2013

An Arms Race or Bureaucratic Dogfight? Assessing the Underlying Causes of India's Nuclear Force Development

Drew Stommes
College of Saint Benedict/Saint John's University

An Arms Race or a Bureaucratic Dogfight?
Assessing the Underlying Causes of India's Nuclear Force Developments

AN HONORS THESIS

College of St. Benedict/St. John's University

In Partial Fulfillment

of the Requirements for Distinction

in the Department of Political Science

by

Drew Stommes

May, 2013

Project Title: "An Arms Race or a Bureaucratic Dogfight? Assessing the Underlying Causes of India's Nuclear Force Developments"

Approved by:

Gary Prevost, Professor of Political Science

Manju Parikh, Professor of Political Science

Richard Bohr, Professor of History

Jeffrey Diamond, Assistant Professor of History

Anthony Cunningham, Professor of Philosophy and Director, Honors Program

J. Scott Johnson, Chair, Political Science Department

Introduction

On April 19, 2012 India's Defence Research and Development Organisation (DRDO) successfully test-fired the indigenously developed Agni-V ballistic missile, which has an estimated range of 5,000 kilometers and is purportedly capable of striking any target within China, including Beijing.[1] It is the longest-range missile to be tested by India to date. In addition to the Agni-V, New Delhi has developed a multiplicity of delivery systems, including other land-based ballistic missile systems. It is also close to incorporating the nuclear missile-equipped submarines, the *INS Arihant*. These nuclear force enhancements have occurred simultaneously with a quantitative expansion of India's nuclear warhead stockpile. The current understanding of the Indian nuclear trend lines – and arms buildups and races, more broadly – necessitate a comprehensive assessment. This essay seeks to answer this question: Why is India engaging in a quantitative and qualitative enhancement of its nuclear force capabilities?

The development of a nascent nuclear capability began when India's nuclear program was formed shortly after it received independence in 1947. Shrouded by secrecy, New Delhi commissioned a team of scientists to pursue nuclear-related objectives. The program sought initially to develop civil nuclear energy and a "peaceful" nuclear explosions (PNEs) capability, both of which were ostensibly intended for economic development and enhancing international prestige.[2] Two critical points signaled progress to Indians and the international community. First, India conducted a PNE in 1973,[3] and second, it successfully detonated five nuclear weapons in

---

[1] Kristensen, Hans M. and Robert S. Norris. 2012. "Indian nuclear forces, 2012." *Bulletin of the Atomic Scientists* 68 (4): 96.
[2] Perkovich, George. 1999. *India's Nuclear Bomb: The Impact on Global Proliferation*. Berkeley, CA: University of California Press.
[3] Ibid.

May 1998.[4] After having tested nuclear weapons in 1998, India's development of different quantitative and qualitative nuclear weapons capabilities has increased dramatically.

This is not a new phenomenon. Nation-states have bolstered their conventional and nuclear capabilities consistently throughout history. There is a plethora of examples. One includes the notable Anglo-German naval arms race at the dawn of the twentieth century. Another includes the U.S. and Soviet Union's allocation of astronomical amounts of resources for each nation's defense and national security. The highest number of nuclear weapons the United States had in its stockpile during the Cold War was 31,255,[5] and at times the Soviet Union possessed even more. These are two examples among the history of nation-states replete with military buildups.

Nuclear arms buildups can take two forms: quantitative and qualitative. A quantitative buildup is a simple increase in the number of nuclear weapons that a country possesses. Technological capabilities remain constant. On the other hand, a qualitative enhancement of nuclear forces involves the development and operationalization of capabilities that are *more* sophisticated technologically. For example, a country can develop missiles that have longer ranges and warheads that deliver a higher payload. Other capabilities, such as nuclear submarines, make a country's nuclear forces less vulnerable to a nuclear first strike conducted by an adversary. Oftentimes, qualitative and quantitative force enhancements occur in tandem. As will be discussed in detail later in this thesis, India has done both of these force developments.

---

[4] Department of Atomic Energy and Defence Research and Development Organization (India). 17 May 1998. "Joint Statement by Department of Atomic Energy and Defence Research and Development Organisation." <http://www.globalsecurity.org/wmd/library/news/india/1998/980500-drdo.htm>.

[5] United States Government. 2010. "Fact Sheet: Increasing Transparency in the U.S. Nuclear Stockpile," *Department of Defense* (May 3): <http://www.defense.gov/npr/docs/10-05-03_Fact_Sheet_US_Nuclear_Transparency__FINAL_w_Date.pdf>.

While there are clear examples of the buildup of nuclear weapons and defense capabilities, it is difficult to discern the root cause(s) of these policies, as decision-making processes are extremely complex and involve a multiplicity of stakeholders and actors with varying interests. Scholarship in the field tends to focus on either the impact of external threats on state policymaking on one hand, or the influence of bureaucratic interests on the other. By examining India's nuclear development through these two different lenses, one can gain better insights into the decision-making dynamics within New Delhi and how states in general approach the possibility of increasing their quantitative and qualitative nuclear and military capabilities.

This essay provides a holistic analysis of India's qualitative and quantitative nuclear arsenal buildup and uses Robert Jervis's "spiral model" and theories of bureaucratic politics to gain a better understanding of the root causes of this buildup. I argue that, given the available evidence, the majority of India's nuclear force enhancement and expansion has been caused by the external threat posed by Pakistan and, to a lesser degree, by China. It is also argued that bureaucracies may have influence on the final policy outcomes, though it is more difficult to establish a clear causal relationship.

There are various reasons for exploring India's build up of nuclear weapons. First, various conclusions will yield different policy proposals. Certain policies under certain circumstances are capable of minimizing the risks of war. If nuclear weapons buildups are caused by a state's sense of insecurity due to a perceived external threat, then tension-reducing and deterrence enhancing measures may be necessary. Moreover, this essay contributes to the broader literature on Indian nuclear strategy and planning and helps us to understand the complex security environment in South Asia as well as the different ways that India approaches

its nuclear strategy. Beyond this addition to our existing understanding of India, we can also gain a better understanding of the conditions that facilitate cooperation or fuel competition and conflict.

Nuclear weapons and defense policies – especially in one formulated in India – are developed in an extremely secretive way. First, this makes any research on this issue fraught with limitations and speculation. This caveat weakens the foundation upon which my argument rests, but it does not mean that the issue cannot be explored as there is plenty of evidence available to draw some conclusions. Secondly, no single theory of arms racing or arms buildups will be confirmed or disconfirmed. However, the evidence available is more capable of being analyzed through Jervis's spiral model than the bureaucratic politics theory. The evidence used in this thesis includes publicized missile tests, nuclear arsenal estimates, and public statements by policymakers in India. By piecing these fragments of evidence together, this thesis illuminates the probable root causes of India's qualitative and quantitative nuclear force development.

This essay proceeds as follows. First, I delve into the existing literature on arms races and arms buildups. This survey of previous scholars' attempts at understanding this complex and dynamic phenomenon is crucial for framing the analysis of India's recent developments. As will be shown, the literature on arms races and arms buildups falls into a dichotomy of causal explanations: external threats versus internal influences, which are the common explanations among scholars and experts of India's nuclear weapons program. After the literature review, I provide a detailed overview of India's quantitative and qualitative force developments: the expansion of the nuclear warhead stockpile, the development and deployment of cruise and ballistic missile capabilities, and sea-based nuclear systems.

I proceed by assessing the causal relationship that potentially exists between various external threats and policy outcomes on one hand, and between organizations/bureaucracies and policy outcomes on the other. This analysis explores the first causal possibility by applying Robert Jervis's spiral model, and the bureaucratic interest theory is used to analyze as the second possible explanation. I find that Robert Jervis's spiral model and the available evidence regarding India's perceptions and trend-lines suggest that most of India's nuclear developments have been caused by the threat posed by Pakistan and, to a lesser degree, China. The available evidence also suggests that the influence of bureaucratic interests may also be having some impact, though it is more difficult to establish a clear causal connection. Moreover, I also discuss the importance of Indian nationalism – and Hindu nationalism – and the Indian identity in inflating the perceived threat posed by Pakistan, a predominantly Muslim nation. After providing a final account of my findings in the conclusion, I propose various policies that may minimize the risks of a potential nuclear war.

Literature Review

India's nuclear weapons expansion and enhancements have been considerable, and the potential explanations abound. Before conducting an in-depth exploration of India's nuclear capabilities buildups, it is important to examine the literature that attempts to explain the reasons states choose to build up arms and/or engage in an arms race with perceived external adversaries. These theories fall into two broad categories of causal explanations. The first explicates arms buildups as a result of the presence of external threats to one state's security. The second argues that bureaucratic and organizational interests primarily impact the policymaking process. These organizations include branches of the military and research and development organizations, among others. Existing scholarly and expert explanations of India's nuclear buildup also fall into

the two explanatory categories of external and internal causes of state policy. Each approach has relative strengths and weaknesses.

External Causes of Arms Buildups

The first approach to arms buildups and arms races focuses on the impact of an external security threat on states' policymaking. This is rooted in the Realist paradigm of International Relations.[6] One crucial component of realism is that states operate in an anarchic (absence of a supreme authority about nation states) and self-help nature of the international system. With each state fending for its own survival, the presence of an external threat catalyzes the buildup of a certain military capability. However, when one country bolsters its security, its adversary feels less secure. As a result, the latter state responds by matching or exceeding the capabilities of the original state. This cycle continues and turns into what is called the "security dilemma." This external threat dynamic leads into an arms race between the two states and becomes extremely difficult to escape. The external threat-based literature broadly agrees about the causes of arms buildups, save for a few nuances.

Samuel Huntington crafted one of the first arguments regarding the impact of external threats on states' decisions to build up their military capabilities.[7] By analyzing over ten different arms races, Huntington argues that external threats are the cause of arms races and buildups and that "the increase [in arms] in itself becomes an accepted and anticipated stabilizing factor in the relations between two nations."[8] These cases include the aforementioned Anglo-German naval buildup from the early part of the 20th century and the early stages of the arms race between the

---

[6] For important works on the realist theory of international relations, see: Waltz, Kenneth. 1979. *Theory of International Politics.* Boston, MA: McGraw Hill; and Mearsheimer, John. 2001. *The Tragedy of Great Power Politics.* New York: W.W. Norton.
[7] Huntington, Samuel P. 1958. "Arms Races: Prerequisites and Results" *Public Policy* 8: 41-86.
[8] Huntington, 63.

United States and Soviet Union. He argues further that arms races can be both stabilizing and destabilizing for the relations between two states, depending on the circumstances.

Other scholars and experts have argued in similar terms as Huntington, observing a clear tit-for-tat (or, "action-reaction") dynamic taking place between two states which pose security threats to one another.[9] Beyond this literature, Robert Jervis pushes further in his examination of the security dilemma and arms races by arguing that psychological variables also play a significant role.[10] His theory is called the "spiral model." For Jervis, the first step in an arms race involves states developing images of each other (hostile, friendly, neutral, etc.). These images are derived from states' prior experiences with each other and the nature and magnitude of the military capabilities that each one possesses.[11] If two states have hostile images of each other, then they fall down a spiral of fear and hostility. The result is that these hostile images form a cognitive rigidity among each state when viewing the other's actions and capabilities.[12] According to Jervis, a cognitive rigidity characterized by hostility reinforces the security dilemma.[13] When the security dilemma sets in and cognitive rigidity solidifies, states find it difficult to escape from this dilemma. As a result, states will almost always assimilate information to preexisting beliefs and interpret ambiguous and discrepant information in a negative way.[14] Jervis argues that the effects of the security dilemma – compounded by psychological constraints that bind policymakers – precipitate an arms race between states that have hostile images of each other.

---

[9] Buzan, Barry and Eric Herring. 1998. *The Arms Dynamic in World Politics.* (Boulder, CO: Lynne Rienner); McNamara, Robert. 1967. "The Dynamics of the Nuclear Strategy" *Department of State Bull* 57; Freedman, Lawrence. 1981. *The Evolution of Nuclear Strategy.* (New York: St. Martins).
[10] Jervis, Robert. 1976. *Perception and Misperception in International Politics.* (Princeton, NJ: Princeton University Press).
[11] Jervis, 68.
[12] Jervis, 68.
[13] Jervis, 64.
[14] Jervis, 143-145.

A third piece in the external threat literature worth examining is Charles Glaser's "offense-defense" approach to arms races.[15] Glaser argues that arms races are fundamentally driven by a state's sense of insecurity. However, what causes insecurity is the ability of an adversary to conduct an offensive military operation against one state.[16] A state is driven by a profound sense of insecurity when the adversary has the incentive to attack. The logical response is a buildup of military capabilities to offset the adversary's capability. Glaser additionally argues that if one of the states is "greedy" and pursues non-security objectives, the arms race will become catalyzed even further.[17] Glaser's approach differs from the traditional external threat arguments by stating that "sub-optimal" state behavior regarding arms buildups are caused by irrational domestic actors.[18] Glaser's most noticeable contribution from the previous external threat literature is that arms races are not caused by the threat a state poses in and of itself. Rather, the ability of one state to conduct an offensive military operation against the other creates the insecurity that catalyzes an arms race.

Each of these studies has its relative strengths and weaknesses. For example, Huntington's piece draws from a wide variety of cases but errs by concluding that quantitative and qualitative arms races have completely separate outcomes. Oftentimes, quantitative and qualitative buildups occur simultaneously. Jervis's argument, while substantially backed by evidence, assumes at the outset of his piece that state behavior is a product of the external threat environment. Finally, Charles Glaser's argument is problematic because it is extremely difficult to determine a particular setting whether "offense" or "defense" has the advantage. For example, tactical nuclear weapons may create the perception of offensive advantage, even though the use

[15] Glaser, Charles. 2000. "The Causes and Consequences of Arms Races" *Annual Review of Political Science* 3: 251-276.
[16] Glaser, 267.
[17] Glaser, 268-269.
[18] Glaser, 272.

of tactical nuclear weapons would ultimately lead to the destruction of the country if its adversary also possessed nuclear weapons. From the above review of this literature, I feel that Robert Jervis's argument is nuanced and will provide a proper analytic framework through which India's nuclear development can be analyzed, especially given the conceptual shortcomings of Glaser's theory.

The literature that specifically examines India's nuclear buildup has argued in a similar vein that the root cause of New Delhi's decision-making is the presence of two external security threats: China and Pakistan. For example, Pant, Bharath, and Basrur argue that various strands of India's nuclear forces, especially the long-range ballistic missiles, are being developed in order to respond to the Chinese security threat.[19] In a similar assessment, Jaclyn Tandler and Toby Dalton argue that India's nuclear force development has, over time, become almost exclusively focused on the threat emanating from China.[20] Others have argued that the quantitative expansion of India's warhead stockpile and development of sea-based nuclear capabilities are responses to the security threat posed by Pakistan.[21] One problematic aspect of the India-specific literature is that the arguments focus on disparate strands of the Indian nuclear developments instead of providing a more comprehensive assessment. Moreover, the literature has yet to systematically assess the relative influence of the Chinese and Pakistani threats on India's nuclear force developments. To make this assessment, I will use Robert Jervis's spiral model.

---

[19] Basrur, Rajesh. 2004. "India's Escalation-resistant Nuclear Posture" in *Escalation Control and the Nuclear Option in South Asia,* eds., Michael Krepon, Rodney W. Jones and Ziad Haider. Washington, DC: The Henry L. Stimson Center: 59; Pant, Harsh and Gopalaswamy Bharath. 2008. "India's Emerging Missile Capability: The Science and Politics of Agni-III" *Comparative Strategy* 27 (4): 381.

[20] Dalton, Toby and Jaclyn Tandler. 2012. "Understanding the Arms "Race" in South Asia" *The Carnegie Papers* (September).

[21] See: Rehman, Iskander. 2012. "Drowning Stability: The Perils of Naval Nuclearization and Brinkmanship in the Indian Ocean" *Naval War College Review* 63 (4) (Autumn): 64-88; and Pant, Harsh. 2007. "India's Nuclear Doctrine and Command Structure" *Armed Forces & Society* 33 (2) (January): 238-264.

Internal and Bureaucratic Causes of Arms Buildups

It has also been frequently argued that arms races and buildups are caused primarily by the pressure of bureaucratic and domestic organizations' interests. This diverges from the previously-explained Realist perspective because the state is viewed as an aggregate of actors, rather than a singular unit. For bureaucratic and organizational perspective, the source of strategic policy lies in the specific interests and influence that different bureaucracies have within the state's decision-making process. Organizations' interests depend on each one's history, objectives, and organizational culture. More importantly, these theories do not preclude the potential influence of external threats. Other pieces of literature (as will be explained further in the next sections) examine the desire of military branches to have the most sophisticated weaponry and the influence of their proclivity for offensive doctrines. Research and development organizations hope to continually develop prestigious technologies and capabilities. All of these organizations seek financial resources. The bureaucratic politics theory contains a wide variety of analyses that focuses on different types of organizations.

Several authors argue that bureaucratic interests play the primary role in foreign policymaking,[22] and others, such as Scott Sagan, have looked at bureaucratic influences in the formulation of nuclear weapons policies, more specifically.[23] This literature argues that different bureaucracies within a state have specific interests, which are based on each organization's goals, interest in maintaining a steady flow of funds, and the desire to be on the cutting edge of technological innovations.[24] As each sub-state bureaucracy and organization competes to be the

[22] See: Halperin, Morton H. 1974. *Bureaucratic Politics & Foreign Policy* (Washington, DC: Brookings Institution).
[23] Sagan, Scott. 1996-1997. "Why do states build nuclear weapons?" *International Security* 21 (3) (Winter): 54-86; Greenwood, Ted. 1975. *Making the MIRV: A Study of Defense Decision-Making* (Cambridge, MA: Ballinger).
[24] Sagan, Scott. "Why do states…"

dominant voice in a state's particular foreign policy, the final decision to build up a state's nuclear weapons capability is a reflection of successful lobbying efforts by these specific organizations.

Some scholars have examined the specific role of research and development organizations in influencing states' policy outcomes. These R&D organizations within a bureaucratic structure develop a new capability, and then successfully convince the central decision makers that the newly developed weaponry will enhance a state's security.[25] Thus, the advancement of R &D organizations' interests in maintaining funding and remaining on the cutting-edge of weapons systems development is a reflection of how bureaucratic interests are a root cause the decision to move forward with different capabilities. Unfortunately, this scholarship specifically does not extend its analysis to the potential influence of branches of the military.

Another body of literature within the internal causes of arms buildups scholarship examines the influence that branches of the military have on states' foreign policies, weapons systems acquisitions, and, by extension, the nuclear force planning process. For example, Allison and Morris have argued that the U.S.'s acquisition of intercontinental ballistic missile (ICBM) forces were largely a product of the armed services' desire to have the most sophisticated weaponry and protect their autonomy in strategic decision-making.[26] Additionally, scholarship on military doctrine and the influence of "offensive" doctrines adopted by the military show how

---

[25] For literature that assesses the role of research and development organizations in state policy making, see: Brooks, Harvey. "The Military Innovation System and the Qualitative Arms Race" *Daedalus* 104: 75-98; Shapley, Deborah. 1978. "Technology Creep and the Arms Race: ICBM Problem a Sleeper" *Science* (September 22): 1102-1105; Buzan, Barry. 1987. *An Introduction to Strategic Studies: Military Technology and International Relations.* New York: St. Martin's Press; and Evangelista, Matthew. 1988. *Innovation and the Arms Race.* Ithaca, NY: Cornell University Press.

[26] Allison, Graham and Fredric Morris. 1975. "Exploring the Determinants of Military Weapons" *Daedalus* 104: 99-129.

policymakers would come to see the most advanced weapons systems as being necessary guarantors of national security.[27] Such offensive doctrines become more "effective" when the state acquires the most advanced weaponry and as much of that weaponry as possible. This causal chain of events manifests itself in the buildup of arms, and could arguably be seen in the nuclear realm.

Since most countries' strategic decisions regarding nuclear weapons and nuclear force planning are made in utmost secret (as are India's), it is extremely difficult to establish a causal link that would suggest that the competing interests of bureaucracies and organizations have manifested themselves in the acquisition of the most sophisticated weaponry, including the overall expansion of a nuclear arsenal. Moreover, the argument regarding the branches of the military having influence over policymaking is difficult to generalize because countries have different civil-military arrangements, which affect the way in which a particular branch of the military is capable of influencing final policies. Undoubtedly, however, this component of arms racing and arms expansion is worth exploring in India's case because of the existence of those bureaucracies and organizations within India that potentially have influence on policies.

One further possible internal explanation for the rapid buildup of weapons systems is the role of nationalism and the overall sense that a country needs to be a dominant actor in a particular region or over a certain competitor. The dynamic potentially works in a way where a nation's identity leads policymakers to inflate a perceived external threat. This then leads key decision-makers to overreact. There have been a number of scholarly pieces on the role of

---

[27] Posen, Barry. 1984. *The Sources of Military Doctrine: France, Britain and Germany Between Wars* (Ithaca, NY: Cornell University Press); Snyder, Jack. 1984. *The Ideology of the Offensive: Military Decisions and the Disasters of 1914* (Ithaca, NY: Cornell University Press); Van Evera, Stephen. 1999. *Causes of War: Power and the Roots of Conflict* (Ithaca, NY: Cornell University Press); and Kier, Elizabeth. 1997. *Imagining War: French and British Military Doctrine Between the Wars* (Princeton, NJ: Princeton University Press).

nationalism and national identities in driving states' foreign policies.[28] These potential internal dynamics are also considered when looking at India's nuclear arms buildup and expansion.

Within the India-centric literature, substantial attention has been paid to the potential influence of bureaucracies in New Delhi's nuclear weapons policies and trajectory. In a single-case study of the country's nuclear expansion and enhancements, P.R. Chari argues that India's pursuit of the nuclear triad of land, sea, and air-based nuclear capabilities is a direct result of competition among the different branches of India's armed services.[29] In another case study, *India's Nuclear Bomb,* George Perkovich argues that the reason that India decided to move forward with the development, testing, and operationalization of the nuclear weapons capability was in large part due to the inordinate amount of influence that the research and development establishment had on policymakers.[30] To a lesser degree, Rajesh Basrur echoes these sentiments and states that "organizational interests and perceptions do seem to play an unacknowledged role in bolstering arguments [about what capabilities constitute "credible minimum deterrence"]."[31] The lack of exploration of bureaucratic interests playing a role in policymaking in India since the 1998 nuclear tests necessitates further exploration in this essay.

Literature Review Conclusion

As seen above, much of the literature regarding arms races and arms buildups has generally fallen into an "external threat" and "internal influence" dichotomy. It is important to

---

Katzenstein, Peter J. 1996. *The culture of national security: norms and identity in world politics*. New York: Columbia University Press; Wendt, Alexander. 1999. *Social theory of international politics*. Cambridge, U.K.: Cambridge University Press; Campbell, David. 1992. *Writing security: United States foreign policy and the politics of identity*. Minneapolis: University of Minnesota Press; Hadfield, Amelia. 2010. *British foreign policy, national identity, and neoclassical realism*. Lanham, Md: Rowman & Littlefield.

[29] Chari, P.R. "India's Nuclear Doctrine." 131.

[30] Perkovich, George. 1999. *India's Nuclear Bomb* (Berkeley, CA: University of California Press).

[31] Basrur, Rajesh. "India's Escalation-resistant Nuclear Posture" in *Escalation Control and the Nuclear Option in South Asia,* eds., Michael Krepon, Rodney W. Jones and Ziad Haider (Washington, DC: The Henry L. Stimson Center, 2004): 60.

consider the relative relevance of these theories and use them to yield insights into the underlying causes as to why India is embarking on its current nuclear path. I will further explore these different possibilities in the forthcoming sections where I delve into the Indian nuclear force trend lines. Moreover, I specifically use Robert Jervis's spiral model, and then explore the bureaucratic politics to assess glean insights regarding India's force capabilities.

India Nuclear Program and Development Background

This section provides an overview of the history of India's nuclear program, its nuclear strategy and posture, and the new capability enhancements since its weapons program became overt in 1998. The history of India's nuclear program has several critical points, which include key decisions to establish and advance the program and test nuclear devices and weapons. India's nuclear strategy and posture are comprised by several core tenets: use of nuclear weapons as political instruments (not war-fighting tools); deter adversaries; no-first use of nuclear weapons; assured retaliation in response to a nuclear strike against India; separation of warheads from delivery vehicles; and the pursuit of "credible minimum deterrence" capabilities. There has been a wide range of capabilities that the Indian government has developed in its ostensible pursuit of the credible minimum deterrent capability. This background information on the development of India's nuclear arsenal establishes a foundation upon which analysis of Indian decision-making can be conducted.

The Indian nuclear program began shortly after the country's independence from Great Britain in 1947. The Indian Parliament and Prime Minister Jawaharlal Nehru established the Indian Atomic Energy Commission (AEC) and the necessary scientific research organizations to develop a "peaceful" nuclear capability for economic development, though in reality, the

technology could also be used to develop nuclear weapons.[32] The nuclear establishment pushed forward with the development of a peaceful nuclear capability through the 1950s and 1960s. While the nuclear bomb lobby within the establishment clamored for India's leaders to push forward with a nuclear weapons capability, the critical decision-makers resisted. This stance changed in the early 1970s when Prime Minister Indira Gandhi along with others in the national security apparatus decided to prepare for a peaceful nuclear explosion. The context of this decision was the 1971 Bangladesh War with Pakistan, an increased U.S. presence in Diego Garcia (Indian Ocean), and after Communist China had tested a nuclear weapon. The nuclear device was eventually detonated in 1974, sparking condemnation from the international community.[33] The first nuclear test was the initial watershed moment that signaled to the world just how far India had come in the development of its nuclear program.

The Indian nuclear program went through a dormant period, of sorts, after the nuclear test in 1974 until 1980. Though India's research and development team made modest advances, further nuclear weapons development was not central for Prime Minister Gandhi from 1975-77, due primarily to the focus that her "Emergency" domestic rule had necessitated.[34] When the nuclear program was run under the control of another political party after Gandhi's ouster until 1980, it floundered and did not produce many noteworthy results.[35] Then, throughout the 1980s, the nuclear program gained steam and began to develop nuclear warheads and embarked on a ballistic missile project.[36] However, throughout this period, it is important to note that India's policymaking elite were still ambivalent about whether or not India should become an overt nuclear power.

---

[32] Perkovich, George. 1999. *India's Nuclear Bomb.* Berkeley, CA: University of California Press: 20.
[33] Ibid, 146-189.
[34] Ibid, 192.
[35] Ibid, 212-222.
[36] Ibid, 226-292.

As the Indian nuclear program moved into the 1990s, international pressure on India to halt its nuclear activities – though present throughout the duration of India's nuclear program – mounted. In the face of these pressures and sanctions, India's Prime Minister Narasimha Rao decided in 1995 that India would conduct a nuclear weapons test.[37] However, the plan was halted, but with the election of a new Hindu-nationalist political party, the Bharatiya Janata Party (BJP), in 1998 India decided to prepare for the nuclear weapons test.[38] In the two years prior to the tests, peace talks between India and Pakistan were conducted in hopes of averting a crisis between the two countries and reducing tensions on nuclear-related issues. In spite of these talks, the BJP leaders decided to conduct a series of nuclear weapons tests in May 1998, which made India's nuclear weapons capability overt.[39] This watershed moment for the program was reciprocated by Pakistan's own nuclear weapons test. The development of a nuclear posture and strategic vision would be necessary at this point.

After the nuclear tests occurred in 1998, the Indian government had to make critical decisions regarding how the nuclear arsenal would be used. After 1998, India's nuclear posture and strategy began to emerge.[40] The closest-to-official *document* regarding India's nuclear posture and doctrine is the National Security Advisory Board's (NSAB) "Draft Nuclear Doctrine," which was released in 1999.[41] The NSAB was comprised of an eclectic mix of security strategists within and outside of government, members of civil society, and journalists.

---

[37] Ibid, 353.
[38] Ibid, 371.
[39] Ibid, 408-416.
[40] For this thesis, nuclear "posture" is comprised of three components: doctrine regarding nuclear weapons use, organizational structure (which includes command and control), and force structure.
[41] 1999, "Draft Report of National Security Advisory Board on Indian Nuclear Doctrine", Pugwash Conferences on Science and World Affairs, August 17. <http://www.pugwash.org/reports/nw/nw7a.htm>.

The basic tenets of this doctrine have been reiterated by Indian officials in the years since. The most notable components include:[42]

- Nuclear weapons will only be used to retaliate against a nuclear attack on Indian soil.
- India will not use nuclear weapons first in any conflict or exchange.
- "Credible Minimum Deterrence" capabilities (qualitative and quantitative) will be pursued in order to deter any adversary
    - As part of credible minimum deterrence, India will pursue the "triad" of ground, sea, and air-based nuclear capabilities
- The decision to use nuclear weapons will rest with the highest civilian political leaders

While there are other parts of this draft regarding research and development, and the security and safety of the strategic arsenal, these contain very few specifics and/or are not central to the critical components of the document.

The first two components of India's nuclear posture are doctrine and organizational structure regarding command and control of the nuclear weapons. Several scholars and experts agree that India not only established a "no first-use" commitment regarding nuclear weapons, it has maintained that commitment into the present day.[43] In addition to this tenet of India's nuclear posture, status quo policy has been that India will guarantee retaliation with nuclear weapons in

[42] 1999. "India's Draft Nuclear Doctrine," *Arms Control Today* (July/August): <http://www.armscontrol.org/act/1999_07-08/ffja99>.
[43] Tellis, Ashley. 2002. "Toward a 'Force-in-Being': The Logic, Structure, and Utility of India's Emerging Nuclear Posture." *Journal of Asian Studies* 25: 64; Pant, Harsh. 2005. "India's Nuclear Doctrine and Command Structure: Implications for India and the World" *Comparative Strategy* 24: 279.

response to a nuclear or other WMD attack on its own soil or against Indian troops.[44] The retaliation against a nuclear attack will be so strong and overwhelming that any potential enemy of India will incur unacceptable costs, which includes the death of a significant portion of the population. These decisions indicate that nuclear weapons will be used as political instruments meant to deter adversaries and are not intended to provide a battlefield advantage.

The organizational structure regarding stewardship of and decision-making about India's nuclear forces has a number of core components. First, the decision to use nuclear weapons lies with political leadership. The group of policymaking elites that make these decisions are part of the Nuclear Command Authority (NCA), which is comprised of the prime minister, National Security Advisor, along with other members of an executive and political council. Ultimate authority, however, lies with the prime minister.[45] Stewardship of nuclear weapons components are divided between civilian and military institutions. Civilian institutions control the warheads and fissile cores, and the military controls the delivery systems (i.e. missiles, aircraft, etc.).[46] One of the logics behind the decision to have these components separated is that the nuclear weapons and delivery vehicles will be able to withstand a potential counter-force nuclear strike by an adversary because the potential targets will be dispersed. During a supreme emergency when the weapons are to be used, these components will be transported across various distances and will be assembled and ready to carry out their missions.

---

[44] Narang, Vipin. 2012. "What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict" *Journal of Conflict Resolution* Published Online (July): 8; Pant, Harsh. 2005. "India's Nuclear Doctrine and Command Structure: Implications for India and the World" *Comparative Strategy* 24: 279; and Tellis. "'Force-in-Being'": 64.

[45] Pandit, Rajat. 2003. "Nuke command set up, button in PM's hand," *The Times of India* (January 4): <http://articles.timesofindia.indiatimes.com/2003-01-04/india/27281139_1_nuclear-command-and-control-nuclear-arsenal-nuclear-retaliation>.

[46] Tellis. *India's Emerging Nuclear Posture.* 431; and Basrur, Rajesh M. 2004 "India's Escalation-Resistant…" 57.

The third component of India's nuclear posture is its force structure, which has constantly been evolving and maturing since the 1998 nuclear tests. As part of its "credible minimum deterrence" requirement put forth in the 1999 Draft Nuclear Doctrine, India has stated that it will develop a nuclear force "based on a triad of aircraft, mobile land-based missiles and sea-based assets."[47] These forces are intended to provide policymakers in New Delhi with the ability to maintain a nuclear force that can credibly threaten unacceptable destruction upon an adversary in a response to a nuclear attack. Part of this credibility means being able to achieve certain targeting goals (i.e. important cities, assets, etc.) in the adversary or potential adversary's country and having a residual force that is large enough to retaliate. In its ostensible pursuit of a credible minimum deterrence capability, India has expanded the size of its nuclear arsenal (number of warheads) and has developed and operationalized a wide range of ballistic missiles, cruise missiles, and sea-based nuclear capabilities.

The quantitative expansion of New Delhi's strategic forces refers to the number of nuclear warheads in its stockpile. Official numbers are Indian government secrets, but expert estimates are widely seen as the best alternative. These periodic assessments are carried out by Hans Kristensen and Robert Norris, who have made estimates regarding *all* nuclear weapons states' force capabilities. The first estimate of Indian forces was published in 2002. At this time India was estimated to have 30-35 warheads in its stockpile.[48] In 2005, the estimate increased to 40-50 warheads,[49] and the 2007 estimate was 50-60.[50] The two most recent estimates were 60-80

---

[47] 1999. "India's Draft Nuclear Doctrine," *Arms Control Today* (July/August): <http://www.armscontrol.org/act/1999_07-08/ffja99>.
[48] Kristensen, Hans M. and Robert S. Norris. 2002. "Nuclear Notebook: India's nuclear forces 2002" *Bulletin of the Atomic Scientists.* 58 (2): 70-72.
[49] Kristensen, Hans M. and Robert S. Norris. 2005. "Nuclear Notebook: India's nuclear forces 2005" *Bulletin of the Atomic Scientists.* 61 (5): 73-75.
[50] Kristensen, Hans M. and Robert S. Norris. 2007. "Nuclear Notebook: India's Nuclear Forces, 2007" *Bulletin of the Atomic Scientists.*63 (4): 74-78.

(2010) and 80-100 (2012).[51] [52] These figures are not conclusive, yet they do provide insights into crucial trend lines regarding the quantitative expansion of India's nuclear arsenal.

India's qualitative capabilities have grown as well. After the nuclear weapons tests, India had to choose whether it would push forward with advanced delivery systems or not.[53] Ballistic missile development and operationalization has been a cornerstone of New Delhi's force modernization and advancement since 1998. The two series of ballistic missiles are the Prithvi and Agni.[54] The former series is comprised of several short-range ballistic missiles (SRBM), and the latter series contains missile with medium-range and intercontinental capabilities. While there are three different versions of the Prithvi ballistic missile, the only one that has a nuclear mission is the Prithvi-I, which has a range of 150 km, and of the five Agni missiles tested so far, only the Agni-I and Agni II are fully operational.[55] Below is a chart containing the names and estimated ranges of India's ground-based ballistic missiles:

Missile	**Estimated Range**
Prithvi-I	150 km
Agni-I	700 km
Agni-II	2,000 km
Agni-III	3,000 km
Agni-IV (Agni-II +)	3,500 km

[51] Kristensen, Hans M. and Robert S. Norris. 2010. "Nuclear Notebook: Indian Nuclear Forces, 2010" *Bulletin of the Atomic Scientists.* 66 (5): 76-81.
[52] Kristensen, Hans M. and Robert S. Norris. 2012. "Nuclear Notebook: Indian Nuclear Forces, 2012" *Bulletin of the Atomic Scientists.* 68 (4): 96-101.
[53] Huntley, Wade L. 1999. "Alternate Futures after the South Asian Nuclear Tests: Pokhran as Prologue." *Asian Survey* 39 (3): 504-524.
[54] For an archive of Agni and Prithvi missile testing, see: 2011. "India Missile Chronology" *Nuclear Threat Initiative* (July): <http://www.nti.org/media/pdfs/india_missile.pdf?_=1316466791>.
[55] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2012…"

Agni-V	Over 5,000 km

These missiles provide India the ability to strike targets all throughout Pakistan, and the Agni-V is capable of striking any major city in China. Recently, it was announced that a new missile, that Agni-VI, is under development, will have a farther reach than the Agni-V, and will be able to carry multiple warheads (MIRVs).[56] However the only fully-operational missiles thus far are the Prithvi-I, Agni-I, and the Agni-II. While India's ballistic missile program began in the 1980s, the testing and development of these systems was ramped up and made more transparent after the 1998 nuclear weapons test.

New Delhi has also proceeded with the development of a cruise missile system. The BrahMos cruise missile is being developed in cooperation with the Russian government,[57] and it is estimated that the BrahMos's range is between 300-500 kilometers.[58] The advantage that cruise missiles have over ballistic ones is that these former are more accurate and can be fitted with larger nuclear warheads. While it is unclear as to if and when the BrahMos will be inducted into India's nuclear forces, this development and cooperation between the Russians and Indians cannot go unnoticed.

In addition to land-based ballistic missiles and the BrahMos cruise missile, the Indian government has been developing a variety of sea-based nuclear systems, including the Sagarika (or K-15) sea-launched ballistic missile (SLBM) that will equip the INS Arihant ballistic missile

[56] 2013. "Agni-VI missile in the works, India to be in world's elite nuclear club," *The Indian Express* (February 9): <http://www.indianexpress.com/news/agnivi-missile-in-the-works-india-to-be-in-worlds-elite-nuclear-club/1071407>.
[57] 2008. "Flight test of BrahMos cruise missile next year: Pillai" *The Hindu* (January 25): <http://www.hindu.com/2008/01/25/stories/2008012560320800.htm>.
[58] 2010. "BrahMos cruise missile test-fired successfully," *Times of India* (March 22): <http://articles.timesofindia.indiatimes.com/2010-03-22/india/28124829_1_mobile-autonomous-launchers-brahmos-block-ii-290-km-range>.

submarine (SSBN). [59] The Sagarika ballistic missile is modeled after the land-based Agni III missile, except it has been modified so that it can be fired from underneath the ocean's surface.[60] These capabilities further enhance the Indian nuclear arsenal's invulnerability to a potential first strike by a nuclear-armed adversary, thereby enhancing the retaliatory capability. In addition to the nuclear submarine capability, the New Delhi has developed and inducted the "Dhanush" a ballistic missile (variant of the Prithvi II) that is launched from ships at sea.[61] These capabilities help to form the nuclear triad of India's land, sea, and air-based nuclear capabilities.

This is a broad overview of the history of India's nuclear program, as well as the more recent developments and advancements of its nuclear forces. However, this brief history begs the question about the quantitative and qualitative developments since the 1998 nuclear weapons tests: why has India embarked on its current nuclear trajectory? The potential explanations vary from internal influences emanating from bureaucratic and organizational interests, to an external threat environment that has driven India in this direction. The next section of this article assesses the underlying causes of New Delhi's nuclear advancements and enhancements since 1998.

Spiral Model and External Threat Perceptions

Using Jervis's Spiral Model

Robert Jervis's spiral model, which explains why states respond to external threats and bolster their defense capabilities, is a useful tool to analyze different countries' arms buildups. It will also be shown that it is useful for analyzing India, more specifically. This approach contains

---

[59] 2009. "INS Arihant Launch Boosts India's Strategic Ambitions," *Military Technology Military Technology* 33 (9) (September): 134.
[60] Dikshit, Sandeep. 2008. "Sagarika to be tested soon off Orissa," *The Hindu* (February 19): <http://www.hindu.com/2008/02/19/stories/2008021959711000.htm>.
[61] 2004. "Dhanush missile successfully test-fired," *The Hindu* (November 8): <http://www.hindu.com/2004/11/08/stories/2004110806870100.htm>.

several different tenets. First, due to the anarchic state of international relations – also known as the "self-help" system – states must fend for themselves in order to ensure their survival.[62] Because states are the only guarantors of their own survival, they will seek to enhance their security through a variety of means (alliances, military capabilities, etc.). As stated earlier in this essay, the self-help situation creates a dynamic known as the security dilemma, which is a perpetual spiral of two states seeking to match or exceed one another's actions.[63] This leads to an arms race.

Jervis further argues that psychological factors reinforce and intensify the security dilemma. States first develop images of each other (friendly, hostile, neutral, etc.) based on past experiences in addition to the military capabilities that each state possesses. Those images create a cognitive rigidity that influences policymakers to assume the worst, and even "ambiguous and even discrepant information will be assimilated to that image."[64] As a result, cognitive rigidity reinforces the security dilemma. These images are formed by important historical events (wars, revolutions, crises, etc.), policymakers' firsthand experiences, and generational effects.[65] This theory is analytically robust and provides a nuanced account of the impact of external forces (China and Pakistan) on India's nuclear trend lines. As the data and available information will show, the vast majority of India's nuclear developments since 1998 are due to the impact of the threat of Pakistan, though the potential threat emanating from China cannot be dismissed.

The Spiral Model and India's Response to the Pakistani Threat

---

[62] Jervis, Robert. 1976. *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press): 62.
[63] Jervis, Robert. 1976. *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press): 64.
[64] Jervis, Robert. 1976. *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press): 68.
[65] Jervis, Robert. 1976. *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press): 217-266.

There are several core indicators regarding the empirical data of India and Pakistan's security behavior which suggests that they are following a tit-for-tat buildup of nuclear capabilities. The first indicator, consistent with the spiral model, is that Pakistan and India have developed hostile images of each other, due to prior crises and wars. This hostile image is confirmed by the lack of economic activity between the two countries. Though trade has increased since the 1990s, the absolute level of economic activity remains negligible.[66] The second indicator is that the quantitative expansion of both India and Pakistan's nuclear arsenals have followed similar trend lines, in spite of India's ability to develop an even larger arsenal than it has. The third important indicator is that both countries engaged in a tit-for-tat missile development and testing phase from1998 to 2006, with the competition becoming less intense since 2006. Moreover, public statements by Pakistani and Indian officials have buttressed these patterns by showing that they are interested in matching the threat posed by each country's primary adversary. I conclude this section by arguing that the quantitative expansion of India's nuclear arsenal has been primarily a result of the Pakistani threat, and its qualitative missile developments were a direct response to the Pakistani threat, with that response becoming less direct in the following years.

According to Robert Jervis's spiral theory, conflicts and crises between states have profound impacts on the development of images. The history of India-Pakistan relations is replete with these perception-shaping events. In 1965, tensions flared over border dispute near the Arabian Sea and eventually spread to the disputed region of Kashmir, resulting in a relatively

---

2012. "Trade Relations between Pakistan and India." (Islamabad, Pakistan: Pakistan Institute of Legislative Development and Transparency): <http://www.pildat.org/publications/publication/FP/TradeRelationsbetweenPakistanAndIndia_IndianPerspective_Jan2012.pdf>.

brief, but quite intense, armed conflict.[67] The second conflict – which was larger – occurred in 1971 when Indian armed forces assisted the separatist movement in East Pakistan, which by extension pressured Pakistani forces trying to maintain law and order. As the situation deteriorated, the Pakistani military withdrew, leading to the vivisection of Pakistan and the creation of Bangladesh.[68] Since this conflict, Pakistani officials have vowed to "never again" allow a similar event to occur, and it even had a significant impact on the development of Pakistan's own nuclear weapons program.[69] Today, the Pakistani Army refers to 1971 as the most tragic year in Pakistan's history.[70] However, 1971 did not mark the end of conflicts and crises between the two countries.

Throughout the 1980s until the present day, both Pakistan and India have been responsible for instigating crises and conflicts. In 1986, India conducted a large-scale military exercise and simulated war game near its western border with Pakistan, which led Pakistan to misinterpret India's actions and mobilize its forces near the border. Each country thought that the other was about to launch a large-scale attack. No shots were fired, but the "Brasstacks" crisis raised tensions and suspicions.[71] In 1989, the Indian military countered extremist militant uprising in Indian-administered Kashmir, a militant movement supported by the Pakistani government and military. This crisis did not lead to a full-scale conflict between India and

---

[67] See: Barnds, William J. 1972. *India, Pakistan, and the Great Powers*. New York: Published for the Council on Foreign Relations, by Praeger.

[68]

[69] For a historical account of the development of Pakistan's nuclear weapons program, see: Khan, Feroz Hassan. 2012. *Eating Grass: The Making of the Pakistani Bomb* (Stanford, CA: Stanford University Press).

[70] "1971 War" Pakistan Army Website. <http://www.pakistanarmy.gov.pk/AWPReview/TextContent.aspx?pId=197&rnd=446>.

[71] Kanti P. Bajpai, P.R.Chari, Pervaiz Iqbal Cheema, Stephen P. Cohen, Sumit Ganguly. 1995. *Brasstacks and Beyond: Perception and Management of Crisis in South Asia*, (New Delhi: Manohar).

Pakistan.[72] Even though conflict was averted, this was another important event that further deteriorated relations.

In 1999, the Kargil War dashed all hopes at improvements in peace between the two countries. Pakistani Prime Minister Nawaz Sharif and his Indian counterpart A. B. Vajpayee had previously met in Lahore in February 1999 and signed a Memorandum of Understanding (MoU) that charted a path towards rapprochement.[73] However, several months later, the Pakistani military, acting independently of civilian political authority, carried out an offensive military operation in Kargil, which is located in Indian-administered Kashmir. A war ensued that eventually led to over one thousand battle deaths.[74] Since Kargil, two crises have been sparked by sub-state militant groups supported by Pakistan's security apparatus. In 2001-2002, the Twin Peaks crisis occurred when militants associated with Jaish-e-Mohammad attacked the Indian parliament building. As a result, both India and Pakistan's armed forces mobilized for war.[75] The second occurred in November 2008 when Lashkar-e-Taiba killed one hundred-fifty individuals in Mumbai.[76] As a response to these crises, India developed a set battlefield plans that allow for quick strikes into Pakistani territory, should another crisis or small-scale incursion take place in the future.[77] The significance of these crises and wars is that they reinforce the hostile images that both India and Pakistan have of each other. Even in a case where both countries are

---

[72] For information on the threat this crisis had to stability, see: Hagerty, Devin T. 1995/1996. "Nuclear Deterrence in South Asia," *International Security* 20 (3) (Winter): 79-114.
[73] For full text of the MoU, see: "Lahore Summit" *The Henry L. Stimson Center* (Posting date unknown): <http://www.stimson.org/research-pages/lahore-summit/>.
[74] For a detailed account of the Kargil War, see: 2009. *Asymmetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict.* Ed. Peter Lavoy (Cambridge, UK: Cambridge University Press).
[75] For information on this crisis, see: Praveen Swami. 2009. "A War to End a War: the Causes and Outcomes of the 2001-2 India-Pakistan Crisis" In Ganguly And Kapur, *Nuclear Proliferation In South Asia* (New York: Routledge): 144-162; and Bajpai, Kanti. "To War or Not To War: The India-Pakistan Crisis of 2001-2," in Ganguly and Kapur, *Nuclear Proliferation In South Asia* 162-182.
[76] For an assessment of the Mumbai crisis, see: Seth G. Jones et al. 2009. "The Lessons of Mumbai" RAND Occasional Paper. <http://www.rand.org/content/dam/rand/pubs/occasional_papers/2009/RAND_OP249.pdf>.
[77] Ladwig III, Walter C. 2007/2008. "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine," *International Security* 32 (3): 158-190.

optimistic about improving relations, past experience spoils future hopes. The rigidity of these hostile images is important for Jervis's spiral model.

Another specific example of hostile image formation can be seen with a Pakistani missile test in 1998. In April of 1998 – before either Pakistan or India tested nuclear weapons – Pakistan tested the 1500 km-range Ghauri ballistic missile. This range enables Pakistan to strike nearly all of the largest cities within India. Justifiably, India felt a strong sense of insecurity as a result, and the test solidified then-Indian Prime Minister Vajpayee's decision to move forward with the nuclear weapons tests. The Indian nuclear test in turn catalyzed the Pakistani decision to move forward with its nuclear weapons test.[78] This back-and-forth is a perfect example of how both countries respond to each other and have developed hostile images of each other.

These dynamics and occurrences have had an indelible impact on relations between the India and Pakistan. An appropriate contemporary indicator of hostile images is a dearth of direct economic activity. In fact, no direct trade is conducted between Pakistan and India, and only Kashmir-based economic activity is conducted.[79] While both countries have provided "most-favored nation" (MFN) status to one another, economic activity has remained anemic. Moreover, Pakistan's security institutions are constantly reminded by India's offensive military operations in the 20th century, and Indian policymakers continually fear the next terrorist attack or operation by the Pakistan Army. Nuclear weapons capabilities exacerbate tensions and hostile perceptions. These images are buttressed by observable behavior and force estimates that suggest India and Pakistan have become engaged in an arms race.

---

[78] For a more detailed historical account, see: Perkovich, George. 1999. *India's Nuclear Bomb* (Berkeley, CA: University of California Press): 409-424.

[79] For a review of Pakistan and India's lack of economic linkages, see: Syed, Maria. 2012. "Pakistan-India Trade: Rationale and Reality." *Pakistan Horizon* 65, no. 3: 85-101.

In addition to the development of hostile images, there are three components of evidence that are consistent with the basic tenets of Jervis's spiral model. First, both countries have followed similar quantitative expansions of their arsenals, and Pakistani and Indian public officials' public rhetoric buttresses these trends and suggests that the quantitative size of both countries nuclear arsenals are tied to each other. Second, the two countries tested nuclear-capable missiles on a fierce tit-for-tat basis from 1998 to 2006, and to a lesser degree after 2006. Third, both countries' policy-makers have a propensity to make worst-case assessments of inherently ambiguous nuclear capabilities and developments, which is consistent with Jervis's argument that leaders will fit discrepant information with a preexisting image. This evidence shows that the great bulk of India's nuclear developments can be traced to the external threat posed by Pakistan.

The first body of evidence of India's nuclear developments consistent with Jervis's spiral model is the parallel quantitative expansion of its nuclear stockpile with the expansion of Pakistan's. The figures – widely used by India-centric literature – are based on periodic estimates. While they may be *estimates* in the truest sense of the term, they illuminate general trend lines of India and Pakistan's force expansions. This can show a "tit-for-tat" development. In 2002, India reportedly possessed 30-35 warheads in its stockpile.[80] In 2005, the estimate increased to 40-50 warheads,[81] and the 2007 estimate was 50-60.[82] The two most recent estimates were 60-80 (2010)[83] and 80-100 (2012).[84] Pakistan's force expansion has mirrored

[80] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2002"
[81] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2005"
[82] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2007"
[83] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2010"
[84] Kristensen and Norris. "Nuclear Notebook: India's nuclear forces 2012"

India's. In 2001, it was estimated to have 24-48 warheads,[85] and in 2007 it was estimated to have around 60 warheads in its stockpile.[86] The 2009 and 2011 Pakistani nuclear force estimates were 70-90 [87] and 90-110, [88] respectively. Both countries have more than doubled their warhead stockpiles since the beginning of the 21st century. Moreover, it has also been argued that India is capable of expanding its arsenal at a much quicker rate, but has not done so.[89] These mirroring trend lines suggest that neither country is keen on falling behind the other in the quantitative size of their arsenals. Doing so would leave one's own nuclear forces at-risk of a crippling nuclear first strike by the other.

These mirroring trends are supported by public statements by policymakers in India and Pakistan. In 2011, in response to a question regarding Pakistan's nuclear arsenal expansion, India's defense minister said that India would be responding and "taking care of that" expansion with its own actions.[90] Moreover, former Minister of External Affairs for India Jaswant Singh stated that India's nuclear arsenal would not be a fixed number and would be tied to the level of the external threat posed by an adversary.[91] Former Indian National Security Advisor from 1998-2004 Brajesh Mishra echoed these sentiments and said that India's nuclear arsenal can be expanded at any moment if "certain events" occur.[92] Pakistani officials have argued in similar terms. Former Pakistani President Pervez Musharraf suggested that the size of India and

---

[85] Kristensen Hans M. and Robert S. Norris. 2002. "Nuclear Notebook: Pakistan's Nuclear Forces, 2001" *Bulletin of the Atomic Scientists.* 58 (1): 70-71.
[86] Kristensen, Hans M. and Robert S. Norris. 2007. "Nuclear Notebook: Pakistan's Nuclear Forces 2007" *Bulletin of the Atomic Scientists.* 63 (3): 71-74.
[87] Kristensen, Hans M. and Robert S. Norris. 2009. "Nuclear Notebook: Pakistan's Nuclear Forces 2009" *Bulletin of the Atomic Scientists.* 65 (5): 82-89.
[88] Kristensen, Hans M. and Robert S. Norris. 2011. "Nuclear Notebook: Pakistan's Nuclear Forces 2011" *Bulletin of the Atomic Scientists.* 67 (4): 91-99.
[89] Krepon, Michael. 2013. "The Tortoise and the Hare." *Arms Control Wonk* (February 24): <http://krepon.armscontrolwonk.com/archive/3706/the-tortoise-and-the-hare#more-3263>.
[90] "Antony: Not worried about Pak n-arsenal," *The Indian Express* (June 11, 2011): <http://www.indianexpress.com/news/antony-not-worried-about-pak-narsenal/802119>.
[91] Kharnad, Bharat. 2008. India's Nuclear Policy. 89.
[92] Kharnad, Bharat. 2008. India's Nuclear Policy. 89.

Pakistan's nuclear arsenal were joined at the hip, and that any reduction in the arsenals would have to be made cooperatively.[93] Pakistani officials have additionally stated that the size of their nuclear arsenal will be used "to deter all forms of aggression, mainly from India."[94] The above evidence shows a linkage between the quantitative size of both India and Pakistan's nuclear arsenals.

In terms of qualitative missile capabilities, there has also been an action-reaction dynamic occurring between Pakistan and India. Missile tests are useful indicators because countries frequently use missile tests to signal their emerging and already-established capabilities.[95] From 1998 to 2006, there was fierce tit-for-tat testing between India and Pakistan. During this period, India conducted 40 ballistic and cruise missile tests, all of which had an estimated average range of around 513.25 kilometers.[96] These missiles included the Agni-I, Agni-II, and the Prithvi missiles that are reportedly designated to nuclear missions. Pakistan, on the other hand, tested 28 cruise and ballistic missiles during the same period of time, all of which had an average estimated range of 1056 kilometers.[97] These average distances are useful for Pakistan and India only against each other. With both countries frequently publicizing their missile tests during this time period suggests that the announcement of Indian tests were to show Pakistan that it possessed significant capabilities as well. Moreover, given the context of this time period, which included the nuclear weapons tests, the 1999 Kargil War, and the 2001-02 "Twin Peaks" crisis, it

---

[93] 2004. "N-arsenal to be cut if India follows suit: Musharraf urges peace in region," *Dawn* (June 5): <http://archives.dawn.com/2004/06/05/top2.htm>.
[94] Sultan, Adil. 2011-2012 "Pakistan's Emerging Nuclear Posture," *Strategic Studies* vo. XXXI & XXXII (nos. 4 & 1) (Winter & Spring), Institute of Strategic Studies, Islamabad: <http://www.issi.org.pk/publication-files/1340000409_86108059.pdf>.
[95] See: Khan, Feroz Hassan. 2003. "Nuclear Signaling, Missiles, and Escalation Control in South Asia," in Michael Krepon, Rodney W. Jones and Ziad Haider (eds.), *Escalation Control and the Nuclear Option in South Asia* (Washington: The Henry L. Stimson Center): 75-100.
[96] Dalton and Tandler. 2012. "Understanding the Arms Race in South Asia," *Carnegie Endowment for International Peace.*
[97] Ibid.

is clear that threat perceptions manifested themselves in the testing and development of India and Pakistan's various missile capabilities.

The other tenet of Jervis's spiral model is that states will assume the worst about ambiguous developments and actions in a country with which it has a hostile image. There is substantial evidence that suggests both Pakistan and India have done this regarding each others' nuclear capabilities and developments. For example, in June 2000, Pakistani officials offered to start a "restraint regime" that would curtail a hasty buildup of nuclear and conventional weapons between the two countries. This seemingly conciliatory gesture was categorically rejected by India, which labeled it as "propagandist."[98] This certainly is a result of hostility between the two actors as a result of the Kargil War. India understandably rejected the offer, and it is important to note that this is prime evidence that supports Jervis's main thesis that any conciliatory gestures will be rejected by adversaries. Moreover, this is evident when Pakistan fits India's development of sea-based nuclear capabilities into its preexisting hostile image of India. Pakistani officials have made frequent statements that the nuclear missile-equipped submarine will undermine stability in the subcontinent and will spark a fierce arms race between the two countries.[99] The reason this is a significant development is because nuclear submarines are inherently ambiguous in terms of deterrence objectives. It is impossible to discern which country India is intending to deter with this capability, and as a result, it cannot be seen as an overt and direct threat to one country's security. Pakistan's hostile image of India seemed to predetermine the threat assessment of the nuclear submarine.

---

[98] 2000. "India rejects Pak. proposal, terms it 'propagandist'" *The Hindu* (June 15): <http://hindu.com/2000/06/15/stories/01150001.htm>.
[99] Subramanian, Nirupama. 2009. "Destabilising step: Pakistan," *The Hindu* (July 28): <http://www.hindu.com/2009/07/28/stories/2009072860551000.htm>.

India has, in turn, signaled ambivalence and even an unwillingness to progress forward on substantive peace talks with Pakistan even when Pakistani leaders make positive gestures. This is primarily due to their unwillingness to trust Pakistan in a meaningful way because of Pakistan's involvement as a spoiler in crises and conflicts. A "trust deficit" exists between the two. Indian External Affairs Minister S. M. Krishna stated that India had been assured at the highest levels that Pakistan would not be supporting terrorism, but that trust was lost due to the Mumbai attacks.[100] He has further argued that Pakistan has always had a posture of "compulsive hostility."[101] These quotes accuse Pakistan of holding nefarious designs and motives and state that, even if Pakistan were interested in holding peace talks, India will be reluctant to move forward.

The empirical evidence regarding India and Pakistan's nuclear developments suggests that many of the short and medium range ballistic missiles which were tested in the early to mid-2000s were done so due to the external threat that each state posed to the other. The context of relations included the Kargil War as well as the Twin Peaks crisis of 2001-02, which heightened the sense of insecurity by both states. There is also a tendency, as seen above, by policymakers to tie their nuclear pursuits to what happens in the external threat environment. Moreover, the quantitative expansion of India's nuclear arsenal since 1998 (as well as Pakistan's) indicates that both countries are seeking to maintain parity in terms of quantitative nuclear capacity. Neither state wants to fall behind the other, which would then damage each state's ability to retaliate in the event of a nuclear war. These tit-for-tat developments in quantitative and qualitative missile capabilities – along with Pakistan and India's longstanding hostile images of each other – show

[100] 2011. "India ready for 'step by step' approach with Pak" *The Indian Express* (January 26): <http://www.indianexpress.com/news/india-ready-for-step-by-step-approach-with-pak/742381/1>.
[101] 2011. "Pakistan must discard posture of compulsive hostility: India" *The Hindu* (January 4): <http://www.hindu.com/2011/01/04/stories/2011010460680200.htm>.

that Jervis's spiral model helps to explain that India has made a bulk of its nuclear developments in response to the external threat posed by Pakistan.

External threat posed by China

India's relationship with China has not been plagued by the frequent crises and conflict that have consistently rotted the relationship between India and Pakistan. However, there has been tension in the past, such as the 1962 war between the two. New Delhi and Beijing also have longstanding territorial dispute over the state of Arunachal Pradesh. In spite of these problems, both China and India have not had the frequent negative experiences that precipitate hostile images of each other. In the nuclear realm, both India and China have significant disparity in terms of quantitative nuclear forces, and we have not seen a tit-for-tat buildup in each country's nuclear capabilities. Moreover, if India wished to more quickly achieve parity with China, it could have done so but, as stated previously, has not. However, it is argued here that India is hedging against a future Chinese threat by incorporating long-range missile systems that can effectively deter against any aggressive policies enacted by Beijing.

Both India and China do not yet have hostile images of each other. However, those images have not been completely friendly, necessarily. As both China and India have grown economically and expanded their military capabilities, certain points of tension have been building. One example is the budding maritime rivalry in the Indian Ocean and off the coast of Southeast Asia. Both countries are seeking to secure their economic interests, and the naval realm appears set to be a point of contention for both New Delhi and Beijing as their perceived interests clash.[102] However, this new development and tension has also been met with news of

[102] Mohan, C. Raja. 2012. *Samudra Manthan: Sino-Indian Rivalry in the Indo-Pacific.* (Washington, D.C.: Carnegie Endowment for International Peace).

possible maritime cooperation and joint military exercises being conducted between the two countries.[103] While tensions may be rising, both countries are willing to establish the necessary linkages to minimize the risks associated with their cashing interests. This suggests that both countries, currently, do not necessarily have adversarial images of one another, but that a base line of tension exists between the two. This tension has the potential to be cause for concern in the future, but for the time being, conflict appears on the horizon.

The China-Pakistan security nexus has also been influenced India's image of China. At various points through the development of Pakistan's nuclear weapons program, the Chinese government provided substantial technical and material assistance to the Pakistanis. This assistance played an important role in allowing Pakistan to cross the threshold and become a nuclear weapons state.[104] Moreover, Beijing has provided Islamabad and Rawalpindi with difficult-to-obtain ballistic missile components and plans.[105] A CIA report argued that China violated international export controls by transferring arms to Pakistan as it was in the latter stages of its nuclear weapons development.[106] China's connection to Pakistan's security apparatus has heightened India's overall concerns. Moreover, Pakistanis and Chinese have become concerned with greater security cooperation between the United States and India. The prime example of this was their displeasure with the U.S.-India civil nuclear cooperation

[103] 2013. "India, China agree to hold joint military exercise," *The Indian Express* (January 15): <http://www.indianexpress.com/news/india-china-agree-to-hold-joint-military-exercise/1059308>.
[104] For more information on China's assistance to Pakistan's nuclear weapons program, see: Khan, Feroz Hassan. 2012. *Eating Grass: The Making of the Pakistani Bomb.* (Stanford, CA: Stanford Security Studies, Stanford University Press).
[105] Krishnaswami, Sridhar. "'China supplied missile parts to Pak.'" *The Hindu* (August 7, 2001): <http://www.hindu.com/2001/08/07/stories/01070004.htm>.
[106] Krishnaswami, Sridhar. "CIA report finds increased Chinese arms sales to Pak." *The Hindu* (August 10, 2000): <http://www.hindu.com/2000/08/10/stories/03100003.htm>.

agreement.[107] This deal enables India to possibly devote more nuclear materials to weapons purposes.

Another indicator of relations not being adversarial between China and India is the level of economic activity between the two. Over the last decade, trade between the two has increased manifold. In 2000, total trade between China and India was $3 billion, and it increased to around $74 billion in 2011.[108] In addition to this trend line, the two countries have signed on to several economic cooperation agreements which span from the service sector, to manufactured hardware, to consumer goods (among many other areas of trade).[109] This component of the Sino-Indian relationship, in addition to the aforementioned security ambivalence between Beijing and New Delhi, is indicative of an image that is relatively neutral, with a potential for future tensions. Put simply, the two countries do not view each other in a hostile way.

In terms of India's nuclear weapons capability developments, there are several indicators that it is responding *potential* threat posed by China. Three of India's ballistic missile capabilities have utility against Chinese cities. The first is the Agni-III medium range ballistic missile, which has a range of around 3,000 km. The other two are the Agni-IV and Agni-V, which have ranges of around 3,500 km and over 5,000 km, respectively. While the Agni-III and Agni-IV can strike targets deep within China, the Agni-V provides India with the farthest reach and can strike nearly all of China's major cities, including Beijing. These three missile capabilities have limited or no utility in deterring the Pakistani threat. Moreover, the Indian government announced in 2013 that it has been designing the new Agni-VI ballistic missile, which has an even farther reach than the

---

See an official Pakistani press release here: 2007. "Statement by the National Command Authority," August. <http://missions.itu.int/~pakistan/2005_Press_Releases/Disarmament/prnca_2aug07.htm>.

[108] Kumar, Hari. 2012. "India and China Deepen Economic Ties," *New York Times* (November 27): <http://india.blogs.nytimes.com/2012/11/27/india-and-china-deepen-economic-ties/>.

[109] Ibid.

Agni-V.[110] These capabilities provide India with a much-desired deterrent capability against China.

Another ballistic missile-related indicator of India's underlying motives in developing its missile capabilities to respond to a potential Chinese threat is the frequency and average distance of those ballistic missile tests. Since 2006, India publicized thirteen different ballistic missile tests. The average distance of these tests was around 2,500 km.[111] That figure is a stark contrast to the average distance of the missile tests from 1998 to 2006, which, as previously mentioned, averaged 513.25 km. The shift in this trend suggests that India's increased technological capability to produce more sophisticated systems afforded it to concentrate on the threat posed by China. Moreover, the increased tensions over the maritime rivalry as well as other systemic issues in the security environment support this claim.

Indian nuclear doctrine and public statements by officials buttress this argument and suggest that New Delhi's recent missile pursuits are in fact driven by the Chinese threat. The first evidence is the consistent claim that India's nuclear deterrent is not country-specific. Interviews with former Indian national security officials Brajesh Mishra and K. Subrahmanyam have argued that India's flexible deterrence requirements are not "country-specific."[112] Other officials have echoed these sentiments.[113] Since India, in its nuclear doctrine and elsewhere, has stated that it will only use nuclear weapons to retaliate against a nuclear strike on its own soil, it can be surmised that India's nuclear deterrent objectives lie only with those countries that possess

---

[110] Subramanian, T.S. 2013. "Agni-VI all set to take shape." *The Hindu* (February 4): <http://www.thehindu.com/news/national/agnivi-all-set-to-take-shape/article4379416.ece>.
[111] Dalton, Toby and Jaclyn Tandler. 2012. "Understanding the Arms "Race" in South Asia." *The Carnegie Papers* (Washington, D.C.: Carnegie Endowment for International Peace).
[112] Kharnad, Bharat. 2008. *India's Nuclear Policy*. 89.
[113] 2012. "India test launches Agni-V long-range missile." *BBC* (April 19): <http://www.bbc.co.uk/news/world-asia-india-17765653>; 2001. "India not engaged in nuclear race." *The Hindu* (March 27): <http://www.hindu.com/2001/03/27/stories/0227000b.htm>.

nuclear weapons. As such, India's nuclear-capable ballistic missile developments since 2006 have become more emphasized on developing those missiles that can target various locations within China.

While the India's missile developments and signaling have indicated a shift in focus towards meeting the Chinese threat, the quantitative expansion of the arsenal has not yet been indicative of such a shift. As previously mentioned, the Indian nuclear warhead stockpile has doubled since 2002, and the most recent estimate in 2012 was 80-100. China's arsenal, on the other hand, in both 2010 and 2011, was estimated to have approximately 240 nuclear warheads.[114] While India's upward trend could be indicative of its desire to reach parity with China's quantitative nuclear force capabilities, this ignores a key point. India has the *capacity* to build nuclear weapons at a far quicker pace than it is doing so today.[115] If India were interested in establishing parity with China's nuclear force capabilities, it could be expected that it would proceed as quickly as possible. This suggests the potential Chinese threat – although present in Indian policymaking calculus – is not an immediate threat and does not warrant a rapid buildup in quantitative nuclear capabilities.

Consistent with the spiral model's argument that states with non-hostile images of one another will not necessarily fall down a path of fear and security dilemma, India and China do not appear to be headed down this path. However, this is not to say that the threat posed to India by China is going unnoticed. To the contrary, much of New Delhi's energy in its nuclear weapons capabilities pursuits has been directed towards developing long-range ballistic missile systems that can effectively deter the threat posed by Beijing's strategic arsenal. As seen with

[114] Kristensen, Hans M., and Robert S. Norris. 2011. "Chinese nuclear forces, 2011." *Bulletin Of The Atomic Scientists* 67, no. 6: 81-87; Norris, R. S., & Kristensen, H. M. 2010. Chinese nuclear forces, 2010. *Bulletin Of The Atomic Scientists*, *66*(6), 134-141.
[115] Kristensen, Hans M. and Robert S. Norris. "Indian nuclear forces, 2012."

the missile test trend change since 2006 and the open-ended deterrence requirements, it can clearly be seen that the rising concentration of India on Beijing has precipitated this development. The quantitative expansion of India's arsenal, on the otherhand, is not directly tied to the survivability of its nuclear forces vis-à-vis China's counterforce threat as New Delhi, if it so chooses, could proceed to expand its arsenal at a far higher rate in order to reach parity with Beijing.

To conclude, there is significant evidence that the quantitative expansion of India's nuclear arsenal is a direct response to the threat posed by Pakistan. This dynamic is reinforced by the hostile images that both countries have of each other. Secondly, India's missile developments from 1998 to 2006 were primarily a response to the threat posed by Pakistan, with New Delhi's attention shifting since 2006 towards the potential threat emanating from Beijing. While there is significant evidence supporting these claims, it is necessary to explore another potential source of influence: domestic organizations and bureaucracies.

Internal Factors

Bureaucratic Politics

One other lens through which to analyze India's nuclear expansion and enhancements is by looking at the competing interests of bureaucracies, and how those interests manifest themselves in policy outcomes. The term "bureaucratic interests" raises several possible explanations as to what constitutes an "interest." The first possibility is that each bureaucracy has an interest in maximizing resource allocation and maintaining a constant flow of funds to keep its operations salient. Second, the different branches of the military and the research and development apparatus seek to have the most sophisticated weapons systems and push the limits

of technological innovation. Third, each organization may have a different outlook regarding their nation's role in the global or regional system of states, one that influences the policies each one will prescribe. These are a few among a wide range of possible specific bureaucratic and organizational interests.

Within India's bureaucratic and national security system, there are several organizations that may have influence over what constitutes the necessary and proper nuclear weapons policies. First, the Defense Research and Development Organization (DRDO) conducts feasibility studies, designs new weapons systems, and tests the nuclear capable missiles. The other organizations include the Indian Army, Navy, and Air Force, all of which are the stewards of the nuclear weapons' delivery vehicles and would carry out any mission to strike an adversary with a nuclear weapon. Another organization is the Indian Strategic Forces Command (SFC), which is an independent armed services entity that dedicates itself to the protection and maintenance of India's nuclear stockpiles. While there is evidence that suggests that each of the organizations seeks to maximize resource allocation, motivated by prestige, and has contrasting views of what constitutes appropriate nuclear weapons policies, it is concluded in this section that it is nearly impossible to use this information to establish causality in decision-making. However, I do not preclude the possibility of these organizations influencing New Delhi's decision-making calculus in a meaningful way.

The first indicator of these organizations competing for influence in India's nuclear decision-making process is the issuance of conflicting and organization-propping public statements regarding the appropriate measures for India to take. The first example is the Indian Navy's longstanding claim that a nuclear submarine which is equipped with nuclear-tipped

ballistic missiles is a necessary ingredient for achieving "credible minimum deterrence."[116] Another example of this bureaucratic interest of the Navy to have a more privileged place in India's nuclear policies was iterated in the 2004 *Maritime Doctrine*, which said that, unlike all no-first-use nuclear powers, "India stands out alone as being devoid of a credible nuclear triad."[117] The *Arihant* nuclear submarine will provide the Navy with a more sophisticated and less vulnerable system, and it provides the Indian Navy with a more important role in Indian defense matters.

A second example of a component of India's armed forces having organization-specific interests is with the Indian Strategic Forces Command (SFC). While the SFC is not an official wing of the Indian armed forces, it is a quasi-military organization which is the steward of India's nuclear stockpiles. In 2010, it was reported that the SFC made a proposal to acquire 40 fighter jets capable of conducting nuclear missions.[118] If this proposal is indeed operationalized, it would form a new part of the already-established air-based leg of India's nuclear triad. This organization-specific request is indicative of different organizations attempting to wrest control of a greater portion of India's nuclear forces. Moreover, while this report was based on internal Indian defense sources and did not include a response from the Indian Air Force (IAF), it is likely that the IAF did not welcome the move as it would eliminate the branch's monopoly on nuclear-capable aircraft.

---

[116] 2007. "India to launch indigenous n-submarine by '09: Navy Chief," *The Indian Express* (December 4): <http://www.indianexpress.com/news/india-to-launch-indigenous-nsubmarine-by--09-navy-chief/246495/1>; Bedi, Rahul, 2004. "A new doctrine for the Navy," *Frontline,* vol. 21, issue 14 (July 03-16): <http://www.flonnet.com/fl2114/stories/20040716002104600.htm>.
[117] Integrated Headquarters (Indian Navy). 2004. *Indian Maritime Doctrine.* (New Delhi): 49.
[118] 2010. "Strategic Command to acquire 40 nuclear capable fighters," *The Indian Express* (September 12): <http://www.indianexpress.com/news/strategic-command-to-acquire-40-nuclear-capable-fighters/680636>.

There are also examples of competing statements made by the bureaucracies and branches of the military regarding what constituted "credible minimum deterrence." This essay previously discussed the Indian Navy's desire to incorporate sea-based nuclear capabilities as part of "credible minimum deterrence." However, in June 2011, Commander-in-Chief of SFC stated that India is "way up and ahead on what we need to do (in the creation of minimum credible nuclear deterrence."[119] This suggests that there are competing interpretations regarding what capabilities are needed by India in order to achieve a credible minimum deterrence capability. These suggest that the different branches of the military compete with one another to promote their own specific interests.

Notwithstanding this evidence of bureaucratic jostling, there is one caveat when looking at the role of the armed forces in India's nuclear planning. The nuclear program and force planning has largely shunned the branches of the military, and the civilian leaders are often the ones making the strategic plans to acquire different capabilities.[120] Even when India embarked on its nascent nuclear weapons program in the latter half of the 20th century, the civilian leadership excluded military brass from providing substantial input in the program's direction.[121] Moreover, while it had always been assumed that the Indian nuclear program was under civilian authority, it was formally expressed through the creation of the Nuclear Command Authority (NCA) in 2003.[122] If the civilian leaders and entities have virtually all control over nuclear force planning in India, then the validity of a component of the bureaucratic politics theory must be questioned.

2011. "India way ahead in creating minimum credible nuke deterrence." *The Indian Express* (June 17): <http://www.indianexpress.com/news/india-way-ahead-in-creating-minimum-credible-nuke-deterrence/805134>.

[120] For an account of this civil-military dynamic, see: Koithara, Verghese. 2012. *Managing India's Nuclear Forces* (Washington, DC: Brookings Institution Press).

[121] Perkovich, George. 1999. *India's Nuclear Bomb: The Impact on Global Proliferation*. Berkeley, CA: University of California Press.

[122] Boyd, Kerry. 2003. "India Establishes Formal Nuclear Command Structure." *Arms Control Today* (January/February): <http://www.armscontrol.org/act/2003_01-02/india_janfeb03>.

However, evidence regarding a civilian bureaucracy with a history of substantial influence in policymaking circles – the Defense Research and Development Organization (DRDO) – provides more evidence of how organizational interests have potentially influenced India's nuclear policy planning.[123]

When India conducts missile tests or inform the press of newly-developed, designed, or inducted nuclear capabilities, DRDO officials will make public statements as well. In these statements, there is evidence of the DRDO holding organization-specific interests that are then able to influence policy outcomes. These arguments have centered on justifications such as enhanced nuclear deterrence, international prestige, and profit motives. All three of these motives form DRDO's organizational interests, which then leads it to advocate for the Indian government to develop and operationalize certain nuclear capabilities. While the potential influence of the DRDO's bureaucratic interests cannot be precluded, it is not possible to establish a clear causal relationship between these interests and the final policy outcomes.

The first component of DRDO's organizational interest is the desire to develop a greater deterrent capability for the Indian government. In November 2010, a DRDO official stated that the 5000 km-range Agni V, as well as the slightly shorter range Agni II +, would boost India's deterrent capabilities.[124] There have been additional statements that have alluded to how new

[123] DRDO was established shortly after India gained independence from Great Britain in 1947. It was intended to provide India with modern technological capabilities like nuclear power and infrastructure that would spark economic development. Moreover, it worked on developing defense technologies in order to provide India an indigenous source of defense capabilities (conventional and nuclear). It played a key role in the decision to test the nuclear device in 1974 and the subsequent tests in 1998. It has been at the forefront of nuclear weapons and conventional military development in the 21st century as well. A counterpart in the United States would be the Defense Advanced Research Projects Agency (DARPA), which was established in 1958 and continues to carry out research and development today.

[124] Subramanian, T.S. 2010. "Agni-II + launch before December 10," *The Hindu* (November 28): <http://www.thehindu.com/todays-paper/tp-national/agniii-launch-before-december-10/article918781.ece>.

missile and delivery vehicles will help to boost India's security.[125] These statements would suggest that the DRDO has India's security situation in mind when it advocates for different projects and systems that should be incorporated into India's nuclear arsenal. However, the supposedly increased security that these systems provide is not DRDO's only motive.

Another common theme seen in DRDO's public statements regarding India's emerging nuclear capabilities is that, by developing and incorporating increasingly sophisticated nuclear weapons systems, India will become part of an elite club, and its status in the international system will be enhanced. When the Agni-V ballistic missile was successfully tested on Thursday, April 19, 2012, head DRDO official and Scientific Adviser to the Defence Minister V.K. Saraswat said, "This missile belongs to the 21st century not only in timeframe but in technological capability."[126] Regarding the development stages of the Agni-V, the director of the Agni program Avinash Chander said that "this technology is developed by very few countries and we are on a par with them now."[127]

DRDO is also vocal of the fact that India has developed missile technologies in the face of international efforts to prevent them from doing so. After the successful flight tests of the Agni-III missile, V.K. Saraswat showed a great deal of pride of DRDO being able to develop a

---

[125] Mallikarjun, Y. 2007. "DRDO begins work on Agni-IV missile," *The Hindu* (August 9): <http://www.thehindu.com/todays-paper/drdo-begins-work-on-agniiv-missile/article1888805.ece>; Subramanian, T.S. "Agni-1 launch successful," *The Hindu* (October 6, 2007): <http://www.hindu.com/2007/10/06/stories/2007100662140100.htm>; Subramanian, T.S. and Y. Mallikarjun. 2010. "DRDO raises the bar, sets its sights on 5,000-km Agni-V," *The Hindu* (February, 8): <http://www.thehindu.com/news/national/drdo-raises-the-bar-sets-its-sights-on-5000km-agniv/article102608.ece>.

[126] Subramanian, T.S. and Y. Mallikarjun, 2012. "In Wheeler Island, a perfect mission sparks celebrations," *The Hindu* (April 20): <http://www.thehindu.com/news/national/in-wheeler-island-a-perfect-mission-sparks-celebrations/article3332940.ece>.

[127] Mallikarjun, Y., 2008. "Agni-V design completed; to be test-fired in 2010," *The Hindu* (November 27): <http://www.thehindu.com/todays-paper/tp-national/agniv-design-completed-to-be-testfired-in-2010/article1384080.ece>.

missile indigenously and in spite of the Missile Technology Cut-off Regime (MTCR).[128] The MTCR is an international effort to prevent the illicit sale and spread of missile technology and components, an effort which is part of the international community's broader nonproliferation efforts. This arrangement includes most developed countries and all nuclear weapons states formally recognized by the Nuclear Nonproliferation Treaty (NPT). Similar comments related to prestige have been offered up for successful flight tests of the Agni-IV ballistic missile.[129] Additionally, the Sagarika underwater-launched ballistic missile – which will help to form part of India's nuclear triad – has been a point of pride for DRDO. The director of the Sagarika program said, "India is the fifth country to have an underwater launch system. The other countries are the U.S., Russia, France, and China."[130] These statements are consistent with the logic that each organization in a government's bureaucratic system is interested in enhancing India's international prestige and becoming associated with the most technologically advanced systems.

There is also evidence of a third bureaucratic interest: the potential resource allocation motive of DRDO and its officials. By continuing the development of more advanced nuclear capabilities, this ensures that funds will continue to be devoted to DRDO, ensuring the sustainability of its existence and operations. Additionally, these funds are also used to pay for the salaries of the officials working within DRDO. After the successful test of the Agni-V ballistic missile, V.K. Saraswat (Scientific Adviser to the Defence Minister) stated that there is

---

[128] Subramanian, T.S. and Y. Mallikarjun. 2010. "DRDO raises the bar, sets its sights on 5,000-km Agni-V," *The Hindu* (February 8): <http://www.thehindu.com/news/national/drdo-raises-the-bar-sets-its-sights-on-5000km-agniv/article102608.ece>.
[129] Subramanian, T.S. 2012. "Agni-IV scores a hit yet again," *The Hindu* (September 20): <http://www.thehindu.com/todays-paper/tp-national/agniiv-scores-a-hit-yet-again/article3916483.ece>.
[130] Subramanian, T.S. and Y. Mallikarjun. 2012. "K-15 all set to join Arihant," *The Hindu* (December 27): <http://www.hindu.com/2009/07/27/stories/2009072755801000.htm>.

export potential for some of the missile technologies that India has developed.[131] While he did not specify that the nuclear-capable missiles would be suitable for exporting to friendly nations, his statement did suggest that DRDO has an interest in continuing the development of missile technology in order to maintain its privileged position within the Indian bureaucratic system.

There is also evidence of tensions between DRDO and other public officials and bureaucracies regarding the battle for resources and that DRDO's technological developments are not essential for Indian national security purposes. Defence Minister A. K. Antony suggested that DRDO had an archaic way of operating and needed to change its mindset if India is to achieve self-reliance and meet its maximum potential.[132] After an attempt to reign in the resource allocations to the DRDO, there was significant backlash from current and former leaders of the DRDO.[133] Many of the proposals in the past have hit bureaucratic roadblocks.[134] In 2010, there were attempts at making the DRDO more accountable financially due to the dissatisfaction of the armed services.[135] Further evidence of these conflicting interests occurred in 2008 when the Indian Army showed its dismay with DRDO's plans to develop an anti-aircraft (potentially nuclear-capable) missile.[136] This evidence–coupled with the other evidence – suggests that DRDO's policy proposals are largely driven by its specific bureaucratic interests, as are the branches of the military.

---

[131] 2012. "'Tremendous potential to export missiles to friendly nations,'" *The Hindu* (April 29): <http://www.thehindu.com/todays-paper/tp-national/tremendous-potential-to-export-missiles-to-friendly-nations/article3365999.ece>.
[132] Prasad, K.V. 2010. "Discard old mindset, Antony tells DRDO," *The Hindu* (February 24): <http://www.hindu.com/2010/02/24/stories/2010022459282000.htm>.
[133] 2012. "Liberate scientific pursuit from bureaucratic clutches: Nair," *The Indian Express* (September 24): <http://www.indianexpress.com/news/liberate-scientific-pursuit-from-bureaucratic-clutches-nair/1007145>.
[134] Pubby, Manu. 2009. "DRDO revamp: Antony appoints high-level panel," *The Indian Express* (June 12): <http://www.indianexpress.com/news/drdo-revamp-antony-appoints-highlevel-panel/475162/>.
[135] Unnithan, Sandeep. 2010. "DRDO: Trimming the fat," *India Today* (May 28): <http://indiatoday.intoday.in/story/DRDO:+Trimming+the+fat/1/99242.html>.
[136] Pubby, Manu. 2008. "We don't need Akash missile, Army tells DRDO," *The Hindu* (January 8): <http://www.indianexpress.com/news/we-don-t-need-akash-missile-army-tells-drdo/258844>.

In spite of this evidence, it is extremely difficult to establish a causal relationship between India's nuclear developments and the parochial interests of the various bureaucracies. The prior argument and observations are made with inferences on the role of the DRDO in nuclear decision-making. One must remember that the relative weight of the different bureaucracies are hard to measure because the deliberations in the meetings to are never made public. This makes the bureaucratic politics theory nearly impossible to prove in India's case. However, one certainly cannot preclude the possible substantial influence of DRDO in India's nuclear policymaking process. There is substantial evidence that preliminarily suggests that organizational interests are influencing the final policy outcomes and the nuances of New Delhi's specific nuclear weapons policies. Moreover, it can also be surmised that external threats posed by China and Pakistan provide the initial impetus for Indian civilian policymakers to move forward with the decision to develop a weapons system, while the bureaucracies help to sustain the policies.

Internal Factor for the Buildup: Indian Nationalism

One other internal factor that needs to be considered is the role of Indian and Hindu nationalism in promoting an aggressive and/or expansionist foreign policy strategy. Indian nationalism has been a prominent feature of Indian politics and social movements. In fact, it has played a prominent role in contemporary Indian politics and society.[137] The argument of Hindu nationalism is that India is a distinctly "Hindu" country. It also espouses a sense of entitlement and hubris in the region. The Bharatiya Janata Party (BJP) – a Hindu-nationalist party – came to power in 1998 and stayed in power until 2004. The BJP has been one of the most vocal

---

For more on Hindu nationalism, see: Jaffrelot, Christophe. 2007. *Hindu nationalism a reader*. Princeton, N.J.: Princeton University Press; Hansen, Thomas Blom. 1999. *The saffron wave: democracy and Hindu nationalism in modern India*. Princeton, NJ: Princeton University Press.

supporters of an assertive Indian national security strategy and was in power when the nuclear weapons tests took place in 1998. Moreover, such nationalist sentiments also permeated the ranks of the Indian Congress Party, which has been the dominant political party in India since independence. It is evident, then, that the importance of nationalist ideology has also played a supporting role in inflating threats abroad from Pakistan and the need for India to be the dominant power in the region. These ideas manifest themselves in the expansion and enhancement of India's nuclear arsenal.

The Bharatiya Janata Party came to power in India in 1998, supplanting the Congress Party's near-monopoly on Indian national politics. Its main party platform evoked Hindu nationalism and the belief that India should be the dominant actor in the subcontinent. In the BJP's manifesto which was made public before it came to power, it advocated for the testing and development of a nuclear weapon and different nuclear capabilities. It said, "Though the BJP stands committed to a nuclear-free world, we cannot accept a world of nuclear apartheid... [the party declared it would] reevaluate the country's nuclear policy and exercise the option to induct nuclear weapons."[138] Moreover, the manifesto said the party would "expedite the serial production of Prithvi and make Agni I operational for the deployment of these missiles."[139] In the run-up to the 1998 election, BJP officials made public statements along similar nationalist lines. Brajesh Mishra stated that "given the security environment, we [India] have no option but to go nuclear," referring to the perceived threats posed to India by China and Pakistan.[140] Such sentiments play a major role in India's overall nuclear trajectory, especially when the BJP was in power from 1998 to 2004.

---

[138] Bharatiya Janata Party Manifesto. 1996. *FBIS-NESA,* (supplement), May 10: 11.
Ibid
Vyas, Neena. 1998. "BJP in Govt. to Exercise N-Option," *The Hindu,* January 14.

Such sentiments do not necessarily stem directly from the threat that Pakistan poses to India's security. Rather, the threat becomes inflated by Hindu-nationalist ideas which became engrained in a significant portion of India's electorate and political elite. The nuclear trend lines of both India and Pakistan follow a similar trajectory not only because of the legitimate threat that each state poses to the other, but also from an *idea* which results in poor relations between the two countries. Pakistan had been created at independence as a state for Indian Muslims, and India was intended to be a country for Hindus. The animosity between the two groups and communities had created hostilities between the two. Therefore it is argued that the identity-driven animosity between these two groups has reinforced the poor relations between the two countries.

The Hindu-nationalist sentiments have also permeated the Indian Congress Party after the BJP took over in 1998. The Indian Congress Party returned to power in the 2004 elections, removing the BJP's six-year rule in India. However, one of the main reasons why Congress was capable of making a comeback in Indian politics was because it made a shift in its attitudes on foreign policy issues. No more could Congress afford to have a dove-ish approach to foreign policy and potentially promote peace with Pakistan. In order to continue to be seen as a party protecting and advancing India's interests, Congress needed to take a hard-line approach on foreign policy issues.[141] This shift ensured the maintenance of the foreign policy status quo which the BJP had created when it came to power, and the development of a nuclear arsenal has also been part of this status quo.

Wilkinson, Steven I. 2005. "Elections in India: Behind the Congress Comeback," *Journal of Democracy* 16 (1): 153-167.

Therefore, it is argued that much of India's nuclear trajectory has to do with the ultra-nationalist sentiment that the BJP made the norm in Indian politics when it came to power in 1998. These ideas played a prominent role in Indian decision-makers' calculi leading up to the nuclear weapons test and placed India on a trajectory that would lead them to the expansion of India's nuclear arsenal and the development of different nuclear delivery capabilities. From 1998 to 2004 (when the BJP held power), missile testing was quite frequent, as shown earlier. Missile testing has continued since then, and the expansion of India's nuclear arsenal has remained constant since the 1998 tests, regardless of political party. This evidence shows that Indian nationalism has not necessarily been the sole cause of India's nuclear expansion and enhancement, but that it has certainly reinforced and heightened any of the security concerns which Indian policymakers have had regarding the external threat posed by Pakistan and China.

Conclusion

This essay concludes by arguing that – given the available evidence and data – India's nuclear buildup is largely a product of the external threat posed to it by Pakistan. When applying Robert Jervis's spiral model to this case one can see that the quantitative and (part of the) qualitative nuclear trend lines of both countries evince a "tit-for-tat" expansion and enhancement. However, Jervis's spiral model also shows that the potential threat emanating from Beijing has impinged on Indian strategic decision-making to a lesser degree. While these external threats are catalyzing policymakers in New Delhi, it is impossible to preclude the possibility of India's bureaucracies and military branches promoting their specific interests, which then translates into the nuclear policy outcomes. Given the evidence regarding external threats and internal sources of influence, this essay shows that it is more likely that India's nuclear buildup has been in response to external threats of various forms.

By assessing the threat of external adversaries through Jervis's spiral model, I show that the threat posed to India by Pakistan has been a driving source of New Delhi's strategic nuclear decision-making. From 1998 to 2006, the two countries engaged in tat-for-tat missile testing in terms of timing and of range. Moreover, both India and Pakistan's nuclear force expansion have followed the same trajectory, with both possessing anywhere from 80 to 100 nuclear warheads. Further evidence that the size of one country's arsenal is tied to the other's is that India's nuclear arsenal *could* expand even further if its policymakers chose to do so. Since it has not chosen to do so and follows a clear path with Pakistan shows that the external threat is impinging on the quantitative expansion of its arsenal. This buildup has been reinforced by the hostile perceptions that both states continually hold of each other, which creates a cognitive rigidity when making policies. These findings are consistent with the core arguments of Jervis's spiral.

However, it is also to note that the threat of China has also impacted India's nuclear buildup, albeit to a lesser degree than Pakistan's impact. The longer-range Agni missiles which increase the range of India's nuclear deterrent to targets deep within China are prime evidence of this occurrence. These long-range developments have occurred in tandem with the intensification of the Sino-Indian rivalry in other areas, such as the naval area. However, because there is still a reasonable amount of non-hostile interaction between the two – such as economic activity and minimal military-to-military interactions in the form of joint exercises – both states' images of each other have not turned hostile, and they have not fallen down the spiral of fear and hostility that Jervis argues can occur.

The final component that this essay explores is the potential impact of bureaucratic interests on India's nuclear force planning outcomes. Their impact cannot be precluded. The conflicting statements made by the different bureaucracies as well as the statements that suggest

that financial interests play a role in the policies that each organization – especially the Defence Research and Development Organization – promotes. Moreover, it is important to see that there are competing statements by each of the bureaucracies regarding what constitutes the necessary and proper nuclear weapons development. While this evidence can be seen through a variety of different source materials, it is difficult to illuminate a clear causal linkage between bureaucratic interests and India's nuclear policy outcomes, due to the extremely secretive nature in which these policies are formulated.

The one component of India's nuclear weapons development that remains the most difficult to analyze – no matter the theoretical approach – is its nuclear missile-equipped nuclear submarines. This capability will form the third leg of the triad. There is very little information regarding the development of this capability as well as the factors that have impacted the decision to deploy this capability in the near future. The nuclear submarine was included in the 1999 Draft Nuclear Doctrine, but little is known about why New Delhi has pursued its development, as the destabilizing effects of the capability could be detrimental to peace and stability between Pakistan and India and China and India. This certainly makes it likely that the Indian Navy has played an important role in advocating for this particular system.

This essay has not ended the debate regarding internal versus external impacts on nuclear force planning. However, I have showed through the available sources that the evidence suggests that external forces are dictating India's nuclear force capabilities – more so than the potential internal influences on policy, given the way in which Jervis's spiral model yields significant insights into India's nuclear trend lines. The threats posed by Pakistan and China almost certainly have had a significant impact on many of India's decisions to move forward with various ballistic and cruise missile developments, and the expansion of the nuclear arsenal as a

whole. However, it is important to leave open the possibility of bureaucracies and branches of the military having an impact on force planning. Arising from these conclusions are several policy prescriptions.

In terms of areas that need to be explored for further research, one possibility could be to look at the role of international prestige in impacting India's nuclear decision-making. While this article explores several different possible underlying causes of India's nuclear trend lines, it did not fully explore this possibility. There is a wide swath of literature with broadly argues that states pursue different foreign policies because of the role of international prestige, and that nuclear weapons provide this prestige. If this possible cause is to be explored further in India's case, it is necessary to devise a systematic assessment that can weight its impact against the other potential underlying causes of nuclear behavior.

Policy Prescriptions

Even when countries fall down a spiral of fear and hostility (consistent with Jervis's spiral model), all is not lost in terms of relations reparations. Since this security dilemma is reinforced by the hostile images that both states have of each other, it is difficult to make quick, wide-sweeping changes in their respective foreign policies. However, incremental steps can be taken to improve relations between India and Pakistan. By improving communication links, engaging in cultural and social exchanges, and slowly increasing economic activity between both countries, the hostile images that both states have of each other can be slowly alleviated. These types of measures helped incrementally unthaw and ameliorate tensions during the Cold War between the United States and Soviet Union. While the tensions will most likely remain present at any degree, by focusing on ways to reduce the hostile nature of relations, one can then hope

that relations between the two will become ameliorated, with the end result being a reduced chance of conflict and/or nuclear war.

More ambitiously, New Delhi and Islamabad can engage one another and pursue potential arms control and reduction agreements. These agreements will necessarily place limitations on the capabilities that each country can pursue. Moreover, these arrangements can provide assurance. Such measures served a similar purpose during the Cold War and helped to reduce the possibility of an all-out cataclysmic conflict between two nuclear-armed adversaries. While these agreements will provide benefits to the two parties involved, these arrangements are extremely difficult to formalize. Détente between India and Pakistan will be a necessary precondition.

While these initial steps between India and Pakistan will be important, it will become equally vital for both countries to address outstanding territorial dispute in Kashmir and Sir Creek as well as contentions regarding the future of Afghanistan. The Kashmir and Sir Creek disputes have been intractable thus far, but with the correct atmosphere between the two countries and creative policymaking, a settlement could perhaps be made. Moreover, if both New Delhi and Islamabad recognize that both countries stand to gain from a peaceful Afghanistan, this could provide further impetus for cooperation. However, these issues are quite complex, and previous noble efforts at resolving these disputes have fallen short. That said, they will need to be addressed for tensions to be reduced in the future – which would mitigate the effects of the negative spiraling of relations.

By extension, the same measures can be taken to *prevent* hostile images from developing between China and India. As stated earlier, both countries do not have extremely hostile images

of each other. Rather, they have begun to feel some tensions, but also engage in a variety of bilateral and multilateral policies that suggest they are not willing to cut off ties. However, relations can deteriorate. As both Beijing and New Delhi continue to advance their conventional and nuclear force capabilities, it is possible that hostile images could begin to form. This does not need to happen if the appropriate measures are enacted: maintaining and boosting current levels of economic activity, having regular contact between military and political leaders, and engaging in cultural exchanges. Tensions between India and China *are* increasing, and the maritime rivalry in the Indian Ocean between the two is certainly reason for considerable concern. Moreover, China's continued cooperation with Pakistan on security issues will also strain relations. This is not to say that a complete deterioration of relations will inevitably develop. The negative consequences of those tensions can be mitigated if both China and India engage in incremental steps to avoid stepping down a path towards the downward spiral and recognize that initial steps of developing more nuclear arms can be avoided.[142]

It is difficult to establish meaningful and lasting peace in the subcontinent. However, by taking incremental steps, it will provide an opening for a more meaningful amelioration of tensions to take place. India and China need not head down a path of fear and hostility, as India and Pakistan have done. Cautious steps by both sides, which will also include the maintenance of communication between government and militaries, will go a long ways toward establishing a level of stability between the two countries that will not lead to war. Equally important is for policymakers in Pakistan and India to take incremental confidence-building measures to slowly build up a sense of trust between the two countries. However, if past is any indication of future, stability between New Delhi and Islamabad will be fragile: a spoiler can act irresponsibly and

[142]The same could be said for avoiding unnecessary tensions in U.S.-China relations.

erode any improvements in relations. Responsibility by all parties involved is a necessary ingredient for peace.

Bibliography

2013. “Agni-VI missile in the works, India to be in world’s elite nuclear club,” *The Indian Express,* February 9. http://www.indianexpress.com/news/agnivi-missile-in-the-works-india-to-be-in-worlds-elite-nuclear-club/1071407.

2013. “India, China agree to hold joint military exercise,” *The Indian Express,* January 15. http://www.indianexpress.com/news/india-china-agree-to-hold-joint-military-exercise/1059308.

2012. “India test launches Agni-V long-range missile.” *BBC,* April 19. http://www.bbc.co.uk/news/world-asia-india-17765653.

2012. “Liberate scientific pursuit from bureaucratic clutches: Nair,” *The Indian Express,* September 24. http://www.indianexpress.com/news/liberate-scientific-pursuit-from-bureaucratic-clutches-nair/1007145.

2012. “’Tremendous potential to export missiles to friendly nations,’” *The Hindu,* April 29. http://www.thehindu.com/todays-paper/tp-national/tremendous-potential-to-export-missiles-to-friendly-nations/article3365999.ece.

2011. “Antony: Not worried about Pak n-arsenal,” *The Indian Express,* June 11. http://www.indianexpress.com/news/antony-not-worried-about-pak-narsenal/802119.

2011. “India Missile Chronology” *Nuclear Threat Initiative,* July. http://www.nti.org/media/pdfs/india_missile.pdf?_=1316466791.

2011. “India ready for ‘step by step’ approach with Pak” *The Indian Express,* January 26. http://www.indianexpress.com/news/india-ready-for-step-by-step-approach-with-pak/742381/1.

2011. “Pakistan must discard posture of compulsive hostility: India” *The Hindu,* January 4. http://www.hindu.com/2011/01/04/stories/2011010460680200.htm.

2010. “BrahMos cruise missile test-fired successfully,” *Times of India,* March 22. http://articles.timesofindia.indiatimes.com/2010-03-22/india/28124829_1_mobile-autonomous-launchers-brahmos-block-ii-290-km-range.

2010. “Strategic Command to acquire 40 nuclear capable fighters,” *The Indian Express,* September 12. http://www.indianexpress.com/news/strategic-command-to-acquire-40-nuclear-capable-fighters/680636.

2009. “INS Arihant Launch Boosts India’s Strategic Ambitions,” *Military Technology Military Technology* 33 (9): 134.

2008. “Flight test of BrahMos cruise missile next year: Pillai” *The Hindu,* January 25. http://www.hindu.com/2008/01/25/stories/2008012560320800.htm.

2007. “India to launch indigenous n-submarine by ’09: Navy Chief,” *The Indian Express,* December 4. http://www.indianexpress.com/news/india-to-launch-indigenous-nsubmarine-by--09-navy-chief/246495/1.

2004. “Dhanush missile successfully test-fired,” *The Hindu,* November 8. http://www.hindu.com/2004/11/08/stories/2004110806870100.htm.

2004. “N-arsenal to be cut if India follows suit: Musharraf urges peace in region,” *Dawn,* June 5. http://archives.dawn.com/2004/06/05/top2.htm.

2001. “India not engaged in nuclear race.” *The Hindu,* March 27. http://www.hindu.com/2001/03/27/stories/0227000b.htm.

2000. “India rejects Pak. proposal, terms it ‘propagandist’” *The Hindu,* June 15. http://hindu.com/2000/06/15/stories/01150001.htm.

“1971 War.” Pakistan Army Website. http://www.pakistanarmy.gov.pk/AWPReview/TextContent.aspx?pId=197&rnd=446.

Allison, Graham and Fredric Morris. 1975. “Exploring the Determinants of Military Weapons” *Daedalus* 104: 99-129.

Bajpai, Kanti. 2009. “To War or Not To War: The India-Pakistan Crisis of 2001-2,” in *Nuclear Proliferation In South Asia,* ed. Ganguly and Kapur, 162-182. New York: Routledge.

Bharatiya Janata Party Manifesto. 1996. *FBIS-NESA,* (supplement), May 10: 11.
Barnds, William J. 1972. *India, Pakistan, and the Great Powers*. New York: Published for the Council on Foreign Relations.

Basrur, Rajesh. “India’s Escalation-resistant Nuclear Posture” in *Escalation Control and the Nuclear Option in South Asia,* eds., Michael Krepon, Rodney W. Jones and Ziad Haider (Washington, DC: The Henry L. Stimson Center, 2004): 56-74.

Bedi, Rahul. 2004. “A new doctrine for the Navy,” *Frontline* 21 (14) (July 03-16). http://www.flonnet.com/fl2114/stories/20040716002104600.htm.

Brooks, Harvey. 1975. “The Military Innovation System and the Qualitative Arms Race” *Daedalus* 104 (3): 75-98.

Buzan, Barry. 1987. *An Introduction to Strategic Studies: Military Technology and International Relations* (New York: St. Martin’s Press).

Buzan, Barry and Eric Herring. 1998. *The Arms Dynamic in World Politics.* (Boulder, CO: Lynne Rienner).

Chari, P.R. 2000. “India’s Nuclear Doctrine.” *The Nonproliferation Review* 7 (3): 123-135.

Dalton, Toby and Jaclyn Tandler. 2012. “Understanding the Arms ‘Race’ in South Asia.” *The Carnegie Papers* (Washington, D.C.: Carnegie Endowment for International Peace).

Department of Atomic Energy and Defence Research and Development Organization (India). 1998. “Joint Statement by Department of Atomic Energy and Defence Research and Development Organisation,” May 17. http://www.globalsecurity.org/wmd/library/news/india/1998/980500-drdo.htm.

Dikshit, Sandeep. 2008. “Sagarika to be tested soon off Orissa,” *The Hindu,* February 19. http://www.hindu.com/2008/02/19/stories/2008021959711000.htm.

Evangelista, Matthew. 1988. *Innovation and the Arms Race* (Ithaca, NY: Cornell University Press).

Freedman, Lawrence. 1981. *The Evolution of Nuclear Strategy.* (New York: St. Martins).

Glaser, Charles. 2000. “The Causes and Consequences of Arms Races,” *Annual Review of Political Science* 3: 251-276.

Greenwood, Ted. 1975. *Making the MIRV: A Study of Defense Decision-Making* (Cambridge, MA: Ballinger).

Hagerty, Devin T. 1995/1996. “Nuclear Deterrence in South Asia,” *International Security* 20 (3): 79-114.

Halperin, Morton H. 1974. *Bureaucratic Politics & Foreign Policy* (Washington, DC: Brookings Institution).

Hansen, Thomas Blom. 1999. *The saffron wave: democracy and Hindu nationalism in modern India*. Princeton, NJ: Princeton University Press.

Huntington, Samuel P. 1958. “Arms Races: Prerequisites and Results” *Public Policy* 8: 41-86.

Integrated Headquarters (Indian Navy). 2004. *Indian Maritime Doctrine.* (New Delhi).

Jaffrelot, Christophe. 2007. *Hindu nationalism a reader*. Princeton, N.J.: Princeton University Press

Jervis, Robert. 1976. *Perception and Misperception in International Politics.* Princeton, NJ: Princeton University Press.

Jones, Seth G. et al. 2009. “The Lessons of Mumbai” RAND Occasional Paper. http://www.rand.org/content/dam/rand/pubs/occasional_papers/2009/RAND_OP249.pdf.

Kanti P. Bajpai, P.R.Chari, Pervaiz Iqbal Cheema, Stephen P. Cohen, and Sumit Ganguly. 1995. *Brasstacks and Beyond: Perception and Management of Crisis in South Asia*, (New Delhi: Manohar).

Karnad, Bharat. 2008. *India's Nuclear Policy*. (Westport, CT: Praeger Security International).
Khan, Feroz Hassan. 2012. *Eating Grass: The Making of the Pakistani Bomb* (Stanford, CA: Stanford University Press).

Khan, Feroz Hassan. 2012. *Eating Grass: The Making of the Pakistani Bomb.* (Stanford, CA: Stanford Security Studies, Stanford University Press).

Khan, Feroz Hassan. 2003. "Nuclear Signaling, Missiles, and Escalation Control in South Asia," in Michael Krepon, Rodney W. Jones and Ziad Haider (eds.), *Escalation Control and the Nuclear Option in South Asia* (Washington: The Henry L. Stimson Center): 75-100.

Kier, Elizabeth. 1997. *Imagining War: French and British Military Doctrine Between the Wars* (Princeton, NJ: Princeton University Press).

Koithara, Verghese. 2012. *Managing India's Nuclear Forces* (Washington, DC: Brookings Institution Press).

Krepon, Michael. 2013. "The Tortoise and the Hare." *Arms Control Wonk,* February 24. http://krepon.armscontrolwonk.com/archive/3706/the-tortoise-and-the-hare#more-3263.

Krishnaswami, Sridhar. 2001. "'China supplied missile parts to Pak.'" *The Hindu,* August 7. http://www.hindu.com/2001/08/07/stories/01070004.htm.

Krishnaswami, Sridhar. 2000. "CIA report finds increased Chinese arms sales to Pak." *The Hindu,* August 10. http://www.hindu.com/2000/08/10/stories/03100003.htm.

Kristensen, Hans M., and Robert S. Norris. 2011. "Chinese Nuclear Forces, 2011." *Bulletin of the Atomic Scientists.* 67 (6): 81-87.

Kristensen, Hans. M. and Robert S. Norris. 2010. "Chinese Nuclear Forces, 2010." *Bulletin of the Atomic Scientists*. 66 (6): 134-141.

Kristensen, Hans M. and Robert S. Norris. 2002. "Nuclear Notebook: India's nuclear forces 2002" *Bulletin of the Atomic Scientists.* 58 (2): 70-72.

Kristensen, Hans M. and Robert S. Norris. 2005. "Nuclear Notebook: India's nuclear forces 2005" *Bulletin of the Atomic Scientists.* 61 (5): 73-75.

Kristensen, Hans M. and Robert S. Norris. 2007. "Nuclear Notebook: India's Nuclear Forces, 2007" *Bulletin of the Atomic Scientists.*63 (4): 74-78.

Kristensen, Hans M. and Robert S. Norris. 2010. "Nuclear Notebook: Indian Nuclear Forces, 2010" *Bulletin of the Atomic Scientists.* 66 (5): 76-81.

Kristensen, Hans M. and Robert S. Norris. 2012. "Nuclear Notebook: Indian Nuclear Forces, 2012" *Bulletin of the Atomic Scientists.* 68 (4): 96-101.

Kristensen Hans M. and Robert S. Norris. 2002. "Nuclear Notebook: Pakistan's Nuclear Forces, 2001" *Bulletin of the Atomic Scientists.* 58 (1): 70-71.

Kristensen, Hans M. and Robert S. Norris. 2007. "Nuclear Notebook: Pakistan's Nuclear Forces 2007" *Bulletin of the Atomic Scientists.* 63 (3): 71-74.

Kristensen, Hans M. and Robert S. Norris. 2009. "Nuclear Notebook: Pakistan's Nuclear Forces 2009" *Bulletin of the Atomic Scientists.* 65 (5): 82-89.

Kristensen, Hans M. and Robert S. Norris. 2011. "Nuclear Notebook: Pakistan's Nuclear Forces 2011" *Bulletin of the Atomic Scientists.* 67 (4): 91-99.

Kumar, Hari. 2012. "India and China Deepen Economic Ties," *New York Times,* November 27. http://india.blogs.nytimes.com/2012/11/27/india-and-china-deepen-economic-ties/.

Ladwig III, Walter C. 2007/2008. "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine," *International Security* 32 (3): 158-190.

"Lahore Summit" *The Henry L. Stimson Center* (Post date unknown). http://www.stimson.org/research-pages/lahore-summit/.

Lavoy, Peter, ed. 2009. *Assymetric Warfare in South Asia: The Causes and Consequences of the Kargil Conflict.* Cambridge, UK: Cambridge University Press.

Mallikarjun, Y. 2008. "Agni-V design completed; to be test-fired in 2010," *The Hindu,* November 27. http://www.thehindu.com/todays-paper/tp-national/agniv-design-completed-to-be-testfired-in-2010/article1384080.ece.

Mallikarjun, Y. 2007. "DRDO begins work on Agni-IV missile," *The Hindu,* August 9. http://www.thehindu.com/todays-paper/drdo-begins-work-on-agniiv-missile/article1888805.ece.

McNamara, Robert. 1967. "The Dynamics of the Nuclear Strategy" *Department of State Bull* 57.

Mearsheimer, John. 2001. *The Tragedy of Great Power Politics.* New York: W.W. Norton.

Mohan, C. Raja. 2012. *Samudra Manthan: Sino-Indian Rivalry in the Indo-Pacific.* (Washington, D.C.: Carnegie Endowment for International Peace).

Narang, Vipin. 2012. “What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict” *Journal of Conflict Resolution* Published Online (July).

National Security Advisory Board. 1999. “India’s Draft Nuclear Doctrine,” *Arms Control Today,* July/August. http://www.armscontrol.org/act/1999_07-08/ffja99.

Pandit, Rajat. 2003. “Nuke command set up, button in PM’s hand,” *The Times of India,* January 4. http://articles.timesofindia.indiatimes.com/2003-01-04/india/27281139_1_nuclear-command-and-control-nuclear-arsenal-nuclear-retaliation.

Pant, Harsh and Gopalaswamy Bharath. 2008. “India’s Emerging Missile Capability: The Science and Politics of Agni-III,” *Comparative Strategy* 27 (4): 376-387.

Pant, Harsh. 2007. “India’s Nuclear Doctrine and Command Structure,” *Armed Forces & Society* 33 (2): 238-264.

Pant, Harsh. 2005. “India’s Nuclear Doctrine and Command Structure: Implications for India and the World” *Comparative Strategy* 24 (3): 277-293.

Perkovich, George. 1999. *India’s Nuclear Bomb: The Impact on Global Proliferation.* Berkeley, CA: University of California Press.

Posen, Barry. 1984. *The Sources of Military Doctrine: France, Britain and Germany Between Wars* (Ithaca, NY: Cornell University Press).

Prasad, K.V. 2010. “Discard old mindset, Antony tells DRDO,” *The Hindu,* February 24. http://www.hindu.com/2010/02/24/stories/2010022459282000.htm.

Praveen, Swami. 2009. “A War to End a War: the Causes and Outcomes of the 2001-2 India-Pakistan Crisis” in *Nuclear Proliferation In South Asia,* ed. Ganguly And Kapur, 144-162. New York: Routledge.

Pubby, Manu. 2009. “DRDO revamp: Antony appoints high-level panel,” *The Indian Express,* June 12. http://www.indianexpress.com/news/drdo-revamp-antony-appoints-highlevel-panel/475162/.

Pubby, Manu. 2008. “We don’t need Akash missile, Army tells DRDO,” *The Hindu,* January 8. http://www.indianexpress.com/news/we-don-t-need-akash-missile-army-tells-drdo/258844.

Rehman, Iskander. 2012. “Drowning Stability: The Perils of Naval Nuclearization and Brinkmanship in the Indian Ocean” *Naval War College Review* 63 (4): 64-88.

Sagan, Scott. 1996/1997. “Why do states build nuclear weapons?” *International Security* 21 (3): 54-86.

Shapley, Deborah. 1978. “Technology Creep and the Arms Race: ICBM Problem a Sleeper” *Science,* September 22: 1102-1105.

Snyder, Jack. 1984. *The Ideology of the Offensive: Military Decisions and the Disasters of 1914* (Ithaca, NY: Cornell University Press).

Subramanian, T.S. 2013. “Agni-VI all set to take shape.” *The Hindu,* February 4. http://www.thehindu.com/news/national/agnivi-all-set-to-take-shape/article4379416.ece.

Subramanian, T.S. and Y. Mallikarjun. 2012. “In Wheeler Island, a perfect mission sparks celebrations,” *The Hindu,* April 20. http://www.thehindu.com/news/national/in-wheeler-island-a-perfect-mission-sparks-celebrations/article3332940.ece.

Subramanian, T.S. 2012. “Agni-IV scores a hit yet again,” *The Hindu,* September 20. http://www.thehindu.com/todays-paper/tp-national/agniiv-scores-a-hit-yet-again/article3916483.ece.

Subramanian, T.S. and Y. Mallikarjun. 2012. “K-15 all set to join Arihant,” *The Hindu,* December 27. http://www.hindu.com/2009/07/27/stories/2009072755801000.htm.

Subramanian, T.S. 2010. “Agni-II + launch before December 10,” *The Hindu,* November 28. http://www.thehindu.com/todays-paper/tp-national/agniii-launch-before-december-10/article918781.ece.

Subramanian, T.S. and Y. Mallikarjun. 2010. “DRDO raises the bar, sets its sights on 5,000-km Agni-V,” *The Hindu,* February, 8. http://www.thehindu.com/news/national/drdo-raises-the-bar-sets-its-sights-on-5000km-agniv/article102608.ece**.**

Subramanian, T.S. 2007. “Agni-1 launch successful,” *The Hindu,* October 6. http://www.hindu.com/2007/10/06/stories/2007100662140100.htm.

Subramanian, Nirupama. 2009. “Destabilising step: Pakistan,” *The Hindu,* July 28. http://www.hindu.com/2009/07/28/stories/2009072860551000.htm.

Sultan, Adil. 2011/2012. “Pakistan’s Emerging Nuclear Posture,” *Strategic Studies,* XXXI & XXXII (4 & 1). Institute of Strategic Studies, Islamabad: http://www.issi.org.pk/publication-files/1340000409_86108059.pdf.

Syed, Maria. 2012. "Pakistan-India Trade: Rationale and Reality." *Pakistan Horizon.* 65 (3): 85-101.

Tellis, Ashley. 2000. *India’s Emerging Nuclear Posture: Between Recessed Deterrent and Ready Arsenal.* (Santa Monica, CA: Rand).

Tellis, Ashley. 2002. “Toward a ‘Force-in-Being’: The Logic, Structure, and Utility of India’s Emerging Nuclear Posture.” *Journal of Strategic Studies* 25 (4): 61-108.

United States Government. 2010. “Fact Sheet: Increasing Transparency in the U.S. Nuclear Stockpile,” *Department of Defense,* May 3. http://www.defense.gov/npr/docs/10-05-03_Fact_Sheet_US_Nuclear_Transparency__FINAL_w_Date.pdf.

Unnithan, Sandeep. 2010. “DRDO: Trimming the fat,” *India Today,* May 28. http://indiatoday.intoday.in/story/DRDO:+Trimming+the+fat/1/99242.html.

Van Evera, Stephen. 1999. *Causes of War: Power and the Roots of Conflict* (Ithaca, NY: Cornell University Press).

Vyas, Neena. 1998. “BJP in Govt. to Exercise N-Option,” *The Hindu,* January 14.

Waltz, Kenneth. 1979. *Theory of International Politics.* Boston, MA: McGraw Hill.

Wilkinson, Steven I. 2005. “Elections in India: Behind the Congress Comeback,” *Journal of Democracy* 16 (1): 153-167.