluating their core strategic assumptions and calculations."[9] He, nonetheless, leaves the discussion on Post-Kargil learning inconclusive because of the lack of information. Another significant contribution to the literature on this subject is the work by Russell J. Leng, who attempts to analyze different crises between India and Pakistan including Kargil (1999) and the 2001-2002 military standoff. He devotes at least some part of the discussion to nuclear learning. He concludes that "the two sides have been learning, but they have been predisposed by their realpolitik beliefs to draw only certain types of lessons from their behavior. Each successive crisis raises the reputational stakes for both sides, and each success or failure is attributed to the state's ability to demonstrate superior resolve. Coercive bargaining strategies and tactics have created a self-fulfilling prophecy."[10]

Leng's study, however, relates to crisis periods rather lessons learned after crises. It also focuses on the operational strategy rather than broader strategic thinking. This paper makes an attempt to build a framework that could help understand the relationship between nuclear learning and doctrinal thinking both at policy and military strategy levels. Based on this framework, it aims to highlight an alternative way of looking at Pakistan's case and helps make better sense of the Pakistani perspective.

Building a Framework of Nuclear Learning and Doctrinal Thinking

Nuclear learning is a process that either brings a change in existing beliefs and ideas or reinforces the old ones based on experience, sources of study, and analogies.[11] It recognizes that learning occurs in many forms and at various levels, often simultaneously. Learning also occurs through a variety of sources including knowledge of history, events, and experiences and the tools of analysis used to interpret or analyze those events. On issues that exist purely in the domain of theory, dominant ideas

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[7] Russell J. Leng, "Realpolitik and Learning in the India-Pakistan Rivalry" in *The India-Pakistan Conflict: An Enduring Rivalry*, ed. T.V.Paul (New Delhi: Cambridge University Press, 2006), 103-27; Hasan Askari Rizvi, "The Lessons of Kargil as Learned by Pakistan," in *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict*, ed. Peter R. Lavoy (New Delhi: Cambridge University Press, 2010), 333-52.

[8] P.R. Chari, "Nuclear Crisis, Escalation Control, and Deterrence in South Asia," *Working Paper Version 1.0* (August 2003), 23, available at http://www.stimson.org/images/uploads/research-pdfs/escalation_chari_1.pdf.

[9] Rizvi, "The Lessons of Kargil as Learned by Pakistan," 351.

[10] Leng, "Realpolitik and Learning in the India-Pakistan Rivalry," 125.

[11] Nuclear learning is treated as any inference rather than positive inference in this paper. Since positive and negative learning is often hard to determine with reference to contemporary analysis. For a detailed discussion on this aspect see, Jack S. Levy, ibid, pp. 291 – 294.

in the global discourse or the debates in the existing literature become the primary source of learning at least in cases where the indigenous discourse is under-developed.[12]

It may also be noted here that a learner may draw different inferences from different sources that inform his or her learning over a single issue, which results in contradictions reflected in the learner's behavior. Also, it is highly important to understand that learning may not always be a long-term, continuous, and linear phenomenon. The challenge emerges from the fact that learning heavily depends on leaders. Therefore, with a change in leadership, lessons may not always be retained and the question then remains as to how much institutional memory lives on.[13] Policy changes made on the basis of learning by one leader might be less permanent than the operational changes.

Nuclear Learning and Doctrinal Thinking

A state's conception of nuclear weapons lies at the heart of its doctrinal thinking. What is the purpose of acquiring a nuclear weapons capability? In Pakistan's case, there was a need to offset the conventional balance and deter invasion. Over time objectives and purposes for these weapons become much more complex, which complicates the learning process. Since factual learning about nuclear weapons is a linear phenomenon, the knowledge about nuclear weapons may therefore increase over a period of time.[14] Inferential learning, however, is a non-linear phenomenon and occurs at multiple levels simultaneously, sometimes even with contradictory lessons.[15] And, it is largely the inferential learning at various levels that informs a state's conception of the role of nuclear weapons and therefore clouds its doctrinal thinking.

The role of nuclear weapons at different levels may vary. Two broad categories can be identified; these include policy and military strategy. If the state's policy and its military strategy correspond to each other, doctrinal development becomes a simpler process. If, however, there is a mismatch between policy and military strategy, which happens at different levels of analysis, the resulting doctrine would be complex and subject to contradictions.[16] If a state looks at nuclear weapons purely as a political instrument with a limited deterrent role, its military force posture should match as

[12] Toby Dalton and Sadia Tasleem, "Reading Brody in Islamabad: Pakistan's Nuclear Thinking and the Future of Deterrence Stability in South Asia," (Unpublished Manuscript).
[13] Jack S. Levy, "Learning and Foreign Policy: Sweeping a Conceptual Minefield," *International Organization* 48, no. 2 (Spring 1994): 290.
[14] Key sources of learning include events, experiences, belief systems, realpolitik considerations, analogies, global strategic culture, etc. For details see, Leng, "Realpolitik and Learning in the India-Pakistan Rivalry"; Sagan, "Evolution of Pakistani and Indian Nuclear Doctrine." Types of learning include factual learning, diagnostic learning, inferential/causal learning, simple learning, and complex learning. For typology, see Knopf, "The Concept of Nuclear Learning"; Levy, "Learning and Foreign Policy."
[15] Inferential learning involves "broader inferences that are drawn from fundamental facts." Ibid.
[16] Paul Nitze, "Atoms, Strategy and Policy," *Foreign Affairs*, 34 (January 1956), 190- 91. The argument made by Nitze highlights the possibility of a gap between policy and strategy and suggests that the gap should be reduced as much as possible.

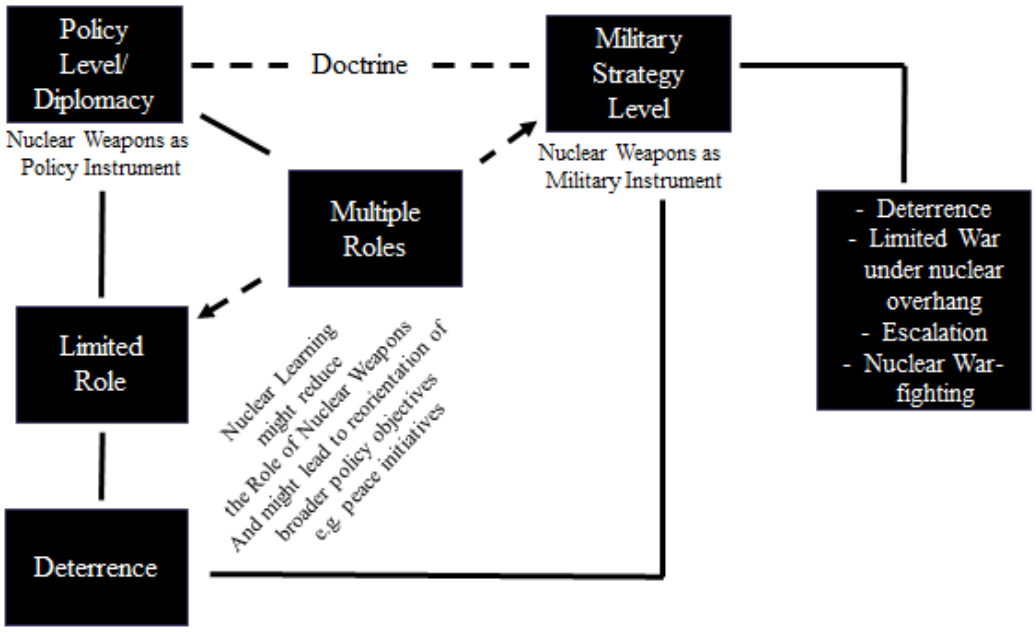
discussed by P.M.S. Blackett.[17] One example could be the case of China where it employed a minimum deterrent doctrine.[18]

If a state looks at nuclear weapons as instruments capable of helping a state achieve a variety of foreign policy objectives, its military strategy would be complex. Likewise, if a state understands that nuclear weapons have serious limitations except for their deterrent role and yet understands that deterrence itself involves a heavy reliance on nuclear weapons, the state's doctrinal thinking would reflect contradictions. When a state relies more on nuclear weapons in its national security strategy, the number and sophistication of its nuclear weapons would increase.

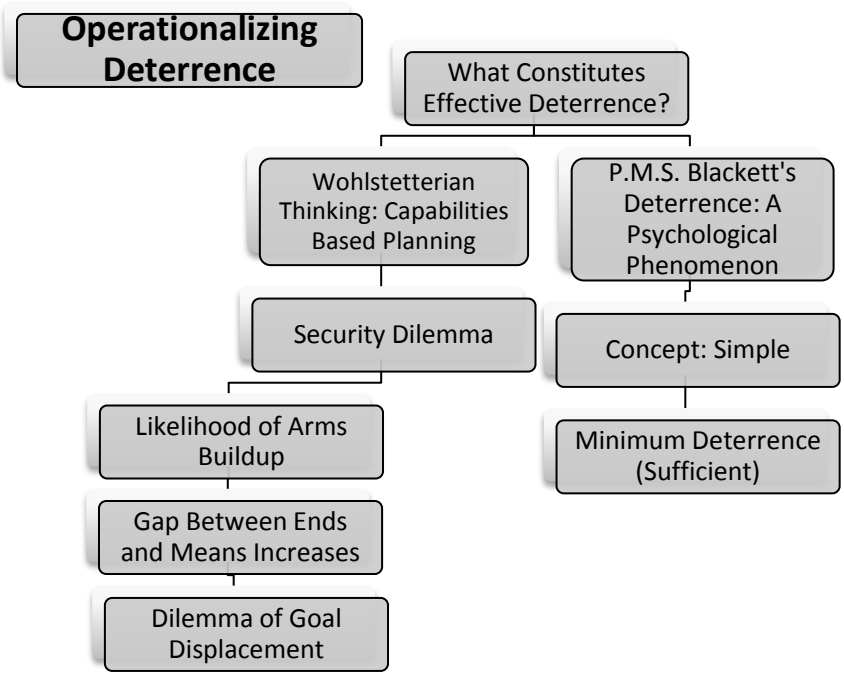
In the case of complex and simple learning with reference to doctrinal thinking, two different sets of actors might be working at the policy and military strategy levels, which can mean the system lacks unity of command: decisions might not always be flowing in a linear direction. Learning at the policy level might actually result in a re-orientation of policy. The sources informing decisions at the policy level might be different from those informing decisions at the operational level. Therefore, an effort should be made to develop tools that evaluate the status of learning on both levels.

Complex learning results in paradigmatic shifts at the policy level. Consequently, the leadership of a nuclear armed state might learn to change its goals by reducing dependence on nuclear weapons and employing alternative means to achieve those objectives. In such a situation, a reorientation of policy would be genuine nuclear learning. To facilitate comprehension, a graphical representation of the ideas discussed is provided below:

RELATIONSHIP BETWEEN NUCLEAR LEARNING & DOCTRINAL THINKING



[17] P.M.S. Blackett, *Studies of War: Nuclear and Conventional* (Westport, CT: Greenwood Press, 1962).
[18] Jeffrey Lewis, *Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (Cambridge, M.A: MIT Press, 2007).



An Alternative Approach to Understand Pakistani Doctrine

Some of the key roles attributed to Pakistan's thinking about nuclear weapons include the following:[19]

- Last-Resort weapons to prevent military defeat or loss of territory[20]
- Deterrent to conventional military attack[21]
- Facilitator of low-intensity conflict[22]
- Tools meant to internationalize the Kashmir conflict and escalate a conflict to draw international attention[23]
- Potentially enable an extended deterrence policy[24]

[19] The role conception has been selectively picked up from the dominant discourse only focusing on foreign policy and deterrence. Others include nuclear weapons and nation building, symbols of self-reliance and defiance, commercial use of Pakistan's nuclear weapons, tools for domestic political and civil – military competition, etc. For reference see Lavoy, "Pakistan's Nuclear Doctrine," 289-98.
[20] Ibid., 283-84. Hussain, "Nuclear Doctrines in South Asia," 13.
[21] Lavoy, "Pakistan's Nuclear Doctrine," 284-87.
[22] Ibid., 287-89; S. Paul Kapur, *Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia* (Stanford: Stanford University Press, 2007). Also see Kapur, "Revisionist Ambitions, Capabilities, and Nuclear Instability: Why Nuclear South Asia Is Not Like Cold War Europe," in *Inside Nuclear South Asia*, ed. Scott D. Sagan (Stanford: Stanford University Press, 2009), 184-218.
[23] Lavoy, "Pakistan's Nuclear Doctrine," 295-97.
[24] This is a question that has received considerable attention in conferences and seminars over the last few years. Some of the scholars in West assume that Pakistan might consider extending deterrence to its Arab friends, particularly Saudi Arabia. It may be noted here that extended deterrence is an extremely expansive idea and its technical requirements are usually highly sophisticated as well as administratively cumbersome. See Bruce Riedel,

While Pakistan undisputedly claims to use nuclear weapons as a deterrent against conventional as well as nuclear attacks, the debate on these weapons' other roles remains highly controversial. The question of whether nuclear weapons served as a catalyst in the Kargil crisis remains disputed. Does Pakistan still believe in using a nuclear overhang to facilitate low intensity conflict or for that matter using nuclear weapons as a tool to internationalize the Kashmir conflict?[25] Many analysts assume that given the quantitative and qualitative developments in Pakistan's nuclear inventory, Pakistan is increasing its dependence on nuclear weapons, but is that the only empirical evidence available?

The very fact that President Musharraf made a peace overture to the Indian Prime Minister in January 2002 and later in 2004, which was followed by a composite dialogue as well as back-channel diplomacy, indicates that regardless of Musharraf's oft quoted and sometimes misquoted statements[26] on boosting the "role of nukes," he possibly learned that these weapons had serious limitations and that a nuclear environment forces certain responsibilities on nuclear weapon capable states.[27] A careful analysis of the policy changes Musharraf made vis-à-vis India imply that he learnt some lessons about the limits of nuclear weapons as a policy instrument. Indian leadership also recognized the extra length he went to in order to resolve the Kashmir dispute.[28] It is also important to mention here that during his long tenure, it was his learning along with some of his closest aides that really mattered as far as serious policy issues were concerned. Therefore, any serious research over the question of complex learning would involve a careful and in-depth study of what former President Pervez Musharraf thought about these issues and how he looked at the Pakistani experience in Kargil, the 2001-02 military standoff, and subsequent peace process with India.[29]

"Enduring Allies: Pakistan's Partnership with Saudi Arabia Runs Deeper," (December 09, 2011) available at http://www.brookings.edu/~/media/research/files/articles/2011/12/09%20saudi%20arabia%20pakistan%20riedel/1209_saudi_arabia_pakistan_riedel.

[25] Peter R. Lavoy, ed., *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict* (New Delhi: Cambridge University Press, 2010).

[26] Given the classified nature of Pakistan's nuclear policy, it is important to highlight here that most of the debate on Pakistan's conception of role of nuclear weapons is substantiated by political statements of Pakistani decision makers. Speech act (regardless of its contextual limitations) as oppose to concrete policy steps therefore often get the most of analysis. Scott Sagan makes the same observation in his work. See Sagan, "Evolution of Pakistani and Indian Nuclear Doctrine," 226-27.

[27] Many steps taken to ensure Pakistan's responsible behavior as a nuclear armed state. Some of these steps clearly indicate individual or organizational learning. Pakistan's establishment of an elaborate and efficient command and control system is a reflection of growth in terms of factual learning. The establishment of a proper institutional framework in the form of National Command Authority with organs like Strategic Plans Division helped create the possibility to preserve historical memory at the institutional level that could lay the foundations for organizational learning. Pakistan's gradual openness in terms of international engagement is yet another indicator of nuclear learning. Besides, high degree of verbal restraint on the part of political and military leadership regarding nuclear weapons also reflect learning to behave as a nuclear armed nation.

[28] "Gujral praises Musharraf's role in talks process," *Daily Times*, October 23, 2004, available at http://www.dailytimes.com.pk/default.asp?page=story_23-10-2004_pg7_35.

[29] Musharraf's book, *In the Line of Fire* provides very limited information on President Musharraf's perspective on the issues mentioned above, except of course Kargil Crisis, that received considerable attention for obvious reasons. Research on this question would therefore require his detailed interviews and if available records of his personal writings like notes and diaries. Besides, it is important to know who were the other people directly involved in the process of discussing and articulating Pakistan's key foreign policy decisions during that time period.

Regardless of whether the presence of nuclear weapons did or did not contribute to Kargil or the 2002 standoff, it is important to note that a few lessons were probably too obvious to be ignored on the Pakistani side—at least at the policy level. For instance, escalation is no more favorable to Pakistan, at least not for the sake of seeking international attention. Regardless of what President Musharraf wrote about the assumed strategic gains from Kargil,[30] the involvement of the United States in the crisis did not bring a favorable end for Pakistan—Musharraf's remarks were only most likely meant to save face and pacify criticism and opposition. Rather, Pakistan was made to withdraw its troops without any gain on its part.[31]

Secondly, while the significance of deterrence was reinforced after Kargil as well as during the 2002 military standoff, it appears that the limitations of nuclear weapons were exposed because India was not deterred from limited operations (Kargil) and full mobilization (2002 standoff). This process of learning then explains the parallel quantitative and qualitative nuclear developments in Pakistan's arsenal. Two important questions are whether Pakistani nuclear weapons are meant to facilitate escalation dominance or enable Pakistan to involve major powers in a crisis?

The role of nuclear weapons in Pakistani strategy is still evolving, which means there are constant fluctuations at the policy and operational level. In the case of post-Kargil Pakistan, for at least a decade, policy issues were dealt with by President Musharraf and his close associates, whereas operational issues were dealt with by the new institutional framework he set up in the form of a National Command Authority (NCA) with specialized branches focusing on technical and operational issues. There is a gap in Pakistani understanding of the role of nuclear weapons at the policy and operational levels may help explain why trends toward doctrinal shifts at the operational level may not be a reflection of increased dependence on nuclear weapons to achieve foreign policy objectives. This dichotomy could, however, be explained further by understanding whose learning matters at both levels.

What President Musharraf thought about the resolution over Kashmir may or may not be the same as his successors, for the process of learning can reverse with a change in leadership. President Musharraf's reconciliatory approach vis-à-vis India appears to indicate a shift in goals and policy priorities.[32] Regarding the maintenance of escalation, it would seem this is a reflection of how deterrence is conceptualized and therefore becomes part of operational strategy not policy.

[30] Pervez Musharraf, *In The Line Of Fire: A Memoir* (UK: Simon & Schuster, 2006), 93-98.
[31] Rizvi, "The Lessons of Kargil as Learned by Pakistan," 349. Also see Gen-Maj. (Retd) M. Akbar, "Time for Sober Reflection," *The Dawn*, July 22, 1999; Shahid M. Amin, "Kargil: The Unanswered Questions II—Time to Shed Illusions," *The Dawn*, July 26, 1999.
[32] One may argue that peace process was a continuation of a trend that has repeatedly occurred during the periods of peace followed by a crisis. If that is so how could one suggest that peace process was a consequence of nuclear learning? It is difficult to answer this question. There are many factors that might have contributed to the peace process including, economic pressures, and involvement of the United States in the region, etc.

Doctrinal Thinking and Deterrence Stability

This author believes that the role of nuclear weapons in Pakistan's policy is more ambiguous today than ever before. The flexibility shown by President Musharraf's government over Kashmir was a clear indicator of complex learning; this lesson apparently did not trickle down to the new leadership or be absorbed into institutional memory.[33] The stabilizing impact of this complex learning was unraveled after the Mumbai incident.[34]

Pakistan's nuclear inventory appears to be expanding, driven by a perceived need to reinforcing deterrence. This drive, however, generates classical security dilemma. Capabilities-based planning is always prone to result in a reactionary buildup on the weaker side and a higher likelihood of a spiral.[35] This process can lead the relatively weaker side to internalize a greater sense of insecurity and vulnerability. In the case of India and Pakistan, owing to a number of reasons including resource constraints and global trends, weapons development may not result in an arms race comparable to those witnessed during the Cold War. Nevertheless, a moderate arms buildup might appear difficult to avoid if the approach towards threat management remains grounded in capabilities-based planning. Also, this criterion of judgment may not be able to satisfy Pakistan's quest for security in the wake of a continuously growing gap in economic potential between the two sides, which affects their ability to invest in military developments.

Besides, an arms buildup on both sides could generate misperceptions, create doubts about the other's intentions, and aggravate collective fears, which could initiate a destabilizing trend.

The likelihood of using escalation as a policy measure to seek international attention may not be a viable option for Pakistan anymore. However, given the growing emphasis on deterrence and increased dependence on nuclear weapons in Pakistan's operational doctrine, the possibility of inadvertent escalation should not be ruled-out. The introduction of short-range ballistic missiles (SRBMs) into the battlefield could induce instability by raising the risk of escalation. The proponents of battlefield nuclear weapons have long argued that using these weapons against limited strikes reduces the disproportionality of escalation. This type of use would not lead to a threat of all-out nuclear war and therefore enhances the credibility of deterrence.[36] They further argue that the presence of such weapons raise the nuclear threshold by providing sufficient time for leaders to explore all possible options, which increases stability. Both arguments are debatable. The presence of tactical missiles might encourage the adversary to seriously contemplate not attacking lest it lead to an all-out war. However, the adversary's judgment is the key here. Would India accept the limited use of tactical nuclear weapons? If not, will India respond tit-for-tat or with massive retaliation? Another intervening variable on Indian and Pakistani doctrinal learning is the complication that

[33] Steve Coll, "The Back Channel," *The New Yorker*, March 2, 2009.
[34] Rajesh Basrur, et.al., "The 2008 Mumbai Terrorist Attacks: Strategic Fallout," *RSIS Monograph No.* 17 (2009) available at http://www.rsis.edu.sg/publications/monographs/Monograph17.pdf.
[35] Dalton and Tasleem, "Reading Brody in Islamabad."
[36] The discussion on Hatf IX has been taken from the author's short piece on the subject. See Sadia Tasleem, "NASR (Hatf IX): What does it mean for Deterrence and Strategic Stability," *Eurasia Review* (April 26, 2011), available at http://www.eurasiareview.com/26042011-nasr-hatf-ix-what-does-it-mean-for-deterrence-and-strategic-stability-oped/.

China provides for South Asian strategic stability. India has long expressed fear of a two-front war on its borders by Pakistan and China. Nonetheless, the fluidity and uncertainty characterizing the current direction of Sino-Indian relations causes a significant level of doubt. Thus, it is hard to determine the impact of triangular relations on doctrinal trends and eventually deterrence stability.

Conclusion

The relationship between nuclear learning and doctrinal thinking is a slow and challenging process. A state's doctrinal thinking is largely determined by leadership's role-conception of nuclear weapons. Doctrinal thinking operates at two levels, policy and military strategy, learning at both levels matters; however, learning at these levels may or may not be consistent with each other. This chapter concludes that there is a higher likelihood that Pakistan's experiences in the post-1998 timeframe, particularly including the Kargil crisis and 2001-02 military standoff, brought some hard lessons home. Pakistan's learning trajectory has followed a series of crises and failed attempts to structure peace and security in the region. The peace process between India and Pakistan as well as the back channel diplomacy during Musharraf's era could be seen as evidence testifying to a realization that nuclear weapons have limitations. However, it is also clear that the same experiences reinforced the value of a deterrent role for nuclear weapons in Pakistan's strategic thinking, which consequently increases demands to strengthen deterrence. This lesson possibly resulted in a revision of operational needs, which therefore stipulated changes in doctrinal thinking at the operational level.

8 Command and Control Trends and Choices for the Next Decade in South Asia

Christopher Clary

The Road So Far

Fourteen years after the reciprocal nuclear tests of May 1998, India and Pakistan have moved from the modest arms "walk" of the early years to a more serious arms "jog." This development belies predictions that more relaxed South Asian conceptions of deterrence combined with resources constraints might allow India and Pakistan to avoid mistakes made by past nuclear dyads. This chapter has three objectives: (1) to situate future developments by briefly recapping major developments from the preceding decade; (2) identify contemporary reasons for today's more serious pace in technological and doctrinal developments with direct relevance for command and control; and (3) sketch out eight trends and choices that will shape nuclear management in southern Asia in the coming decade.

The last decade of nuclear stewardship in Pakistan has focused on four core areas: (1) the safety and security of the arsenal, (2) the development of a credible ballistic missile leg of Pakistan's current nuclear "dyad," (3) the research and development of a future cruise missile capability for conventional and strategic use, and (4) the expansion of a nuclear enrichment and reprocessing infrastructure to allow Pakistan to meet its nuclear force requirements, perhaps 200-300 weapons worth of fissile material.[1]

According to public accounts, Pakistan has personnel and human reliability programs to screen military and civilian personnel involved in the strategic programs, it has instituted two-man and perhaps three-man rules for handling strategic materials, and it has developed some sort of permissive action link technology (sometimes referred to as PakPALs), though it is unclear under what circumstances these locks prevent improper use. It has also stood up a sizeable security unit to protect Pakistani weapons as well as a dedicated counterintelligence function to detect threats to those weapons.[2]

[1] For a discussion of Pakistani fissile material production, see Christopher Clary, *Thinking about Pakistan's Nuclear Security in Peacetime, Crisis, and War*, Occasional Paper no. 12 (New Delhi: Institute for Defense Studies and Analyses, September 2010), 6-9.

[2] See, inter alia, Feroz Hassan Khan, "Nuclear Security in Pakistan: Separating Myth from Reality," *Arms Control Today*, July-August 2009; Kenneth N. Luongo and Brig. (Ret.) Naeem Salik, "Building Confidence in Pakistan's Nuclear Security," *Arms Control Today*, December 2007; Peter Lavoy, "Islamabad's Nuclear Posture: Its Premises and Implementation," in Henry Sokolski, ed., *Pakistan's Nuclear Future* (Carlisle, Penn.: Strategic Studies Institute, U.S. Army War College, January 2008); Ashley Tellis testimony, "US-Pakistan Relations: Assassination, Instability, and the Future of US Policy," Hearing of the Middle East and South Asia Subcommittee of the House Foreign Affairs Committee, January 16, 2008; and Paul K. Kerr and Mary Beth Nikitin, "Pakistan's Nuclear Weapons: Proliferation and Security Issues, " *CRS Report for Congress*, no. RL34248 (Washington, D.C.: Congressional Research Service, updated January 13, 2011).

In addition to whatever programmatic elements Pakistan has put in place, the safety and security of Pakistan's arsenal is a function of force size, dispersal, and readiness. Simply put, fifty warheads stored in six peacetime locations in a de-mated and disassembled way are far easier to secure than one hundred assembled warheads stored in twenty locations. The more dispersed and readier the arsenal, the less vulnerable it is to enemy conventional or strategic attack, even if that gain in survivability increases risks from internal threats—both "insider" threats within the nuclear organization, but also Pakistani militants who by luck or knowledge target a nuclear facility. This is simply a version of Peter Feaver's "always-never" dilemma with a heightened role for non-state actors.[3]

Pakistan's ongoing acceleration of technological and doctrinal change is derivative of an assessment of risk associated with the current and likely future balance of capabilities. The next nuclear decade for Pakistan will likely center around one core challenge: integrating nuclear weapons capabilities into an "interdependent" nuclear and conventional force. Pakistan, through the testing of the Hatf-IX Nasr and accompanying public, for-attribution quotes by the Strategic Plans Division, has signaled that it seeks nuclear deterrence options at multiple stages of escalation, including nuclear weapons that might have battlefield targets. As Feroz Hassan Khan has argued in the past, it is difficult to believe that Pakistani strategic planners would pursue this course if they did not believe trends in the conventional force balance were shifting in ways dangerous to Pakistan. While I concur with that general assessment, I believe Pakistani developments—despite their accelerated pace—are largely the product of concerns in the medium- and long-term about India, rather than today's fears. This assessment draws on work I completed for the Henry L. Stimson Center that concluded that India's conventional military advantages over Pakistan, particularly in a limited military campaign, are less substantial than are commonly believed.[4]

Even so, in the longer term, the trends with regards to India will shift in ways difficult for Pakistan to manage with conventional deterrence alone. The long-term size disparity, particularly if India can maintain higher rates of economic growth than Pakistan, will mean Pakistan is unable to keep up. Pakistani strategic planners may also be adjusting nuclear production to account for other concerns. The Fissile Material Cutoff Treaty, which will cap future developments in the arsenal, may be prompting some of today's brisk pace in fissile material production. Also, Pakistani planners may be adjusting for worst-case scenarios involving the United States as they attempt to build a survivable force, even if the United States does not largely factor into Pakistan's targeting decisions, which remain India-centric.

India similarly has decided to accelerate nuclear developments. On the command and control side, India has created a Strategic Forces Command that follows "dual-rule" release procedures and follows a multi-stage alert ladder, whose rungs are determined by orders from the National Command Authority, according to Vipin Narang. Narang's work suggests that the nuclear force is

[3] See Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca, N.Y.: Cornell University Press, 1992) and Feaver, "Command and Control in Emerging Nuclear Nations," *International Security* 17, no. 3 (Winter 1992-1993): 160-187.
[4] Clary, "Deterrence Stability and the Conventional Forces in South Asia," unpublished working paper.

kept at varying stages of readiness, with at least some of the arsenal ready for relatively quick retaliatory strikes in the event of a surprise attack.[5] This is a substantial change from the "ragged retaliation" discussed in Ashley Tellis' work from a decade ago, which suggested Indian retaliation might occur days following an adversary nuclear strike.[6] In general, there is still considerable and unnecessary opacity regarding India's command and control arrangements. The outside world knows far more about Pakistan's safety and security procedures than it does about India's, and there is no reason for this to be the case. Among other topics, the existence or non-existence of Indian PALs is virtually unmentioned in the public domain.

Further still, India could do a much better job of broadcasting the redundancy, resilience, and survivability of its command and control system. Since 2003, when India announced that there were alternate chains of command, India has said almost nothing on the topic. These alternate chains of command might be embarrassing for coalition and cabinet politics purposes, but such concerns should presumably be trumped by a desire to ensure that no opponent perceives any benefit from attempting a counter-control, decapitating strike in the midst of a deep crisis.

India, like Pakistan, has made substantial technological developments in building the missile leg of its extant nuclear dyad and made important advancements toward a naval nuclear leg as well. Like Pakistan, India has also made progress in cruise missile technology. Worrisomely, there are some areas where India is pursuing technological developments where the political guidance is ambiguous at best. The most significant area involves continued Indian developments of ballistic missile defenses. Other areas in which India's defense scientists have expressed interest in pursuing development include Multiple Independently Targetable Reentry Vehicles (or MIRVs) for Indian ballistic missiles and even anti-satellite weapons to be launched from atop Indian ballistic missiles. The utility of MIRVs for India's assured retaliation posture is not immediately apparent. Interest in them may reflect Indian scientists pursuing capabilities for their own sake without clear political guidance, and recent statements by the head of the DRDO, V.K. Saraswat, have done little to allay those concerns.[7]

While not exhaustive, this cursory review catalogs most nuclear developments since 1998. Pakistani innovations and changes have been driven largely by assessments of a worsening threat environment, and in particular the deterioration of the conventional military balance with India. Indian innovations and changes with regards to capabilities have been driven more by technological "do-ability" than clear political need. Also, Narang's work indicates that India has made substantial developments in the command and control arena that are largely unrecognized, in no small part because Indian officials discuss this topic very rarely if at all. What might the future bring? The remainder of this chapter will briefly introduce eight trends or choices awaiting both India and Pakistan in the coming decade.

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[5] Vipin Narang, *Posturing for Peace*, unpublished book manuscript.
[6] Ashley Tellis, *India's Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal* (Santa Monica: RAND Corporation, 2001), 273, 317, 470-1 for references to "ragged retaliation"; and 329, 368, 372, 426, and 571-2 for discussion that response could occur days after an adversary strategic attack, though Tellis frequently uses the "hours to days" time span in his assessment.
[7] Narang and Clary, "Capability without Strategy," *Indian Express*, May 22, 2012.

1) **Ballistic Missile Defense and Command and Control:** India is working on both endo- and exo-atmospheric ballistic missile interceptors. It has announced that it is ready to field the system in two cities, and that it seeks to have a command and control arrangement that would permit the ballistic missile defense system to engage an incoming threat with the man-in-the-loop being responsible for override only.[8] In terms of nuclear management, fielding a ballistic missile defense system indicates that India's early warning sensors are now or will soon be sufficiently developed to provide Indian decision-makers with substantial visibility on potential missile threats in real-time. It is not clear from published accounts whether this sensor data might be only available to officers responsible for air defense and ballistic missile defense, or if fusion capabilities would relay this information to the central authorities (including political authorities) in New Delhi. But a ballistic missile defense system requires an advanced early warning system for missile threats.

2) **Conventional Ballistic and Cruise Missile Employment:** Both countries appear to be interested in conventionally armed ballistic and cruise missiles. While there was interest in the relatively recent past to ban short-range ballistic missiles, the development of the Pakistani Nasr and the Indian Prahaar suggest there is still some demand within the governments of India and Pakistan for short-range delivery vehicles. Development of cruise missiles (ground-, sea, and air-launched) shows no sign of abating. So the question for both weapons systems is when they are employed in a conventional mode will they be treated differently than non-dual-use systems? Will both governments treat them like long-range artillery, air strikes, or as something special? Who will have launch authority in the event of hostilities? National command authorities (with civilians in the loop), military headquarters, corps commanders, divisional commanders, or something else?

3) **False Alarms:** These two developments suggest the third novelty, which is that the risk for false alarms of incoming nuclear-capable systems is quite high in the event of an India-Pakistan conflict. A decade ago, the danger of false alarms seemed negligible because the rudimentary state of both sides' early warning capabilities meant that the first time either country would be aware of an incoming missile would be after it had detonated and revealed if it had a conventional or nuclear payload. Similarly, a decade ago, it appeared unlikely that either country would use conventionally armed ballistic missiles for fear of the escalatory signals they would send, or at a minimum their use would entail a conscious decision about those signals and the concomitant risks. Now, the ubiquity of these missile systems combined with developments in early warning capabilities suggests that both countries will likely have to live with ambiguous threats in the midst of a full-scale war. As a silver lining, this may have a positive outcome: a launch-on-warning posture is likely impossible to pursue if conventionally armed missile use is probable in war. Even so, the much-heightened potential for false alarms is a development that will distinguish the coming decade from the past one.

[8] Press Trust of India, "Delhi, Mumbai Selected for Ballistic Missile Defense Shield," *Times of India*, June 24, 2012; Press Trust of India, "India Develops Missile Shield, Can Protect Two Cities," *Hindustan Times*, May 6, 2012.

4) **Targeting Decisions:** Both nations, but particularly India, are gaining more precise weapons systems, often with the ability to engage ground targets from stand-off distances. Plus, with improved intelligence, surveillance, and reconnaissance capabilities, the likelihood of finding, fixing and destroying mobile targets increases. This means that conventional forces might be used in ways that could intentionally or unintentionally degrade the retaliatory capability of the other state, but particularly Pakistan. There do appear to be procedures in place whereby political approval is required prior to military use of force against sensitive targets, but the adjudication of what is and is not a sensitive target is opaque to outsiders. What if Pakistan is employing conventionally armed ballistic missiles against India, will India avoid striking any transporter, erector, launcher (TEL) vehicles that it discovers? Will India avoid striking air bases with potential nuclear warheads? Will India avoid striking ammunition bunkers that it suspects might contain strategic materials? Will India avoid striking command and control targets, including leadership targets? Will India avoid cyber or physical attacks that substantially degrade Pakistan's command and control networks? For each of these questions, who exactly must approve various courses of action?

5) **War Plans:** Targeting is just one element in war planning. While research in this area is much less than warranted, it appears that civilians in neither country undertake substantive review of war plans. In the Indian system, civilian input is concentrated in the Union War Book, but this document is essentially a coordinating mechanism to ensure that rail, petrochemical, and other state assets will be available to the Indian military when the war plans require them. There is some anecdotal evidence that the Indian National Security Advisor (NSA) has used his authority to take a more active role in war planning, but such a role is *ad hoc* and evidence of NSA involvement is fragmentary. In the U.S. system, the 1961 Berlin Crisis and the 1962 Cuban Missile Crisis underscored the importance of controlling military minutia, since ostensibly military maneuvers could have profound political implications. This reinforced the instinct of Robert McNamara to further embed civilian oversight into defense planning, not just for acquisition decisions but also war planning.[9] In both New Delhi and Islamabad, the entrenched problems of civil-military relations complicate civilian oversight of war planning. If French premier Georges Clemenceau was correct that "War is too serious a matter to entrust to military men," then that message has not been heeded fully in South Asia.

6) **Command and Control under Stress:** How will either state's command and control system function under stress? In the Cold War, the United States resorted to predelegating authority to military commanders in certain situations because it had no confidence in the robustness of the command and control network in the face of nuclear attack.[10] In the South Asian contexts, the stressors are likely conventional and electronic rather than nuclear, but the always-never dilemmas are still present. If either country's command and control network—engineered no

[9] See Fred Kaplan, *The Wizards of Armageddon* (New York: Simon and Schuster, 1983), Ch. 20.
[10] For an introduction to the problem of predelegation with Cold War examples, see Paul Bracken, "Delegation of Nuclear Command Authority," in *Managing Nuclear Operations*, eds. Ashton Carter, John D. Steinbruner, and Charles A. Zraket (Washington, D.C.: Brookings, 1987), ch. 10.

doubt with redundancies and resiliencies—does substantially collapse during a war, what authority, if any, or physical ability, if any, will strategic force commanders have to launch? What authority, if any, will local commanders have over nuclear weapons in a situation of all-out war? Will Indian or Pakistani decision-makers, compared to their U.S. counterparts, be more willing to accept systems that fail safe, which perhaps in the process encourages counter-control or counter-force attacks?

7) **Graduated Responses:** When the Pakistani military announced the test of the short-range, nuclear-capable Nasr, the press release quoted Lt. Gen. (Ret.) Khalid Kidwai, the director-general of the Strategic Plans Division, as saying that the test was an "important milestone in consolidating Pakistan's strategic deterrence capability *at all levels of the threat spectrum*." Furthermore, he said that in the "*hierarchy of military operations*, the NASR Weapon System now provides Pakistan with [a] short range missile capability in addition to the already available medium and long range ballistic missiles and cruise missiles in its inventory."[11] Conceptualizing any sort of hierarchy of nuclear operations or levels of strategic deterrence threat, rather than envisioning a dichotomous "use/non-use" decision, implies several things. First, it suggests that the Pakistani command and control system might have to operate under nuclear in addition to conventional stressors. Second, it suggests the content of the message to nuclear units is not simply a "go/no-go" for all units, but rather a unit-specific message with distinct targeting options. The most difficult options to attempt to calibrate involve tactical nuclear weapons. India is understandably wedded to public statements that any nuclear first strike would generate massive retaliation.[12] One wonders whether the Indian system gives policymakers multiple nuclear choices to enhance the credibility of deterrence in the face of limited Pakistani (or Chinese) use, or conforms to India's stated position. In any event, the possibility of graduated options along multiple nuclear pathways likely complicates the task of nuclear management in peacetime, crisis, and war in ways that are not easily foreseeable, given extant public knowledge.

8) **Naval Command and Control:** Both countries have expressed interest in pursuing naval legs for future nuclear triads. India's effort has been more visible, with tests of both surface- and submarine-launched ballistic missiles and trials of a nuclear-powered submarine. Pakistan's effort will likely be more cruise missile centered, and it is not yet clear whether surface vessels or submarines might be involved in a naval Pakistani triad. Developing naval legs of the triad, particularly if they are viewed as more survivable than aircraft- or missile-born weapons, is accompanied by unique command and control challenges. Submarine-launched missiles cannot be mated with nuclear warheads underway, meaning that custody must be transferred to the military at some point. This can occur during peacetime, during crisis, or during war. Crisis or wartime transfer of authority creates incentives for an adversary to launch nuclear or conventional strikes prior to the transfer and loading of nuclear weapons. This is by definition

[11] Emphasis added. Inter-Services Public Relations, Joint Staff Headquarters, Pakistan, Press Release No. PR94/2011-ISPR, April 19, 2011, available at http://www.ispr.gov.pk/front/main.asp?o=t-press_release&id=1721.
[12] Press Information Bureau, Government of India, "Cabinet Committee on Security Reviews Progress in Operationalizing India's Nuclear Program," Prime Minister's Office Press Release, January 4, 2003, available at http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html.

> crisis unstable. Concerns about military custody can be mitigated through technological and procedural fixes, most notably PALs. To the extent these PALs cannot be overridden while underway, this places stress on the command and control system to still be able to broadcast authorizing launch codes even after a possible nuclear strike, or this would create incentives for counter-control strikes.[13]

To conclude, both India and Pakistan have significant choices to make. There is no reason to expect the present configuration of nuclear capabilities and doctrinal choices to be more stable than that configuration which existed in May 1998. One hopes that both civilian and military leaders consider the political and military ramifications of all options so that they can make deliberate decisions. Poor outcomes become more likely when technological capabilities are pursued by drift or at scientific or program manager direction only. Capabilities acquired absentmindedly can still be quite threatening to adversaries and can generate countervailing responses. What seems clear from the past decade is that neither India nor Pakistan was content with staying with a "recessed deterrent" posture or a "force-in-being" arsenal. Developments over the next decade do not suggest a natural stopping point for future technological and doctrinal developments. So far, India and Pakistan have been content to walk or jog in their nuclear developments. Perhaps an outright race is next. It is worth remembering the famous "Red Queen's Race" from Alice in Wonderland. It is possible to have a race where both parties must run very fast to stay in the same place.

[13] A good introduction to the problem of vulnerability for naval nuclear forces is Ashton Carter, "Assessing Command System Vulnerability," in *Managing Nuclear Operations*, Carter, Steinbruner, and Zrakat, eds., particularly 574-8.

9 The Next Decade of Nuclear Unlearning: Command, Control, and Management of Pakistan's Nuclear Weapons

Air Cdre (Ret) Ghulam Mujaddid

Introduction

Bernard Brodie described nuclear weapons as the absolute weapon. Given this status, their management and operationalization is a serious business. Pakistan remains a nascent nuclear weapons state and is still learning how to effectively manage, control, and command its nuclear capabilities. The history of the nuclear age informs us that advanced nuclear powers develop their systems through their national culture and historical experience. Organizational learning suggests that learning takes place more easily within an established mindset or image. A mindset is a set of assumptions, methods, or notations held by one or more people that generate a powerful belief to approach challenges in particular ways. The human tendency to perceive in a particular view and stick to it requires the ultimate act of unlearning. This means that one must challenge the assumptions with which all prior understandings were founded on.

Nuclear weapons capability has always developed within the iron-cast molds of the incumbent nation's psycho-social and political milieu. The most important factor that affects the evolution of nuclear command and control (C2) originates from organizational mindsets and internal political dynamics. These two factors have consequences on the formation of norms, structures, and competencies regarding nuclear C2. Concerning Pakistan's internal dynamics and external choices, the military was instrumental in developing Pakistan's strategic culture since the 1950s. This influence is visible in all walks of Pakistan's political and security establishments. It is widely believed that Pakistan's security policy is heavily dominated by the military, especially the Army. The evolution of Pakistani nuclear command and control was heavily affected by this phenomenon.[1]

This chapter advocates that a revolutionary change in Pakistan's existing C2 system is necessary to accomplish effective nuclear learning. It proposes a joint civil-military methodology that results in a balanced and reliable nuclear C2 management system. The chapter assesses the development of nuclear norms and structures birthed during the first decade of nuclear learning, finding that in Pakistan they matured under the dominance of a military controlled government, where the Pakistani Army held sway.[2] As Pakistan's governing structures shift from authoritarianism to democracy, the question of civilian oversight and control of the absolute weapon becomes extremely important for

[1] Major General (retired) Mahmud Ali Durrani, "Pakistan's Strategic Thinking and the Role of Nuclear Weapons, *"Cooperative Monitoring Center Occasional Paper 37* (Sandia National Laboratories, July 2004), 27.

[2] Hasan Askri Rizvi, *Military, State and Society in Pakistan* (London: Macmillan Press Ltd, 2000), xii. This study establishes the Army's dominating role in the state and society of Pakistan. There are other scholarly works that explain the socio-political and organizational interests of the Army. See for example Ayesha Jalal, *State of Martial Rule: the Origins of Pakistan's Political Economy of Defense* (Cambridge: Cambridge University Press, 1990); Ayesha Siddiqa, *Military Inc: Inside Pakistan's Military Economy*, (London: Oxford University Press, 2004); Shuja Nawaz, *Crossed Swords: Pakistan, Its Army, and the War Within* (Oxford: Oxford University Press, 2008).

every nuclear armed country. Thus, going forward, a one service dominated nuclear command and control (C2) system must shift toward a more collective one.

Evolution of Nuclear Command Authority in Pakistan

In October 1999, for the fourth time in Pakistan's history, the military launched a successful coup. Some scholars have described the coup as an "institutional response to what senior commanders perceived as a threat to the professional and corporate interest of the Army."[3] A year later, under Pakistan's new leadership, a new National Command Authority (NCA) was set up. This development was described by one scholar as a "strategic imperative, not only to establish a harmonized command and control mechanism, operational policy, and development strategy, but also to provide credibility to strategic deterrence."[4]

General Pervez Musharraf viewed the NCA as "...the apex body responsible for all policy matters including the development and employment of our strategic assets."[5] The NCA's architecture that developed under his leadership exhibited a mindset of exclusivity for the Army. The NCA was hardly a product of participative and collective wisdom from Pakistan's strategic community, political leadership, and diplomatic corps. And, to this author's knowledge, other military services were not consulted in the basic planning of NCA.[6] According to Shuja Nawaz, "command and control at [the] national level is unworkable and problematic since the army dominates all events and proceeds largely on its own."[7] This situation became more pronounced when Pakistan's military leadership took the reins of presidential power after 1999. Like the country's civilian institutions, the other services also came under the Army's political control. This seems to have led to a somewhat constrained independence of thought among service chiefs, because Air Force and Navy chiefs could no longer contribute their views on an equal footing with the Army chief. Consequently, a balanced and effective nuclear C2 system could not evolve.[8]

Under the new NCA system, the chair of the NCA was the President, Gen. Pervez Musharraf, who also was the Army chief. This system also had three tiers. The first was the Employment Control Committee (ECC) and Development Control Committee (DCC). The second, the Strategic Plans Division (SPD), and the last, the three service's Strategic Forces Commands. The ECC was the main policy and decision making organ of the NCA charged with coordinating political command with its military counterpart. The Foreign Minister was its Deputy Chairman. Other key members of this committee were the Ministers of Defense, Interior, Finance, Chairman Joint Chiefs of Staff Committee (CJCSC), Chief and Vice Chief of Army Staff, Chief of Naval Staff, Chief of Air Staff,

[3] Rizvi, *Military, State and Society in Pakistan*, xii.
[4] Durrani, "Pakistan's Strategic Thinking and the Role of Nuclear Weapons," 49.
[5] Pervez Musharraf, *In the Line of Fire* (New York: Free Press, 2006), 287.
[6] This information is based on author's observation and interaction with senior airmen and sailors during 1998-2000; an already prepared document on SPD/NCA structure was sent to air force and navy.
[7] Nawaz, *Crossed Swords*, 581.
[8] Ibid.

and any other invited members if required. The Director General of SPD was also the Secretary of the ECC.[9]

The Director General of SPD was an Army general and most of the officers in the organization also came from the Army, leaving little representation for Pakistan's other military services and no civilian representation in the secretariat either. All scientific organizations, including the three commissions charged with civil and military responsibilities were also brought under control of the NCA. SPD's mandate covered everything nuclear related including civilian related projects.[10] Over the decade, SPD's structure and responsibilities expanded into a much larger organization encompassing all aspects of nuclear security.

The SPD's Security Division is its largest component in terms of number of personnel—estimated at around eighteen thousand. This division is responsible for the internal and external security of all sensitive nuclear installations, sites, and assets. The service's Strategic Forces Command is the third main NCA organ. The individual services retain technical assistance, training, and administrative control of their nuclear weapon's delivery systems. Nonetheless, the operational control for nuclear weapons remains with the NCA. The Army Strategic Force Command is responsible for ballistic and cruise missiles while the Air Force Strategic Command operates the aircraft capable of delivering nuclear warheads. The Naval Strategic Force Command was formally established on May 19, 2012 and is likely to develop a sea-based nuclear deterrent in the near future, which would guarantee the nation's second strike capability.[11]

The NCA embodies a formal and declared nuclear C2 arrangement. It is the locus of Pakistan's nuclear deterrence in peacetime, crisis, and war. During peacetime, the SPD has successfully endeavored to maintain deterrence stability. During sporadic Indo-Pak crises, it has worked efficiently to signal the nation's resolve and achieve crisis stability. The NCA and SPD have also been important in changing mindsets inside the Pakistani nuclear structure, especially among individuals and facilities that previously operated with minimal oversight.[12] The SPD has developed a nuclear doctrine of sorts. Export control regulations have been augmented and safety and security procedures have been reviewed and strengthened. Overall, the SPD has done well in checking nuclear proliferation and ensuring the safety and security of Pakistan's nuclear weapons and facilities.

After the exit of President Musharraf and resumption of a democratic polity in Pakistan, there have been some promising developments regarding the NCA. On January 28, 2010, the Parliament passed

[9] Peter Lavoy, "Pakistan's Nuclear Posture: Security and Survivability," Paper presented to the Conference on Pakistan's Nuclear Future, Nonproliferation Education Center, Washington, DC, April 28, 2006 12-14, available at http://www.npolicy.org/files/20070121-Lavoy-PakistanNuclearPosture.pdf.
[10] Durrani, "Pakistan's Strategic Thinking and the Role of Nuclear Weapons," 51.
[11] The News, Islamabad, 19 May 2012.
[12] For a scholarly piece on achievements of NCA, see Feroz Hassan Khan, "Political Transitions and Nuclear Management in Pakistan" in *Nuclear Weapons Security Crises: What Does History Teach?* eds. Henry Solkolski and Bruno Tertrias (Carlisle Barracks, PA: Strategic Studies Institute, Army War College, 2013). Also see Feroz Hassan Khan, "Nuclear Security in Pakistan: Separating Myth From Reality," *Arms Control Today* (July/August 2009).

the NCA Act, which hands over the nation's nuclear arsenal to the prime minister. Some analysts suspect that the transfer will not have a significant effect on the practical control of Pakistan's nuclear arsenal and that the act will not lessen the Army's hold over nuclear weapons because "civilians have never controlled Pakistan's nuclear program."[13] Notwithstanding this pessimism, the NCA Act should have positive effects on the normative and practical control of nuclear weapons in Pakistan in the coming years.

Analyzing Pakistan's NCA

Lt. General Khalid Kidwai was appointed the first Director General of SPD in March 1999 and he held this position after his retirement from active duty until December 2013.[14] Additionally, a large contingent of officers has continued in the same place after retirement, some of whom have continued to serve since the inception of the organization. Given the concentration of military generals in the NCA, decisions to employ nuclear weapons are governed by an Army-centric mindset. Elsewhere in the world, decisions to employ nuclear weapons are considered the final domain of civilian politicians in consultation with the military. In Pakistan's case, it seems to be the other way around.[15]

After the Musharraf regime ended, the Pakistani constitution was amended by the newly democratic leadership through the 18th Amendment. This amendment made the Prime Minister as the head of government and the President a ceremonial head of state.[16] Despite the Prime Minister's leadership of the NCA, the military—in this author's opinion—continued to dominate nuclear decision making.[17] According to Michael Krepon, " until this dynamic changed, no matter which civilian sits at the apex of Pakistan's NCA, the decision making power would rest in uniform; the votes behind closed doors on crucial national security issues in Pakistan have always been heavily weighted in favor of the military."[18] In the opinion of one Pakistani journalist, the public commonly believes that the fingers on Pakistan's nuclear weapons are those of Army generals, not the people's representatives.[19] This perception points to some tension in the effectiveness and reliability of command and control systems. Democratic traditions warrant that all nuclear weapon management and use must remain in control of civilian leaders through peace, crisis, and war. Secure C2 systems and infrastructure require nuclear-resistant buildings, with redundancies and secure multi-channel

[13] S.H. Hasan, "Command and Control of Nuclear Weapons in Pakistan," *Swords and Ploughshares* 9, no. 1 (1994), 13.
[14] Lt. Gen. (retired) Khalid Kidwai has been replaced by Lt. Gen. Zubair Hayat. Lt. Gen. Kidwai continues to be advisor to the Pakistan's NCA until the time of this writing.
[15] Many scholars and former officials in knowledge of the working of the system contest this assertion. They claim that the NCA employment decision is by consensus of all civil and military officials – with final approval resting with the highest civilian authority – the prime minister.
[16] The head of state was still supreme commander of the armed forces and chairman of the ruling political party, who appointed the Pakistani prime minister. After the 18th amendment, he absolved himself of a seat in the NCA.
[17] "National Assembly Passes 18th Amendment," Associated Press of Pakistan, April, 20, 2010, available at www.app.com.pk, accessed 16 May, 2012.
[18] Michael Krepon, "Whose Hands is On the Nuclear Button in South Asia?" Stimson Center, December 3, 2009, http://www.stimson.org/spotlight/whose-hand-is-on-the-nuclear-button-in-south-asia/, accessed July 10, 2012.
[19] Amir Mir, "The Real Fingers on Pakistan's Nuclear Trigger," *The News* (Islamabad), November, 16, 2011.

communication arrangements within the NCA and for each nuclear weapon. In the author's view, nuclear C2 for Pakistan is not yet fully developed. Instead, Pakistan has focused on developing its nuclear arsenal.[20]

To date, the NCA and SPD have not promulgated an official nuclear doctrine.[21] A few informal and formal operational and declaratory postures give a patchwork view of Pakistan's nuclear doctrine.[22] The salient thrusts of such a doctrine include Indo-centric minimum nuclear deterrence, a policy of retaining the option of first-use, foolproof safety and security of nuclear arsenals, and a centralized C2 structure—which includes the option of tactical nuclear weapon (TNW) use. In the absence of an officially declared doctrine, strategic stability between India and Pakistan is beset by hazy conceptions of nuclear responsibility and management at the C2 level.

Pakistan's NCA has no joint Strategic Forces Command headed by a dedicated Strategic Forces Commander. Instead, all three services have individual Strategic Forces Commands under NCA authority, which is exercised through SPD. According to this author's research, a dedicated Strategic Forces Command was apparently resisted by the other services when the NCA was founded. Reportedly, the Air Force and Navy feared that a dedicated single command would go to the Army, hence the other two services insisted on having their separate strategic commands.[23]

The most significant weakness of Pakistan's C2 system was exposed on May 2, 2011 when U.S. forces covertly eliminated Osama Bin Laden deep inside Pakistani territory.[24] This incident indicated that Pakistan's airspace, command, control, communications, computers, intelligence, information, surveillance, and reconnaissance (C4I2SR) systems were vulnerable to high-tech, territorial intrusion. A nuclear state should never find itself in such a vulnerable situation.[25] The May 2011 failure underscores Pakistan's troubled learning curve with C2 and its tendency to focus on arsenal maturation over other problem areas. In the coming decade, Pakistani command system must redress the weakness of Pakistani airspace C4I2SR system.

The Army's influential role in managing the country's nuclear forces suggests that delegation of authority to field commanders could be a delicate issue. Though the Pakistani Strategic Plans have repeatedly asserted that nuclear use authority will remain under centralized control under all

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[20] For an excellent analysis of Pakistan's nuclear C2, see Bruno Tertrais, "Pakistan's Nuclear and WMD Programmes: Status, Evolution and Risks" Non-Proliferation Papers, No. 19 (July 2012), 7-8.

[21] For detailed analysis and rationale of Pakistani nuclear doctrine, see companion Chapter 6 by Naeem Salik and Chapter 7 by Sadia Tasleem in this volume.

[22] Francisco Aguilar, Randy Bell, and Natalie Black, "An Introduction to Pakistan's Military," published by Harvard Kennedy School, Belfer Centre for Science and International Affairs (July 2011), 36.

[23] This conclusion is based on the author's personal discussion with a former officer from ACDA (SPD).

[24] For examples, see Baqir Sajjad Syed, "Pakistan military caught in the crossfire," *Dawn*, May 2, 2011, http://dawn.com/2011/05/03/pak-military-caught-in-the-crossfire/ and Amir Wasim and Iftikhar A. Khan, "Military offers itself for accountability," *Dawn*, May 13, 2011, http://dawn.com/2011/05/14/military-offers-itself-for-accountability-2/

[25] Richard Miniter, *Leading from Behind: The Reluctant President and the Advisors Who Decide for Him* (New York: St Martin's Press, 2012) speculates that Pakistan military knew about the raid. See Anwar Iqbal, "Obama administration had tacit consent of Pakistan military, claims book," *Dawn*, August 22, 2012, http://dawn.com/2012/08/23/obama-administration-had-tacit-consent-of-pakistan-military-claims-book.

circumstances, some Pakistani scholars believed that "even corps commanders would be involved in the decision to use nuclear weapons."[26] Geographical proximity and short flight time of delivery vehicles make delegated control dicey in a volatile region like South Asia.[27] There is also the danger that field commanders may make a mistake or panic under stress, increasing the likelihood of nuclear use. Recently developed TNW systems like the *Nasr* have the potential to merge conventional and nuclear conflict. Risks from delegated nuclear control can be mitigated by a clear nuclear use doctrine, well-rehearsed procedures, a balance in nuclear sharing, and a unified strategic nuclear command. Pakistani officials, however, maintain that like all other nuclear weapons, TNWs will also remain under centralized control and not be pre-delegated.

The NCA's DCC has brought the country's strategic organizations under the military's technical, financial, and administrative control. There is a risk that the tremendous civilian technology potential of these organizations in space, communications, metallurgy, nuclear power generation, agriculture, and medical sectors might not be fully actualized under this arrangement. Historically when the military controlled the country, Pakistan's scientific-technological prowess matured because enough autonomy and intellectual independence was provided, which resulted in the production of nuclear weapons and delivery systems. The military's handling of these matters prioritizes nuclear weapons and delivery systems over civilian uses of nuclear technology.

Unlearning in the Next Decade: Submission to Civilian Political Authority

The preceding analysis highlights the organizational mindset that has monopolized national security thinking in Pakistan. Nuclear C2 has evolved from this same mindset that considers submission to civilian authority an anathema. Therefore, the bid to control nuclear weapons is actually a subset of a more general problem of an organizational mindset of distrust. This problem has been showcased in the following editorial from the *Dawn* newspaper, written when the then military ruler promulgated an NCA ordinance in December 2007.

Its promulgation at this stage shows the army's characteristic distrust of the people's representatives. It also shows that Mr. Musharraf, the retired general, is determined to remain in control of strategic policies and will not delegate any power to his prime minister whoever it may be. Not for nothing did Clemenceau say that war was too important a business to be left to the generals. When to start a war and when to call it off is basically the job of the people's representatives, and not of the military, whose perception of war is technical and misses the larger picture that a statesman can grasp. It is not a coincidence that both the wars that Pakistan fought - in 1965 and 1971- took place when a military

[26] For example, see Z. I. Cheema, "Pakistan's Nuclear Use Doctrine and Command and Control" in *Planning the Unthinkable: How New Powers Will Use Nuclear, Biological and Chemical Weapons*, eds. Peter R. Lavoy, Scott. D. Sagan, and James J. Wirtz (Ithaca: Cornell University Press, 2000), 174. However, the Pakistani system evolved over the decade after this assertion was made.

[27] MV Ramana, R Rajaraman, and Z. Mian, "Nuclear Early Warning in South Asia: Problems and Issues," *Economic and Political Weekly*, January 17, 2004.

ruler was at the helm. Even Kargil was basically the generals' brainchild--notwithstanding President Musharraf's claim that "everyone was on board."[28]

There will be little learning unless this mindset changes. Since the establishment of two successive democratic governments in 2008 and 2013, a number of tangible changes in Pakistan's socio-political environment occurred that should influence the Army to change its mindset in favor of civilian authority on security issues. This change stems from the peoples' enhanced awareness of national security issues due to a vibrant media, formation of the Parliamentary Committee on National Security, and passage of the 2010 NCA Act, and the 18th Amendment. Judicial activism is another factor likely to establish the prominence of the constitution and civilian authority in Pakistan. Thus, other services should now be able to assert their role in nuclear C2 more meaningfully under democratic rule.

Announcing Pakistan's Nuclear Doctrine

Pakistan has not formally articulated a nuclear doctrine. In terms of doctrinal debate, the tendency toward over-secrecy, opacity, and ambiguity must be reduced. Nuclear capability should have given confidence to the NCA and SPD to frame an overall plan of objectives, actions, and preferences regarding nuclear use. It is perfectly understandable to have declaratory and operational doctrines classified, but an officially declared nuclear doctrine is an essential criterion for having an effective and transparent C2 system at home and for conveying the nation's resolve and redlines to other countries in the deterrence equation. An official nuclear use doctrine would mitigate the risks of a delegated command. Also, the development and integration of TNW would be more orderly and justified if they were an outcome of the country's declared doctrine. The NCA and SPD should seriously consider announcing a nuclear doctrine for Pakistan in the near future.

Establishing a Dedicated Joint Strategic Forces Command

The Strategic Forces Commands represent the third tier of the NCA. SPD exercises operational control on behalf of NCA, but this operational control is diffused because each service has their own respective Strategic Forces Command. This author believes that this diffuse command system must be replaced with one dedicated Joint Strategic Forces Command. In order to do this, the Army may need to change its tendency to view itself as responsible for the nation's defense. It now needs to learn to integrate with the Air Force and Navy at parity. For example, as Pakistan's Navy develops submarine-based nuclear deterrents and the Air Force consolidates its aerospace capabilities, the Army needs to understand the shifting importance of the other two services. The C2 system, which is presently Army dominated, must shift to accommodate this new reality. One method to do this would be through the creation of a Joint Strategic Forces Command rather than rely on three separate

[28] Editorial, "Finger on N-trigger," *Dawn*, December 15, 2007, http://www.dawn.com/news/1070743/dawn-editorial-december-15-2007. It is important to note that NCA was announced in February 2000. In 2007 it was Presidential National Command Authority Ordinance, which was initiated under the national emergency which lasted from November 3, 2007 until December 15, 2007. All ordinances passed at the time are now legislated under the 18th amendment to the constitution.

service Strategic Forces Commands. This command could be headed by a Navy or Air Force commander, as is the case in many other countries.

Reorganizing Strategic Organizations

Pakistan's nuclear technology must not be limited to solely nuclear weapons and delivery systems as mentioned earlier because there is a significant component to Pakistan's nuclear program. One reason why the military has taken over all responsibilities of control is purportedly to control and prevent the reoccurrence of activities such as those executed by A.Q. Khan. This author believes that this unfortunate incident should not become an excuse for military dominance over all of Pakistan's nuclear programs, military, and civilian. The NCA is revamped, so therefore the strategic organizations, such as SPD, must reorganize themselves. The Pakistan Atomic Energy Commission (PAEC) and Pakistan Nuclear Regulatory Authority (PNRA) should be strengthened to regulate Pakistan's civilian nuclear technology. As is well known, the primary purpose of PAEC is the peaceful development of nuclear technology as well as the development of reactor and fuel cycle technology. The Space and Upper Atmosphere Research Commission (SUPARCO) is responsible for the nation's public and civil space program and related research. Pakistan has a real and under noticed civilian nuclear capability; it should be promoted by making civilian organizations more autonomous.

Building Satellite and Robust Communications Capability

Presently, Pakistan focuses more on nuclear weapons production and the use of traditional early warning methods. However, more attention must also be paid to space-based communication assets. SUPARCO has suffered from financial trouble and neglect. Revitalization, restructuring, reorientation, and modernization of SUPARCO are critical issues. Pakistan will need to catch up with the world's space leaders and make up for lost time. At present, Pakistan controls only two satellites—the Badr-1 digital communication satellite and the PAKSAT-1 telecommunication one. These capabilities are too feeble to ensure robust communications for Pakistan's nuclear C2. The NCA should build adequate space-based satellite reconnaissance and communication capabilities in near future in order to adapt to an environment where its current C2 assets remain vulnerable.

Building Real-Time Surveillance Capability

The May 2, 2011 incident has likely generated psychological dissonance between behavioral patterns and actual reality. It is likely that the positive lessons learned from this incident will be integrated into the building of a real-time surveillance capability. The Pakistani Air Force's strategic tasks of space operations, unmanned aerial vehicle (UAV) development, missile defense, C4ISR, strategic strike, and strategic deterrence should be encouraged. In particular, the Air Force's surveillance, detection, and air defense capability should be built up significantly in the near future.

Build Strategic Community, Involve Universities and Think Tanks

The military alone does not have exclusive intellectual control over strategic and security issues. Others should be involved. Pakistan's strategic community, comprising diplomats, academics, international law experts, journalists, civil society activists, and scientists should be considered as equally patriotic and knowledgeable on nuclear issues. The universities, especially those with departments of strategic, defense, diplomatic and security studies, can be integrated so as to enable research and academic inputs on nuclear issues. The role of independent think tanks is crucial to nuclear learning, debates over nuclear issues, and building awareness on these issues. The Pakistan Academy of Sciences, Nuclear Society, and Atomic Scientists Society could also contribute to issues of nuclear learning in Pakistan.

Conclusion

This paper illustrated the problems of organizational mindsets that enforce exclusivity because they inhibit the creation of effective, balanced, and reliable nuclear C2 structures. The genesis of the NCA and the circumstances in which it was established highlights the Army's preeminence. Various features of Pakistan's nuclear C2 resulted from this mindset. However, there are compelling changes in the overall Pakistani environment that should present enough psychological dissonance for the Army to unlearn and adjust its mindset to accept civilian authority and do more nuclear sharing with other services and society at large. It is important to note that organizational theory is applicable to all militaries around the world. But in countries like the United States, the United Kingdom, or India, the civilian political authority acts effectively to mediate and reconcile the organizational interests of their militaries. In Pakistan, this political mediation and reconciliation is weak; although, things have changed for the better.

10 Nuclear Arms Control and CBMs: Prospects and Challenges

Manpreet Sethi

Over the last 15 years, India and Pakistan have engaged in operationalizing their respective strategies of 'credible minimum deterrence.' Thus, they focused on building stockpiles of nuclear warheads and testing and inducting delivery systems of varying ranges. The two countries are believed to have accumulated a roughly equal number of nuclear warheads—though Pakistan's stockpile is believed to contain a couple dozen more than India's. Regarding nuclear delivery systems, while Pakistan has tested missiles ranging from 60 km to 2,500 km, India has done the same for 150 km to 5,000 km. These vectors, however, are at different stages of operationalization. A look at the pattern of testing reveals that Pakistan focuses on either very short range (*Nasr* and *Abdali*) or long range missiles of over 2,000 km. In India, the spotlight currently appears set on IRBMs (*Agni* IV and V).

In this process of capability enhancement, little if any thought has been given to nuclear arms control (NAC), which would include explicit unilateral or negotiated measures designed to regulate some aspect of capability or potential capability.[1] In fact, the India-Pakistan relationship suffered from a huge trust deficit from 1999 - 2009. Soon after the nuclear tests in 1998, both governments crafted a number of very forward looking confidence building measures (CBMs) as part of their February 1999 bilateral memorandum of understanding (MoU) signed in Lahore. Most of the CBMs, however, were never implemented. Within three months of the MoU agreement India found that Pakistan mounted a covert operation across the line of control (LoC) in Kargil. In the summer a mini-war broke out between the two countries in which scores of Indian soldiers lost their lives. The biggest casualty of the crisis was the trust built up earlier in Lahore. A trust deficit has always dominated relations between India and Pakistan, especially after the repeated acts of terrorism planned in and supported by Pakistan—the latest being in Mumbai in November 2008.

India's problems thus are that it must face China, which is modernizing its military forces and compels parallel Indian modernization. Yet, on the other hand India must contend with an asymmetric strategy emanating from Pakistan. A further perceived danger is the possibility, however remote, of a two-front war enabled by Sino-Pak cooperation. Under these circumstances constructing an arms control regime is a huge challenge for India.

Given this background of mistrust and parallel military modernization programs, it is hardly surprising that Pakistan and India have not placed serious thought on NAC. In fact, the first reaction to suggestions of NAC amongst many in Delhi's strategic circles, and possibly Islamabad's, is to question whether their country has enough nuclear weapons or capabilities. The general belief is that building credible deterrence remains a work in progress. Hence arms control is viewed as premature.

[1] The regulations or restrictions may apply to the location, amount, readiness, use or types of weapons.

A second reaction that dismisses NAC is the lack of conducive political conditions. Of course, the dilemma over whether the right political atmosphere exists to foster arms control or whether arms control can create cordial conditions has never been resolved conclusively—not even during the Cold War. Several analysts concluded that efforts toward arms control during the 1970s and mid-1980s never made much progress because of the "depth of disagreement between East and West. There were constant antagonisms between NATO and the Soviet Union, with frequent allegations of violations of the existing CBMs that hindered and detracted from relations between the two blocs.[2] The situation changed only in April 1986 with new initiatives from Soviet President Mikhail Gorbachev. These initiatives radically altered the political atmosphere and opened the way for nuclear and conventional arms control. If the above is true, how can the countries of South Asia be expected to engage in NAC and CBMs with such strained political relations?

This article argues that nuclear learning in South Asia has been affected by the absence of any progress in arms control and suggests that irrespective of the state of political relations between India, Pakistan, and China, the time for creation of NAC and CBMS architecture has arrived. The deeper the political mistrust, the greater the need for NAC in order to minimize, if not obviate, chances of miscalculation or accidental escalation. As Hedley Bull pointed out in the 1960s, the United States and Soviet Union being locked in a political and ideological conflict "did not mean that they could not recognize common interests in avoiding a ruinous nuclear war, or cooperate to advance these common interests."[3]

Given that nuclear weapons are here to stay until universal nuclear disarmament can occur, and given that existential risks of their inadvertent use and concerns over nuclear security accompany nuclear weapons, it is only prudent that countries try to identify and accept measures that can help alleviate these concerns to the extent possible. This is even more necessary as countries move towards acquisition of a mix of offensive and defensive capabilities, where every act of one side evokes a response from the other. Consequently, as arsenals grow, capabilities increase, and infrastructure expands, so will the risks of events triggered by improper leadership judgment and involuntarily offence-defense spirals. NAC can provide one way of stabilizing deterrence by redressing crisis instability caused by pre-emptive pressure and arms race instability.

This paper examines the need, rationale, and mechanics of NAC. It is broadly divided into three sections. The first examines the purpose and prerequisites of NAC in a general manner derived from Cold War experiences of the superpowers. The second applies these generic conclusions to the specific context of the India-Pakistan nuclear relationship. This section establishes the unquestionable relevance of NAC and examines the significant challenges standing in its way, which has stymied positive nuclear learning. Finally, the paper concludes with some suggestions on possible future nuclear CBMs and arms control measures, which will augment the learning curve for the region.

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[2] For details see Kevin Wright, *Arms Control and Security: The Changing Role of Conventional Arms Control in Europe* (Aldershot: Ashgate, 2000), 23-50.

[3] Hedley Bull, *The Control of the Arms Race: Disarmament and Arms Control in the Missile Age* (New York: Praeger Publishers, 1961), 4.

Purpose and Prerequisites of Nuclear Arms Control

Countries build nuclear weapons to deter against an adversary's nuclear weapons through the threat of retaliation. However, deterrence stability is prone to two problems – probabilities of nuclear use and prospects of nuclear arms race. The first problem derives from a doctrine of deliberately use and the risk of an inadvertent use through miscalculation or misperception. The second problem arises from a desire to stay ahead of an adversary's offensive or defensive nuclear capability, which eventually leads to an unstable arms race.

NAC can be an effective tool to address these two problems because it enables mutually agreed measures to alleviate mutually perceived risks. NAC can range from efforts at increasing transparency such as through an exchange of doctrines, to more specific elimination of classes of weapons or their uses, or even a regulation of certain military activities or deployments. The basic objective is to enhance the understanding of each other's nuclear doctrines and capabilities, reduce the aspects of unpredictability, and help avoid nuclear war. In fact, the very process of arms control negotiations creates better communication and understanding, reduces hostilities, and helps improve political relationships. For successful implementation of NAC, certain pre-conditions are necessary. One of the most important is a shared interest between negotiating nations on the need to avoid deterrence breakdowns and recognize that nuclear war brings no benefits. In the absence of a shared mutuality of interest, NAC is certain to flounder.

A second prerequisite is the acceptance of NAC as a worthy objective by national leaderships. In a democracy, this would imply a broad consensus between the major political parties to acknowledge NAC as a matter of the highest national interest and accord it requisite priority. This acceptance is critical if negotiations are to steer clear of party politics. At the same time, political consensus is also essential to imbue the arms control process with a certain confidence that outlasts changes in government. In a more military-dominated system, acceptance of the logic and rationale for arms control as a worthwhile pursuit is equally important. By their very nature militaries are reluctant to limit their fighting capabilities. Therefore, forging consensus within diverse political parties as well as convincing national military leadership to accept the centrality of arms control is an uphill task. Unless all stake-holders consider it worthwhile, NAC can quickly degenerate into a futile exercise.

Thirdly, having accepted NAC as a national objective, the nation must exhibit a readiness to invest in negotiations and decision-making. NAC is negotiated in relationships that are difficult and even hostile, which is certain to make the exercise a complex, drawn-out process. Hence, the state must commit time and manpower to maneuver through political negotiations and technical issues. The following paragraphs apply these lessons to the context of India-Pakistan nuclear relations. As will become evident, the need for NAC between these two countries is unquestionable. The risks that afflict this relationship demand the highest level of priority in their mitigation, but the challenges are numerous and difficult.

Challenges to Indo – Pak NAC

India and Pakistan share a six-decade-long history of confrontation. Territorial disputes remain unresolved and without a clear-cut demarcation of the international boundary, border skirmishes occur frequently across the line of control. The danger of these escalating to a larger conflict always exists. In fact, chances of conflict are exacerbated and the prospects of arms control are dampened if there is a pervasive belief that states are complicit in the use of terrorism as an instrument of state policy. Continuation of such acts has the potential of breaching India's tolerance threshold, which would lead to a viscous circle of escalation. India's concept of 'limited war' or the calibrated use of military force is amongst the several options that India might be forced to choose as result of India's persistent hypothesis of Pakistan's complicity.[4] But the presence of nuclear weapons obviously makes the military option a risky game.

The challenges to South Asian NAC appear enormous and can be divided into two categories: general and nuclear specific. Amongst the general problems, the most obvious is the deep rooted mistrust that has existed between the two countries since partition. The wars in 1947, 1965, 1971, the Kargil conflict in 1999, and major terrorist incidents in 2001 and 2008—in addition to the myriad smaller ones—have only aggravated this mistrust.

Meanwhile, there is a long history of failed CBMs. Yet, both countries are not new to the concept of confidence building. They negotiated at least two significant documents in the last 65 years. The first was the Simla agreement in 1972, which established the "commitment to peaceful coexistence, respect for each other's territorial integrity and sovereignty and non- interference." Both sides also agreed to "refrain from [the] threat or use of force," to respect the LoC and not to "unilaterally alter the situation."[5]

In 1999, more specific nuclear CBMs were concluded as part of the Lahore MoU but have ultimately not been executed. Among others, these included agreements to exchange information on nuclear doctrines and security concepts, provide advance notification of ballistic missile flight tests, provide prompt notification of nuclear accidents or unauthorized or unexplained incidents, engage in bilateral consultations on security, disarmament and non-proliferation, and establish communication hotlines to avert crisis situations. The only Indo-Pak agreement not yet violated is the 1988 agreement prohibiting attacks on each other's nuclear facilities. Every year on January 1 both sides exchange a list of their nuclear installations. The overall atmosphere, however, is still one of low trust and confidence.

Yet another challenge to NAC arises from divergent threat perceptions. Pakistan has often expressed concern with India's size and the Pakistani military harbors a sense of injustice regarding the

[4] In India, there is widespread belief that a Pakistan's Inter-Service Intelligence (ISI) has facilitated acts of terrorism. In some worse-case threat perceptions, it is feared that Pakistan may either be incapable of controlling extremist forces within its territory or may even use these forces for deliberate nuclear terrorism against India. Thus, India's responses stem from such a pervasive belief.

[5] Government of India Ministry of External Affairs, "Simla Agreement July 2, 1972," http://mea.gov.in/in-focus-article.htm?19005/Simla+Agreement+July+2+1972.

allocation of resources and military assets at partition. Put simply, Pakistan resents India for having forced it to "start its independent career as a weak nation."[6] Hence, for the last six decades Islamabad has looked for ways to equalize its perceived power asymmetry with India. Over the years Pakistan even used this sentiment to keep the threat of India alive as the socio-economic, technological, and political trajectories of the nation veered in opposite directions. This tendency distracts Pakistan's population from the dismal state of affairs within their country. Today, this dynamic not only seriously damages Pakistan's own progress and economic growth but also dims the prospects for bilateral arms control.

In the nuclear-specific domain, challenges to NAC are linked with five asymmetries. The first is an asymmetry in the role of nuclear weapons. Indian nuclear doctrine defines a narrow role for nuclear deterrence, where weapons are meant to safeguard the country against nuclear coercion and blackmail but not seen as useful for other purposes. On the other hand, India believes Pakistan's weapons are less for deterrence and more meant to provide immunity so the country can pursue other modes of conflict including covert aggression through sub-conventional means. Deterring Indian use of nuclear weapons is actually the least important function of Pakistan's weapons, which are meant more as a shield against conventional attack. Therefore, nuclear weapons provide Pakistan with immunity to indulge in aggressive military strategies that harbor political ambitions.

A second asymmetry exists amongst Indian and Pakistani nuclear doctrines. India's written doctrine opts for a retaliation-only policy. Deterrence in this case is premised on the threat of assured retaliation causing unacceptable damage and enables India to adopt a more relaxed force posture. By placing the onus of escalation on the adversary while retaining the initiative of punitive nuclear retaliation, India abjures nuclear brinkmanship and even releases the adversary from pressures to use its nuclear forces quickly lest they be lost due to pre-emption. In contrast, India believes Pakistan professes a first use doctrine. Pakistan is focused on developing tactical nuclear missiles as a "quick reaction weapon."[7] In order for Pakistan's weapons to provide any advantage they must be used first; however, a decapitating or disarming first strike is made virtually impossible as each side has a credible second-strike capability. Nonetheless, Pakistan's doctrinal perception pressures it to acquire more warheads and establish a more delegated C2 structure that can incorporate battlefield nuclear weapons. This doctrinal asymmetry carries the risk of pushing both countries into crisis and arms race instability.

Thirdly, there is an asymmetry in the desire for strategic stability. This is a huge challenge since a common desire for stability is an essential pre-requisite for NAC. Yet, Pakistan perceives greater utility in keeping its nuclear relationship with India unstable. As put by one analyst, Pakistan "is not searching for nuclear stability but for managed instability. The purpose of this instability is to keep India off balance, to resist agreement, to underpin uncertainty, and to generate ambiguity."[8] Besides targeting India, instability is meant equally to magnify fears within the international community by

[6] Pervaiz Iqbal Cheema, *The Armed Forces of Pakistan* (New York, NYU Press, 2003), 34.
[7] This is how the press statement issued by Pakistan Inter Services Public Relations Directorate described the Nasr missile after its maiden test on April 19, 2011.
[8] Shaun Gregory, "Pak Toxic Chaos Plan Changes Nuke Debate," *Times of India*, March 6, 2011.

suggesting the possibility of a nuclear exchange. The Pakistani Army presumes that a concerned international community (especially the United States) would restrain India from using military force. Evidently, Pakistan's confidence in managing instability is far greater than India's.

A fourth asymmetry lies in the objective sought from arms control by the two countries. While India seeks strategic stability by addressing weapons or capabilities that exacerbate first strike fears and crisis instability, Pakistan perceives a greater threat from India's conventional superiority and is keener to link conventional arms control to NAC. Islamabad has always argued that since India's conventional capability is superior to that of Pakistan, it has no option but to increase its reliance on nuclear weapons to deter India. In such a situation, it seeks parallel conventional arms control. However, a new twist has been added since India's threat perception of China impinges on its calculation of required conventional capability. Moreover, the Sino-Pak strategic nexus adds to India's security concerns. In fact, the complex state of the political relationship between China, India, and Pakistan produces a tough case for creating a tripartite arms control agreement. Constructing NAC that simultaneously addresses threats at all levels of conflict—sub-conventional, conventional, and nuclear—has never before been attempted.

Lastly, there is an asymmetry in the decision-making authorities of India and Pakistan. In India, the democratic political establishment controls all foreign policy. India's military is only asked to provide inputs where necessary and execute tasking. In Pakistan, on the contrary, all decisions related to nuclear policymaking and especially those related to India are taken by the military.

Suggestions for NAC and CBMs in South Asia

The current state of nuclear affairs in South Asia leaves much to be desired. In fact, the challenges enumerated on earlier can only be surmounted if the relevant participants share an equal sense of the dangers presented by nuclear weapons and urgency of lengthening the fuse of any crisis. It is with the hope that such a day will dawn, sooner rather than later, that some suggestions are offered below. These range from reciprocal measures aimed at enhancing confidence by facilitating conceptual clarity, to more specific suggestions on weapon systems. Each recommendation would be useful for addressing either first strike instability, arms race instability, or both.

Clarity on Nuclear Doctrines and Force Structures

While India formulated a written nuclear doctrine and put it in the public domain in 1999, Pakistan never reciprocated. Greater transparency in nuclear doctrines and force structures can be useful for achieving arms race stability. Confidence in understanding the nature and direction of the other side's forces provides a certain amount of transparency and predictability. Thus, it alleviates concerns of arms racing. For instance, the character of India's nuclear forces, per its doctrine, is "effective, enduring, diverse, flexible, and responsive." Such a clear statement provides notice on the capabilities and aims to remove ambiguity. It announces that India focuses on operationalizing its delivery capabilities via mobile long range missiles, including SLBMs, and the establishment of a robust command and control system. As countries improve their space surveillance technology, a certain transparency of the force structure is inevitable. But a negotiated approach is useful to

understand the future trajectories of development plans so that both sides need not hedge against presumed adversary capabilities.

Transparency in Survivability Measures

A secure second-strike capability forms the bedrock of stable deterrence. Hence, development of, and transparency regarding, survivable capabilities, can alleviate pressures for preemption. This improves crisis stability by credibly promising assured retaliation. The construction of missile silos, operationalization of sea based deterrence, and increased C2 robustness for also do so. Countries moving in the direction of these developments and maintaining a certain transparency about them foster strategic stability and lower the chances of deterrence breakdown.

Formalizing Low-Alert Statuses

Washington and Moscow's NAC agenda includes measures that lower the alert levels of their nuclear arsenals. Since both countries maintain a significant part of their force on hair-trigger alert, de-alerting and de-mating warheads increases crisis stability. Fortunately, China, India, and Pakistan's arsenals are already in such a state. However, an agreement that formalizes the low-alert status of each country's arsenal could be a further step towards stability. If verification could be part of the agreement, it would also be a huge confidence booster. Yet, the political and logistical feasibility of such an agreement poses significant hurdles.

Exchange of Information on Nuclear Safety and Security

Given that the threat of nuclear terrorism looms large over the region, South Asia's nuclear states have an opportunity to enhance confidence by exchanging information on their practices and procedures for maintaining nuclear safety and security. Adherence to the many international conventions in these areas as well as a joint regional center focused on the threat is a possibility worth exploring. This center could distribute region wide information on safety and security best practices.

Joint Study on Effects of Nuclear Explosions

No significant attention has been paid to the likely effects of a nuclear weapons exchange in any of the three countries identified above. Given the regions' high population density and the fact that modern mega cities use material that could maximize the thermal and blast effects of a nuclear explosion, it may be useful to conduct a joint study to assess the damage that nuclear arsenals would inflict on population centers. Such a study could be an effective method of calculating the cost-benefit aspects of nuclear war. This would enhance deterrence by making China, India, and Pakistan understand and appreciate the likely extent of damage if nuclear weapons were used.

Limits on BMD

Defense and deterrence have long been thought mutually exclusive. The ability to defend against another's nuclear strike is believed to lessen its sense of vulnerability, tempt it toward nuclear pre-

emption, and thereby degrade the other's deterrence. Consequently, during the Cold War years, the United States and Soviet Union agreed to keep each other mutually vulnerable by severely restricting their deployment of anti-ballistic missile (ABM). For instance, the ABM treaty of 1972 mandated that both sides defend no more than one site each with no more than 100 interceptors.

Turning to South Asia, one sees that BMD is beginning to make its presence felt. Given Pakistani doctrine and the danger of inadvertent use, India perceives BMD as an insurance measure to reduce damage should the worst happen. At the same time, China's ABM capability is deployed with America's nuclear arsenal in mind. This development obviously casts a shadow over Indian doctrine and makes Indian BMD a sort of necessary evil. In Islamabad, however, the Indian step has been perceived as destabilizing: it degrades Pakistan's nuclear deterrence posture and fears arise that BMD enables India to engage in limited nuclear war. Pakistan's obvious response has been to increase the number and sophistication of its missiles so as to saturate Indian BMD. In turn, Pakistan's actions raise Indian threat perceptions, especially given the reality of the Sino-Pak strategic nexus. This three way nuclear relationship and the induction of BMD complicates the situation.

Despite BMDs complicating effects, NAC can still be attempted. At one level with China, an ABM treaty that allows BMD over a fixed number of mutually agreed upon sites should be explored. Given that both countries have similar nuclear doctrines premised on no-first use and deterrence by punishment, BMD should logically be used for retaliatory capabilities—including command and control structures. Such an agreement would not only stabilize deterrence but also help alleviate arms race instability. If BMD can be mutually deployed to improve the survivability of retaliatory assets and nuclear command authorities, an agreement could increase deterrence stability by ruling out the possibility of a disarming first strike. At the same time, all sides would evade the defense-offense spiral. With Pakistan, NAC in an environment where BMD exists could occur through the fostering of better understanding and clarity on nuclear doctrine. For instance, it is important for India to explain that an NFU doctrine with BMD in no way increases the chance of pre-emption. Also, an India-China agreement on the subject could go a fair distance in psychologically alleviating Pakistani concerns on the matter.

Controls on MIRVed Missiles

China is believed to have MIRV technology but it is unclear whether Beijing has deployed it. Meanwhile, India is certainly moving toward MIRVs and it is only a matter of time until Pakistan also develops or acquires MIRV missiles. Once China, India, and Pakistan deploy MIRVs, strategic stability will suffer because this capability produces a temptation for pre-emption. With their greater accuracy, multiple warheads become essentially first strike weapons. For the attacking state, a MIRV provides the promise of being able to carry out a disarming counter-force strike. Meanwhile, missiles with many warheads also become attractive targets for the adversary too, creating an urge to strike MIRV missiles before they are launched. Therefore, the use or lose dilemma is heightened. Moreover, in a crisis, the states with MIRV technology might be tempted to strike first in hopes of gaining a war-winning advantage.

An agreement whereby all sides agree not to develop MIRV missiles would contribute to fostering crisis stability. Single warhead missiles present much less tempting targets: a pre-emption strategy would require more warheads be expended than could be destroyed. It would be far more worthwhile for India, China, and Pakistan to arrive at a mutual understanding on this technology rather than follow the dangerous path taken by Washington and Moscow. The three South Asian powers would only arrive at the realization that the United States echoed in its latest Nuclear Posture Review, which mandates the de-MIRVing of its missiles as a step towards strategic stability.

The case for mutual agreement on MIRV missiles may appear unfeasible because countries with 'minimum deterrence' doctrines might find it more useful to have smaller numbers of MIRV missiles. But some strategic stability must be established. In this case, it may be worthwhile to link MIRV capabilities with NFU. Doing so will rule out pre-emption since it reduces risks generated by the existence of MIRV arsenals and functions as effective NAC.

Conclusion

NCA and CBMs cannot eliminate political conflicts. Nor are they a solution to outstanding security issues. However, they can work to avoid the exacerbation of political conflicts by enhancing predictability, transparency, and constraint. Nuclear learning in South Asia will improve if both sides develop an understanding or mutually agreed upon proscription or limitation on acquisition, deployment, or use of some weapon systems. For successful NAC, the basis of certain principles and constraining some capabilities will not only reduce the chance of accident but also limit the damage and assure stability. The most important of these is the equity of benefits so that neither side is left nursing a sense of loss. During negotiations, there has to be a flexible approach that allows reciprocal concessions to be made and accepted. Rigid positions that allow no room for maneuverability are bound to fail. Domestic acceptability of the agreements also must be ensured through the construction of political legitimacy. This requires engaging with different stakeholders such as political parties, the armed forces, defense industries, etc. Above all, any such attempts will require vast amounts of patience and perseverance. The entire process is likely to come up against attitudinal and political hurdles and will require deft, determined navigation. NAC must be premised on the absolute belief that arriving at an agreement is in the best interest of the nations—individually and collectively.

11 The Introduction of Ballistic Missile Defense in South Asia: Implications on Strategic Stability

Zafar Nawaz Jaspal

New Delhi is robustly engaged in both modernization and enlargement of its military arsenal which is amassing a large quantity of conventional and nuclear weapons. Since 2007, Indian scientists have confidently claimed that they would be able to build up a deployable Ballistic Missile Defense (BMD) to defend India's major cities.[1] On June 24, 2012, leading Indian newspapers reported that "Delhi and Mumbai, the two most vital metros of India, have been chosen for DRDO's Ballistic Missile Defense system that can be put in place at short notice."[2] Indeed, the Indian scientific bureaucracy's loud declarations can create strong political and public support within India for deploying BMD to protect against long-range missile threats from Pakistan. The deployment of BMD may provide a sense of security to the Indians, but it also contains ingredients that could magnify South Asia's security dilemma puzzle. In South Asia, both parties have been slow to learn the lessons of history. During the Cold War, with the evolution of the Anti-Ballistic Missile Treaty and subsequent arms control agreements, both superpowers eventually came to understand the benefits of mutual vulnerability. In South Asia, India's pursuit of BMD undercuts the logic of mutually assured destruction.

The assessment that a BMD protective shield would be able to prevent Indian cities from strategic missiles strikes is debatable. Bernard Loo opined that "Strategic stability is understood as a condition where policy makers do not feel pressured into making reactive changes from existing non-violent to violent strategies involving the large-scale use of military force in the pursuit of particular state interests."[3] Admittedly, BMD is a defensive weapon, and in theory, it may not affect Pakistan's force posture. Practically, however, the introduction of BMD into India's arsenal could negatively affect Pakistan's deterrence strategy.

New Delhi's consistency in institutionalizing a sophisticated BMD shield is an important indicator that it is determined to reverse the prevailing strategic equilibrium after the 1998 tests. BMD could be an attempt to minimize India's vulnerability to Pakistani missile strikes. The minimization of

[1] "Missile defense shield to be ready in three years: India," *The Dawn*, December 13, 2007; "India's AAD-O2 performs first endo-atmospheric kill," *Missiles & Rockets* 12, no. 2 (February 2008): 1.
[2] "Delhi, Mumbai selected for ballistic missile defense shield," *The Times of India*, June 12, 2012. http://articles.timesofindia.indiatimes.com/2012-06-24/india/32392757_1_bmd-missile-system-enemy-missiles, accessed on August 4, 2012. The DRDO chief V K Saraswat told PTI in an interview on May 6, 2012: "The Ballistic Missile Defense (BMD) shield is now mature. We are ready to put phase one in place and it can be put in very short time." "India's missile defense shield ready: Defense Research and Development Organization," *NDTV*, May 6, 2012. http://www.ndtv.com/article/india/india-s-missile-defence-shield-ready-defence-research-and-development-organisation-206946, accessed on August 4, 2012; Jawed Naqvi, "Indian missile defense shield ready," *The Dawn*, May 7, 2012.
[3] Bernard Loo, "Geography and Strategic Stability," *The Journal of Strategic Studies* 26, no. 1 (March 2003): 156.

India's vulnerability might decrease regional strategic stability, which relies on nuclear deterrence. The conceptual basis for this deterrence is the existence of Mutual Assured Destruction (MAD).[4]

Islamabad has occasionally signaled the credibility of its minimum nuclear deterrence posture with successful flight-tests of its new generations of offensive missiles. Islamabad fears that the effectiveness of these signals may be compromised after an Indian BMD deployment. Arguably, BMD would not provide a complete protective shield—though it might prove capable of defeating most warheads that Pakistan could launch in a retaliatory strike. Can the introduction of BMD be a destabilizing initiative to the prevalent strategic stability between South Asia's belligerent neighbors? Either way India's acquisition of BMD would significantly influence Pakistani calculations of its strategic offensive needs.

The introduction of BMD would intensify the arms race between India and Pakistan. In the worst case, India may miscalculate the impact of Pakistan's retaliatory missile strikes. The deployment of Indian BMD could facilitate the launch of Indian conventional military operations, such as through Cold Start. This logic would also incentivize India's military-industrial complex. Some security experts believe Cold Start is inherently destabilizing. For instance, Thomas W. Graham pointed out that "given India's Cold Start conventional military doctrine and modernization, the world could face another nuclear crisis in South Asia at any time. Such a crisis could be started by a terrorist group that has limited means and capabilities and no proclivity to foster stability among nuclear-armed states."[5] This chapter, however, does not examine Cold Start's implications for regional security. The central argument of this paper is that BMD compliments Indian Cold Start or proactive operations, which is a serious concern for Pakistani strategists.

Generally, the advent of new generations of weapon systems amplifies the security dilemma amongst strategic peers. In South Asia, this dilemma intensifies an ongoing arms race. Does India's BMD capability seriously challenge Pakistan's strategic deterrence? The simplest answer is that if India arms itself with BMD, Pakistan might increase its missile inventory. Should Pakistan choose to ignore the BMD threat, it could run the risk of strategic exploitation. Thus, Pakistani military planners now face a stark choice between business as usual whereby they continue with Pakistan's present nuclear posture, or they undertake a concerted effort to deal with the implications of a new threat.

This chapter explains how the advent of BMD, in conjunction with other technological advancements, has affected the nuclear learning curvature and has contributed to dampening the prospects of arms control and strategic restraint measures in South Asia. I will investigate the relationship between India's maturing BMD capability and Pakistani military planners' response and its impact on regional strategic stability through the logic of nuclear learning. This chapter is structured into three sections. The first investigates India's BMD capability. The second predicts plausible Pakistani countermeasures and the final section provides conclusions with some

[4] Zhong Jing, Pan Zhenqiang, "Redefining strategic stability in a changing world: a Chinese view," *Contemporary Security Policy* 25, no.1 (April 2004): 124.
[5] Thomas W. Graham, "Nuclear Weapons Stability or Anarchy in the 21st Century: China, India, and Pakistan," in *The Next Arms Race,* ed. Henry D. Sokolski (Carlisle, PA: Strategic Studies Institute, July 2012), 272-73.

suggestions for potential arms control that will enhance the nuclear learning experience of South Asia.

India's Ballistic Missile Defense

Since 1983, efforts to solidify India's defensive capacity had the potential to upset the offense-defense balance. The Integrated Guided Missile Development Program, inaugurated in 1983, included offensive missiles as well as defensive missiles in its planning—specifically, the *Akash* surface-to-air missile, which had a Theater Missile Defense (TMD) capability.[6] In the following decades, New Delhi stepped up development of the *Akash*[7] and identified and developed different categories of BMD systems. So why has this occurred? There are multiple drivers, but, since the 1980s these drivers changed at the conceptual and operational level.

Today, the primary driver for Indian BMD is the ambition of its nuclear and defense scientists to prove they can produce world class, highly sophisticated weapons. These scientists wield "a major influence on government decision-making."[8] The next driver originates from the ambitions of India's ruling elite who endeavor to achieve great power status for their country. They are convinced that without maximizing hard power, i.e. military power, India will not become a great power in the 21st century. Accordingly, India has modernized its military muscle, with BMD being one among many capabilities that elites employ to enhance India's status. Ashley J. Tellis indicates that BMD cooperation with the United States fits within India's objective of acquiring technology and advanced systems to further its military objectives.[9] Tellingly, the Vajpayee and Singh governments supported DRDO's BMD research.

Since 2000, New Delhi vigorously cultivated strategic cooperation with Washington. To cement a strategic partnership with the United States and acquire sophisticated BMD technology, New Delhi altered its traditional stance on global disarmament. For instance, India endorsed President Bush's BMD project in May 2001—even before Bush's closest strategic allies backed him. India also remained silent over the abrogation of the Anti-Ballistic Missile Treaty in June 2002.[10] Though Indian experts and political elites claim they have developed military hardware indigenously, it is an open secret that India's missile programs were assisted by numerous foreign suppliers. The leading states were Israel, Russia, and the United States, although, in recent years, Israel emerged as a prime source for sophisticated military supplies.

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[6] Rajesh Basrur "Missile Defense and South Asia: An Indian Perspective," in *The Impact of US Ballistic Missile Defenses in Southern Asia*, eds. Michael Krepon and Chris Gagne, Report No. 46 (Washington D.C.: The Henry L, Stimson Center, July 2002), http://www.stimson.org/images/uploads/research-pdfs/SABMDBasrur.pdf, accessed on July 31, 2012.

[7] Kenneth G. Weiss, "The Limits of Diplomacy: Missile Proliferation, Diplomacy, and Defense," *World Affairs* 163, no. 3 (Winter 2001): 118.

[8] Graham, Nuclear Weapons Stability or Anarchy in the 21st Century," 280.

[9] Ashley J. Tellis, "The Evolution of U.S. Indian Ties: Missile Defense in an Emerging Strategic Relationship," *International Security* 30, no. 4 (Spring 2006): 131-46.

[10] Zafar Nawaz Jaspal, "Indo-U.S. Strategic Relationship & Pakistan Security," *Research Report*, No. 9 (London: South Asia Strategic Stability Institute, 2007), 19.

Indian defense planners appear convinced that their scientists cannot indigenously develop critical BMD components. Therefore, they looked abroad to foreign manufacturers for key components such as radars and launch control centers. India looked into the Israeli Arrow-2,[11] American PAC-3, and Russian S-300V missile technology.[12] A noted South Asia analyst indicates that "Indian scientists have developed the *Rajendra*-phased array radar and negotiated with Russia for its S-300 anti-tactical ballistic missile (ATBM) system, and also with Israel for the Arrow ATBM and *Phalcon* airborne early warning (AEW) platform."[13] Two Pakistani analysts, Moeed Yousaf and Khalid Banuri, reached similar assessments.[14] In addition, New Delhi negotiated with Israel to integrate the *Akash*'s technology with Israeli's Arrow-2, and also the *Rajendra* radar with Arrow-2's Green Pine radar—which can track a missile 300km away.[15] Hitherto, India has acquired the Russian S-300 missile systems, the Israeli Green Pine Radar system, and the Phalcon Airborne Warning and Control System (AWACS) platform.[16]

The U.S. influence on expanding Indian-Israeli defense ties is undeniable. "The Bush administration cleared the Israeli Green Pine radar system for sale to India, and also entered into talks with India on cooperation in missile defense." A U.S.-India agreement signed in 2005 also "specifically mentions a commitment to collaborate in missile defense."[17] The Indian Cabinet Security Committee also approved an air and missile defense umbrella project—worth $2.5 billion—with Israel in 2007.[18] This umbrella uses a network of batteries that can intercept incoming missiles, aircraft, and unmanned aerial vehicles by firing interceptors that could down enemy air assets 70 kilometers away. Under U.S-Israeli agreements, the Israelis could not transfer this missile technology to India without prior approval from the Americans. Once this approval occurred, India purchased three Green Pine systems.[19]

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[11] The Israeli Arrow is a copy of U.S. Patriot PAC-II. The published sources reveal that Patriot provides terminal defense against ballistic missiles, cruise missiles, and aircraft. It consists of a mobile launcher, phased-array air search-and-tracking radar, plus various command and support vehicles. It can shoot three types of interceptor missiles, the PAC-2, PAC-2 GEM, and PAC-3. See Gerald Brown, Matthew Carlyle, Douglas Diehl, Jeffrey Kline, Kevin Wood, "A Two-Sided Optimization for Theater Ballistic Missile Defense," *Operations Research* 53, no. 5 (September- October 2005): 745-46.

[12] Mayank S. Bubna, "Indian Missile Defense: Questions Unanswered," No. 2838, The Institute of Peace and Conflict Studies, March 26, 2009, http://www.ipcs.org/article/pakistan/indian-missile-defense-questions-unanswered-2838.html, accessed on August 4, 2012.

[13] Basrur "Missile Defense and South Asia."

[14] Moeed Yousaf and Khalid Banuri, "India's Quest for Ballistic Missile Defense: A Slippery Slope," in *South Asia at a Crossroads: Conflict or Cooperation in the Age of Nuclear Weapons, Missile Defense, and Space Rivalries*, eds. Subrata Ghoshroy and Gotz Neuneck (New York, Nomos Publishers, 2010), 103-4.

[15] Basrur "Missile Defense and South Asia."

[16] Yousaf and Banuri, "India's Quest for Ballistic Missile Defense," 108.

[17] R. N. Ganesh, "Nuclear Missile-Related Risks in South Asia," in *The Next Arms Race*, ed. Henry D. Sokolski (Carlisle, PA: Strategic Studies Institute, July 2012), 329.

[18] "India, Israel to jointly develop medium range missiles," *Zee News*, July 12, 2007, http://www.zeenews.com/articles.asp?aid=382306&sid=NAT&sname= , accessed on August 7, 2012. For detailed discussion on Indo-Israel defense cooperation see Efraim Inbar and Alvite Singh Ningthoujam, "Indo-Israeli Defense Cooperation in the Twenty-First Century," *MERIA Journal*, 15, no. 4 (December 2011), http://www.gloria-center.org/2011/12/indo-israeli-defense-cooperation-in-the-twenty-first-century/, accessed on August 7, 2012.

[19] Ganesh, "Nuclear Missile-Related Risks in South Asia," 330.

New Delhi has made significant progress in BMD over the past six years. For instance, on November 27, 2006 an exo-atmospheric high-altitude interceptor missile—the *Prithvi* Air Defense (PAD) system—destroyed a *Prithvi* missile in flight. A year later there was a successful test of an endo-atmospheric low-altitude interceptor—the Advanced Air Defense (AAD)—which hit the target in its terminal phase. A second, more advanced PAD test took place in March 2009.[20] In 2012, DRDO successfully conducted tests of all the elements involved in its BMD shield. At this point DRDO announced that its tested shield was comparable to the U.S. PAC 3. Declassified Indian sources confirm that its BMD project would be operationalized in two phases to intercept short, intermediate, and intercontinental missiles.[21] These phases should be capable of intercepting missiles at 2,000km and 5,000km respectively.[22]

Leading Indian scientists have confidently announced that India is capable of deploying a missile shield and only await a government decision to deploy such systems. On May 6, 2012, Dr. V K Saraswat stated that "the Ballistic Missile Defence shield is now mature…. We are ready to put phase one in place and it can be put in very short time." Though Saraswat announced that his team conducted successful BMD tests, he did not detail the specific characteristics of a protective shield. Moreover, he did not touch on whether BMD would attack enemy ballistic missiles in one phase or several. This critical gap between scientific claims and declarations from policymakers raise questions about the development and credibility of Indian BMD. In Michael Krepon's assessment "DRDO's promises have become even more wildly optimistic under the leadership of Dr. V.K. Saraswat, who is now promising effective, near-term ballistic missile defenses for Delhi and Mumbai. India appears to have flight tested six BMD interceptors. The United States, in contrast has flight tested 67 interceptors since 2001, 53 of which have very generously been labeled as successes. Even so, U.S. BMD programs face severe challenges."[23]Creating a technologically feasible system is a cumbersome process; therefore, it is nearly impossible to develop an operational shield in a realistic time frame. If U.S. BMD is encountering scientific challenges despite billions of dollars in investment and 53 successful tests than DRDO likely is not capable of deploying a shield for Delhi and Mumbai in the near future.

The Pakistani strategic community is equally convinced that Dr. Saraswat's recent claims are exaggerated. At the same time, they do not underestimate the impact of BMD advances on Pakistani security. After all India is believed to receive BMD assistance from Russia, Israel, NATO, and the United States. [24] Since the India-U.S. Civilian Nuclear Agreement, Pakistanis believe that

[20] Bubna, "Indian Missile Defense: Questions Unanswered."
[21] Short-range ballistic missiles are missiles with ranges up to 1,000 kilometers. Medium-range ballistic missiles have ranges of 1,000-3,000 kilometers. Intermediate-range ballistic missiles have ranges of 3,000-5.500 kilometers. ICBMs have ranges of 5,500 kilometers or greater. Note that the 1987 treaty banning U.S. and Soviet ground-based intermediate-range ballistic and cruise missiles uses a different definition, categorizing missiles with ranges between 500 and 5,500 kilometers as intermediate-range.
[22] Kanwal Sibal, "The twists and turns of ballistic missile defense in South Asia," *South Asia Monitor*, June 26, 2012, http://southasiamonitor.org/detail.php?type=n&nid=3155, accessed on August 4, 2012.
[23] Michael Krepon, "Nuclear and Ballistic Missile Defense Deals," *IntelliBriefs*, July 24, 2012. http://intellibriefs.blogspot.com/2012/07/nuclear-and-ballistic-missile-defense.html, accessed on August 7, 2012.
[24] "NATO offers missile defence cooperation to India," *The Hindu*, September 4, 2011. http://www.thehindu.com/news/national/article2424128.ece, accessed on August 4, 2012; T. S. Subramanian, "India

Washington and its like-minded partners are not concerned with India's growing nuclear arsenal, and Western observers are instead wary of Pakistani responses to India's developments. To this point, U.S. Deputy Defense Secretary Ashton Carter stated that Washington was interested in helping New Delhi build its BMD protective shield. Specifically, he saw BMD as an "important potential area for our future cooperation."[25] Such kinds of cooperation and technical transfers to India will eventually help it produce an effective missile defense shield. According to Dean A. WiIkening, "upper-tier TMD systems can cover the entire territory of US regional allies. This effectively makes them national defenses for these countries."[26] In Asia's evolving strategic environment, many Americans assume India will be a regional ally and counterbalance to China. If true, this situation could provide New Delhi political space to develop BMD without U.S. interference.

Pakistan's Plausible Nuclear Posture

Presently, both India and Pakistan possess sufficient strategic forces—ballistic and cruise missiles and nuclear capable bombers. It can be argued that a situation of MAD exists between India and Pakistan. If either side considers striking first, it must calculate the huge damage it would suffer as a result of retaliation. Pakistan developed a series of ballistic missiles to deliver munitions over long distances to an opponent's well-defended areas, where penetration by fighter aircraft is either difficult or impossible. India has an advanced air defense system, but it cannot guard against ballistic missiles. Thus, Pakistan's defense strategy assures sufficient destruction of the Indian homeland. With the advent of BMD India can dent the assured penetration capability of ballistic missiles, which undermines the credibility of Pakistan's deterrence strategy. In essence, effective Indian BMD allows India a shield from Pakistani nuclear retaliation and means India would be more confident to carry out conventional offensives like Cold Start.

Pakistan's security managers are concerned that even a rudimentary BMD capability could undermine their nuclear deterrent because it exposes Pakistan to coercive diplomatic tactics. Therefore, Pakistan's reaction is natural and since 1998, Pakistan has tried to prevent the introduction of BMD into South Asia through proposals such as the strategic restraint regime, which included amongst other measures, a restraint against the development and deployment of BMD. The entire premise of this proposal was to enhance deterrence and strategic stability by making predictably certain—neither India nor Pakistan could win nuclear war nor yield any major political-military advantage from it. Another advantage of this proposal was that it would limit the expansion of nuclear arsenals and restrain the deployment of strategic defenses.

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studying NATO offer on joining missile programme," *The Hindu,* October 7, 2011. http://www.thehindu.com/news/national/article2515627.ece, accessed on August 4, 2012.

[25] "US keen to cooperate with India in Ballistic Missile shield programme," *The Economic Times*, July 23, 2012. http://articles.economictimes.indiatimes.com/2012-07-23/news/32804893_1_ballistic-missile-defence-shield-shield-programme-strategic-relations, accessed on August 4, 2012. "US Keen to Help India in Ballistic Missile Programme," *Press Trust of India (PTI),* New Delhi, July 23, 2012. Reported at Outlook India. com. http://news.outlookindia.com/items.aspx?artid=769753, accessed on August 4, 2012.

[26] Dean A. WiIkening, "Ballistic-Missile and Strategic Defence Stability," *Adelphi Paper*, No. 334 (London: Routledge, July 2004), 19. Dean pointed out that: "In the US lexicon, upper-tier TMD systems intercept targets above 4okm, while lower-tier systems do so below this altitude. The defended area (the 'footprint') for lower-tier systems is small, while upper-tier systems have larger defended footprints," 46.

The failure of the strategic restraint initiative was the first misstep that prevented India and Pakistan from embarking on positive learning towards restraint; instead, it placed them in the midst of the prospects for an arms race. This letdown also compelled Pakistan to employ technical countermeasures, such as increasing missile production and taking other passive and active countermeasures. Pakistani nuclear optimists argue that Islamabad needs to develop and retain an expanded nuclear triad to guarantee its ability to strike Indian strategic targets. One immediate response for Pakistan might be the mastering of advanced ballistic missile technologies—including multiple-warhead reentry vehicles (MIRVs). Thus, Islamabad is spending more on an assortment of defense items, including ballistic and cruise missiles, so as to avoid looking weak and exploitable.[27]

Pakistan has a long history of searching for alternatives to deal with its conventional asymmetry vis-a-vis India. Since the 1971 defeat, Pakistani military planners have counted on the look-within or self-defense strategy. So, they succeeded in institutionalizing their nuclear deterrence potential. Today, Pakistan's scientific bureaucracy's ability to manufacture conventional military hardware,[28] nuclear devices, and cruise as well as ballistic missiles of diverse ranges, grants Islamabad the confidence to employ a range of measures to deter India's BMD threat.[29]

Implications for Strategic Stability

India's enormous investment in defense spending and development of sophisticated conventional forces increases the asymmetry between India and Pakistan. This asymmetry forces Pakistan to offset its disadvantages by developing an assortment of nuclear weapons and delivery systems. Despite its military advantages, India cannot deliver a decisive blow to Pakistan because of the latter's nuclear capability. The introduction of BMD may not provide the much-needed defensive shield to India in an actual war, but it has the potential to upset strategic stability. "Antimissile systems…are a double edged sword; they may provide increased protection from missile attack and perhaps an alternative to offensive ballistic missile development, but they can also increase tensions." [30]

A BMD capability influences regional stability due to its potential to alter nuclear deterrence principles (MAD), trigger an arms race, and produce misperceptions that could lead to dangerous miscalculations during a crisis. Christoph Bluth noted that in the nuclear era "strategic stability mean[t] that the balance of forces between the two states is such that nuclear deterrence is effective,

[27] See accompanying Chapter 5 by Mansoor Ahmed in this volume.
[28] Presently, Pakistani military planners claim that their conventional armed forces have been developed to the point that they can defeat the Indian armed forces in any attempt to encroach on Pakistani territory. For instance, India-Pakistan military standoff in 2001-2002 accentuated the truth of their claims. With a rapid mobilization they thwarted India's military plans.
[29] For instance, Pakistan has worked on commissioning a new early warning radar systems, strengthening aerospace defense, deploying surface to air missiles, equipping medium and long range cruise and ballistic missiles with more advanced penetration aids, furnishing ballistic missiles with MIRVs, and developing the capability to attack India's BMD control systems. Pakistan has also worked on deploying modern weapons in locations where they could take out any part of India's missile defense system—forward or closer border deployed radars and missile interceptors—deployed near the Indian border.
[30] Weiss, "The Limits of Diplomacy," 118.

and consequently there is little incentive for the initiation of armed conflict."[31] BMD in South Asia will likely affect three major components of strategic stability: deterrence stability—to maximize second-strike potential and mutual vulnerability; arms race stability—to minimize incentives to build more weapons; and crisis stability—neither side perceives an advantage in escalating violence in a crisis.[32]

Indian BMD ambitions instigated a debate among security observers regarding the applicability of traditional deterrence theory. According to Daniel Barkley, "traditional deterrence theory rests on a number of assumptions including notions of rationality, credibility, and effective communication of threats."[33] BMD possession may provide a false source of confidence during a crisis that may lead India to reach irrational conclusions and act more aggressively. Further it would enable India to deny Pakistan "the ability to execute its strategy."[34]

Cold War era nuclear deterrence principles, therefore, are not likely to guide Pakistani nuclear strategy into the future. This change to nuclear deterrence theory could generate a fear for Pakistani decision-makers that during a crisis they would be unable to defend their country from India's superior military muscle without early nuclear weapon use. The effect of BMD is that it allows India to use its superior military muscle, which in turn obliges Pakistan to modernize its nuclear posture to deter conventional attack. Pakistan's nuclear deterrence posture in turn switches from deterrence to nuclear war-fighting so as to frighten an opponent who possesses superior conventional and unconventional forces. The strategic instability in the region could also push Pakistan toward strategic and battlefield nuclear weapon deployment. Consequently, this strategic shift is necessitating a dramatic increase in spending on offensive nuclear weapons and infrastructure.

The fear of mutually assured destruction resulting from inadvertent escalation discourages both sides from using war as a means to accomplish political objectives. Robert Powell points out that "a state's assured-destruction capability gives it the ability to make the cost that an adversary has to bear in any conflict outweigh any possible gains. If, therefore, a state's threat to impose these costs were sufficiently credible, an adversary would prefer backing down."[35] Theoretically, the deployment of BMD would not prevent inadvertent escalation of war to the nuclear level. The alarming puzzle is that the deterring factor (retaliatory or second-strike capability) of inadvertent escalation to the nuclear level would lose significance for the state with defensive shield capabilities. The holder of BMD gathers confidence that its defensive shield minimizes the repercussions of inadvertent escalation to the nuclear level. That is why many analysts are convinced that as India's BMD advances military planners will be less fearful of inadvertent escalation and will therefore be more

[31] Christoph Bluth, "India and Pakistan: a case of asymmetric nuclear deterrence," *The Korean Journal of Defense Analysis* 22, no. 3 (September 2010): 389.
[32] Frank P. Harvey, "The Future of Strategic Stability and Nuclear Deterrence," *International Journal* 58, no. 2 (Spring, 2003): 321-22.
[33] Daniel Barkley, "Ballistic Missile Proliferation: An Empirical Investigation," *The Journal of Conflict Resolution* 52, no. 3 (June, 2008): 456.
[34] Wyn Q. Bowen, "Missile Defense and the Transatlantic Security Relationship," *International Affairs* 77, no. 3 (July 2001): 499.
[35] Robert Powell, "Nuclear Deterrence Theory, Nuclear Proliferation, and National Missile Defense," *International Security* 27, no. 4 (Spring, 2003): 89.

likely to initiate military adventurism against Pakistan. Hence, in the evolving strategic environment of the sub-continent, deterrence between India and Pakistan may not work with the same effectiveness as was the case in the mid-1980s.[36]

Pakistan's nuclear posture might shift from declared, recessed deterrence to active deterrence, which entails an ambiguous state of hair-trigger alert. Subsequently, India would also look for an ambiguous deployed, hair-trigger posture. This escalatory ladder in both India and Pakistan's nuclear posture would stimulate a destabilizing action-reaction cycle. This action-reaction phenomenon not only would result in ever expanding strategic forces on both sides, but bring India and Pakistan's command-and-control structures under perpetual stress. During a crisis, the situation would be more alarming because the time available to decision-makers for reacting to an ambiguous event would be correspondingly short.

BMD also undermines arms race stability. which envisaged a situation in which neither side had incentives to expand its nuclear forces. If New Delhi began deploying BMD, Islamabad might need to increase its offensive missiles in order to be confident it could overwhelm India's defenses. The history of India and Pakistan's military buildup suggests that BMD will trigger a new arms race—a sword versus shield competition. As Feroz Hassan Khan noted, "the ensuing regional culture leans more toward military competition, as opposed to strategic restraint and conflict resolution (the logical course for strategic stability)." [37] This mirrors the dilemma that Pakistan would not observe restraint at the introduction of BMD and therefore, instantly rush for countervailing strategies.

BMD's impact on regional crisis stability is equally alarming. In theory, BMD increases preemptive-strike advantages for India and undermines crisis stability by increasing pressure in a conflict to preempt and overwhelm the opponent's defense. Dean A. Wilkening opined that "ballistic missile defense can be destabilizing in a crisis if the level of defense is sufficient to absorb an opponent's ragged retaliatory strike after attacking the opponent's ballistic-missile force in a pre-emptive counterforce attack." [38] On the contrary, arrangements that limit or reduce preemptive-strike advantages will enhance crisis stability.[39] "Crises in this view become a kind of brinkmanship. During a crisis, states exert coercive pressure on each other by taking steps that raise the risk that events will go out of control. This is a real and shared risk that the confrontation will end in a catastrophic nuclear exchange. Consequently, no state bids up the risk eagerly or enthusiastically."[40] Invulnerability to an adversary's retaliatory or second strike annihilation through BMD could tempt a state to launch a preemptive strike in a severe crisis. Hypothetically, the possessor of BMD might

[36] Many analysts opined that nuclear capability of Pakistan has been providing it deterring potential against militarily superior India since mid-1980s. Numerous crises—1986-87 Brasstracks, summer 1990, Kargil 1999, 2001-2002 military deployments and Mumbai November 2008—having potential to escalate into war were managed due to India and Pakistan nuclear weapons potential.

[37] Feroz Hassan Khan, "Prospects for Indian and Pakistani Arms Control," in *The Next Arms Race,* ed. Henry D. Sokolski (Carlisle, PA: Strategic Studies Institute, July 2012), 358.

[38] Dean A. Wilkening, "Nuclear Zero and Ballistic Missile Defense," *Survival* 52, no. 6 (December 2010-January 2011): 116.

[39] Robert Powell used term first-strike instead of preemptive strike. See Robert Powell, "Crisis Stability in the Nuclear Age," *The American Political Science Review* 83, no. 1 (March 1989): 61; 67.

[40] Powell, "Nuclear Deterrence Theory, Nuclear Proliferation, and National Missile Defense," 90.

calculate that, if it strikes first and destroys a substantial portion of the adversary's strategic offensive forces, its BMD systems could cope with the weakened retaliatory strike—or at least leave it in a substantially better position than if it absorbed a preemptive strike.

Even if BMD's effect on strategic stability was relatively marginal, it still generates serious consequences. As James M. Lindsay and Michael E. O'Hanlon noted, "defenses provide a safety net in the event that some enemy missiles survive the initial attack, just as a preemptive attack that destroys some but not all enemy missiles can make the defense's job easier. In short, rather than serving as alternative strategies, preemption and missile defense can reinforce each other."[41] Hence, anything that increases the chances of preemption is dangerous for crisis stability.

Finally, BMD facilitates interdependence between offense and defense. India's offensive capabilities could operate in a defensive mode to limit the damage that Pakistan inflicts in retaliation.[42] If Pakistan fears the offensive potential of its adversary through defensive deployments and, for fear of preemption, responds in a way that increases Pakistani aggressiveness and unpredictability, it would undermine strategic stability. Hence, BMD is a weapon that could create intent in the form of an incentive to preempt in times of crisis. Moreover, the moment crisis occurs between India and Pakistan, it is likely that the latter's National Command Authority would delegate authority to junior commanders to guard against a knockout preemptive strike to the central command by India.[43] The decentralization of nuclear weapon launching authority would have spiraling repercussions, risky for the continuity of strategic stability during a crisis.

Conclusion

BMD in South Asia instigated an offensive-defensive arms race between India and Pakistan. Given the history of strategic competition between New Delhi and Islamabad, should India acquire BMD, Pakistan would consider its retaliatory ability insufficient to meet the threat. Consequently, Pakistan would look to increase its nuclear arsenals and delivery systems and engage in an arms race, which would be debilitating given its prostrate economy. This might force Pakistan to look for alliance and strategic partners who could provide Pakistan with the ability to counter BMD. More precisely, introduction of BMD would create an enormous spiral in offensive nuclear arms—a situation in which there would be far less strategic stability and therefore less security for both India and Pakistan.

New Delhi has coupled its enthusiasm for BMD with an expressed distaste for the strategic restraint regime proposed by Islamabad. India's approach is dead set against strategic stability in South Asia. The sensible and direct way of supplementing both India and Pakistan's defensive abilities cannot be

[41] James M. Lindsay, Michael E. O'Hanlon, Charles L. Glaser, and Steve Fetter, " Correspondence: Limited National and Allied Missile Defense," *International Security* 26, no. 4 (Spring, 2002), 195.
[42] James H. Lebovic, "The Law of Small Numbers: Deterrence and National Missile Defense," *The Journal of Conflict Resolution* 46, no. 4 (August, 2002): 462.
[43] To date, Pakistan's official announcement has been that it will maintain centralized control over its deployed tactical nuclear weapons. The author, however, believes that the effectiveness of the weapons would demand decentralization once deployed on the battlefield.

found through BMD. Instead, comprehensive arms control would guarantee restraint, predictability, and transparency in the region.

In the context of nuclear learning, India and Pakistan were already finding simple technological developments difficult to deal with. Now, with the introduction of more sophisticated technologic innovation, for instance via BMD development, the learning curve has become steeper and more complicated. During the Cold War, the superpowers learned the hard way through arms races and crises to reach for the stabilizing effects of arms control. The Anti-Ballistic Missile Treaty was one such example, which employed a deterrent logic that that dissuaded the superpowers from an unbridled arms race to reach MAD. Luckily, in South Asia's first decade, India and Pakistan skirted past this Cold War learning pathway. Nevertheless, in this decade, BMD and other technological developments put India and Pakistan onto a path of nuclear unlearning and ignorance of past folly. This journey will eventually cause instability and financial hardship for both states before the light dawns.

Hence, the sustainability of current strategic stability in South Asia warrants both India and Pakistan to adopt a cooperative and non-confrontational approach on the issue of the introduction of BMD in the region. Indeed, New Delhi and Islamabad's engagement in an honest and constructive dialogue on BMD would create a favorable strategic environment for constituting an arms control arrangement, at the very least, if not establishing a disarmament understanding between the South Asian strategic competitors.