

RETHINKING COMMAND & CONTROL SYSTEMS IN EMERGING NUCLEAR NATIONS:

Evidence from South Asia



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Introduction: Rethinking Peter Feaver's Framework

What factors explain command and control systems in emerging nuclear nations? Command and control systems are the operational means by which a state plans the management, deployment, and potential release of nuclear weapons.¹ When evaluating emerging nuclear powers, researchers often devote attention to the quantity and quality of a state's physical nuclear arsenal while overlooking command and control structures.² These measures of nuclear capacity, however, are more useful for generating estimates of a state's nuclear intentions than accounting for how a nuclear state's organizations might operate in practice.³ Any explanation of how these states operate in practice must account for the role of command and control. By explaining the factors that affect command and control systems within emerging regional nuclear states, researchers can better understand the practical employment of nuclear capabilities, which offers insight into how destabilizing future proliferators may be for regional and global security.

Nuclear proliferation is a timely topic of study. At the time of this paper's writing, the United States and Iran have reached a tentative deal that the US hopes will prevent the development of an Iranian nuclear arsenal.⁴ Furthermore, concerns over North Korea's ability to weaponize its nuclear capability have once again arisen. Adm. Bill Gortney—commander of NORAD and US Northern Command—recently suggested that North Korea's KN-08 delivery platform might be able to deliver a nuclear missile to the

¹ This definition borrows from Vipin Narang, *Nuclear Strategy in the Modern Era* (Princeton: Princeton University Press, 2014), p. 4. Alternative definitions are referenced at a later point in this project.

 ² See, for example, Keir A. Lieber and Daryl G. Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs*, Vol. 88, No. 6 (November/December 2009), pp. 39-51; Keir A. Lieber and Daryl G. Press, "The End of Mad?: The Nuclear Dimension of U.S. Primacy," *International* Security, Vol. 30, No. 4 (Spring 2006), pp. 7-44; Kenneth N. Waltz, "Nuclear Myths and Political Realities," *American Political Science Review*, Vol. 84, No. 3 (September 1990), pp. 731-745.

³ Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, Vol. 17, No. 3 (Winter 1992/93), p. 160. Emphasis in original.

⁴ For a simple and useful overview of the points of contention and tentative results of the negotiations between the US and Iran, see William J. Broad and Sergio Pecanha, "A Simple Guide to the Nuclear Negotiations with Iran," *New York Times* (2 April 2015), available at: ">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes.com/interactive/2015/03/31/world/middleeast/simple-guide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes/@uide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes/@uide-nuclear-talks-iran-us.html?ref=middleeast>">http://www.nytimes/@uide-nuclear-talks-iran-us.html?ref=middlee

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US west coast, despite the fact that the system remains untested.⁵ This pair of observations demonstrates two different policy issues, however: nuclear proliferation and post-proliferation behavior. Although research on nuclear proliferation is extremely important, the prioritization of this topic has obfuscated the importance of understanding what states will do with nuclear weapons once they are acquired. A diverse arrangement of potential nuclear postures is available to regional nuclear powers, and it is the posture—not proliferation itself—that causes insecurity. Iran and North Korea have clearly demonstrated that some states desire nuclear weapons and are willing to incur great costs to acquire such capabilities. This study aims to shift focus to the study of post-proliferation behavior in regional nuclear states. By doing so, we may obtain a better understanding of the conditions under which nuclear proliferation is more or less threatening to regional and global security.

When Peter Feaver first explored the origins of regional power command and control systems in 1992, he faced a paucity of data on these systems.⁶ The most recent nuclear event at this time was India's "peaceful" nuclear explosion in 1974, which was not followed by another atomic test until India weaponized its latent nuclear capabilities in 1998.⁷ Feaver explicitly noted this obstacle to inquiry, stating that "[r]eliable data on existing or developing systems of command and control in emerging nuclear nations are scarce."⁸ Conscious of these limitations, he established a deductively derived framework for evaluating an emerging nuclear state's command and control systems as data became available. Feaver's model has long served as a central framework for debating nuclear stability in proliferating regions, but it has recently been called into question for lacking systematic empirical evaluation. For instance, Vipin Narang plainly asks of the model:

⁵ Jon Harper, "NORAD Commander: North Korean KN-08 Missile Operational," *Stars and Stripes* (7 April 2015), available at: < http://www.stripes.com/news/norad-commander-north-korean-kn-08-missile-operational-

^{1.338909?}utm_source=Sailthru&utm_medium=email&utm_term=*Situation%20Report&utm_campaign=SitRep04%2F08>. ⁶ Feaver, "Command and Control in Emerging Nuclear Nations," pp. 160-187.

⁷ India's permanent representative to the United Nations at the time of the test strongly asserts that India's test was "conducted exclusively for peaceful purposes" and "had no military or political implications." For the full statement, see Rikhi Jaipal, "The Indian Nuclear Explosion," *International Security*, Vol. 1, No. 4 (Spring 1977), pp. 44-51. For an authoritative explanation of the development of India's nuclear program, see Ashley J. Tellis, *India's Emerging Nuclear Posture* (Santa Monica: RAND, 2001).

⁸ Feaver, "Command and Control in Emerging Nuclear Nations," p. 160.

"Does the pattern of command and control arrangements match the theoretical predictions?"⁹ Although this question remains relevant to explaining the conduct of new nuclear states, it nevertheless remains unanswered. Even with the newfound availability of evidence, no effort has been made to evaluate Feaver's propositions.¹⁰ This essay takes this lack of empirical evaluation as a point of departure.

In this project, I aim to further the literature on command and control structures in emerging nuclear nations by disaggregating the two key explanations from Feaver's framework into their constitutive elements and subjecting the proposed hypotheses to evidence from the cases of India and Pakistan. Using observations from South Asia, I argue that a key factor in explaining an emerging nuclear state's command and control system is the state's preexisting pattern of civil-military relations. More specifically, this essay demonstrates that an increased level of military intervention in politics allows military organizations to institutionalize more responsive command and control procedures,¹¹ which may in turn increase the likelihood of preemptive or accidental nuclear use.¹²

These findings suggest that Feaver's model is insufficient in two regards. First, whereas Feaver's model predicts that strategic considerations—such as threat perception and vulnerability—will affect a state's patterns of command and control, the evidence from South Asia shows that this relationship is tentative at best. Indicators of these strategic variables are either invariant or only weakly predict India and Pakistan's divergent command and control systems. Second, the relationship between civil-military relations and command and control systems operates in the opposite direction as

⁹ Narang, *Nuclear Strategy in the Modern Era*, p. 26.

¹⁰ Although no effort has been made to use recent evidence to test Feaver's framework, Feaver calls for such a study to be conducted. He observes, "As more information about emerging nuclear arsenals becomes available, the framework should be tested by comparing the expectations derived from the two propositions against data from specific countries." Feaver, "Command and Control in Emerging Nuclear Nations," p. 180n41.

¹¹ For arguments on the offensive nature of military organizations, see Barry R. Posen, *The Sources of Military Doctrine: France, Britain and Germany Between the World Wars* (Ithaca, NY: Cornell University Press, 1984); Jack Snyder, "Civil-Military Relations and the Cult of the Offensive, 1914 and 1984," *International Security*, Vol. 9, No. 1 (Summer 1984), pp. 108-146; Stephen Van Evera, "The Cult of the Offensive and the Origins of the First World War," *International Security*, Vol. 9, No. 1 (Summer 1984), pp. 58-107.

¹² Scott D. Sagan, "The Perils of Proliferation: Organization Theory, Deterrence Theory, and the Spread of Nuclear Weapons," *International Security*, Vol. 18, No. 4 (Spring 1994), pp. 66-107.

predicted by Feaver. While Feaver's framework anticipates strong civilian control of the military to generate more delegative, military-controlled nuclear command and control structures, precisely the opposite outcome is observed in South Asia. In sum, this project finds that our understanding of the origins of command and control systems in regional nuclear powers is in need of major revision.

Additionally, providing an evidence-driven analysis of command and control structures contributes to the ongoing debate between proliferation optimists and pessimists.¹³ On the one hand, optimists emphasize the outcome-based stability of nuclear states by focusing on the ability of nuclear weapons to suppress the concerns of escalation. In general, these theorists argue that states have strong incentives to keep their arsenals secure and believe that the deterrent value of nuclear weapons is likely to promote stability.¹⁴ Pessimists, on the other hand, focus on the potential for command and control failures that lead to nuclear use in new nuclear states.¹⁵ Understanding the structure of a state's command and control network is important to this debate because it highlights specific nodes at which nuclear weapons may be used, whether by accident or via unauthorized use. Such findings are especially valuable in explaining the dynamics of emerging nuclear nations¹⁶ where nuclear behavior may differ from its Cold War

¹³ For purposes of simplicity, this paper provides a basic distinction between optimists and pessimists. For a more nuanced description of specific camps within each group, see Peter Feaver, "Neooptimists and the Enduring Problem of Nuclear Proliferation," *Security Studies*, Vol. 6, No. 4 (Summer 1997), pp. 93-125.

¹⁴ For examples of nuclear optimism, see David J. Karl, "Proliferation Pessimism and Emerging Nuclear Powers," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 87-119; Jordan Seng, "Less is More: Command and Control Advantages of Minor Nuclear States," *Security Studies*, Vol. 6, No. 4 (Summer 1997), pp. 50-92; Waltz's chapters in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate*, 3rd edition (New York: W.W. Norton, 2012); Kenneth N. Waltz, *The Spread of Nuclear Weapons: More May Be Better*, Adelphi Paper No. 171 (London: International Institute of Strategic Studies, Autumn 1981). For an optimist's view on South Asia, see Šumit Ganguly's chapters in Šumit Ganguly and S. Paul Kapur, *India, Pakistan, and the Bomb: Debating Nuclear Stability in South Asia* (New York: Columbia University Press, 2010).

¹⁵ For examples of nuclear pessimism, see Feaver, "Neooptimists and the Enduring Problem of Nuclear Proliferation"; Sagan's chapters in *The Spread of Nuclear Weapons: A Debate.* For a pessimist's view on South Asia, see Kapur's chapters in *India, Pakistan, and the Bomb.*

¹⁶ For arguments on how regional nuclear powers differ from the US-Soviet example, see S. Paul Kapur, "India and Pakistan's Unstable Peace: Why Nuclear South Asia Is Not Like Cold War Europe," *International Security*, Vol. 30, No. 2 (Fall 2005), p. 152; Vipin Narang, "Posturing for Peace?" *International Security*, Vol. 34, No. 3 (Winter 2009/10), pp. 38-78; Narang, *Nuclear Strategy in the Modern Era*.

origins.¹⁷ Additionally, as recently demonstrated by North Korea and Iran, proliferation efforts are likely to continue in a variety of countries; understanding what these states will do with nuclear weapons once they acquire an arsenal is of significant theoretical and practical interest.

This paper is structured in four sections. First, I develop the concept of command and control systems. Second, I present the rationale for selecting India and Pakistan as cases of study and classify the South Asian cases according to the proposed definition. Third, the paper fully develops two competing explanations of command and control systems and evaluates these explanations with evidence from India and Pakistan. The final section summarizes the findings and concludes with a recommendation for policymakers to place an emphasis on a potential proliferator's civil-military relations when viewing potential threats.

Conceptualizing Command & Control

The dependent variable in this study is a state's command and control system. Although numerous renditions of the concept can be found,¹⁸ this essay employs a simple definition: here, command and control refers to the management, deployment, and potential release of nuclear weapons. This definition of command and control yields a systematized concept that distinguishes between assertive and delegative control patterns.¹⁹ As political leadership—whether civilian or military—claims more control

¹⁷ For a sample of classic statements on Cold War-era nuclear strategy, see Bernard Brodie, ed., *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, 1946); Lawrence Freedman, *The Evolution of Nuclear Strategy*, 3rd edition (New York: Palgrave MacMillan, 2003); Charles L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton: Princeton University Press, 1990); Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of* Armageddon (Ithaca, NY: Cornell University Press, 1989); Thomas Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966).

¹⁸ For instance, Paul Bracken's classic work on the subject matter defines command and control as "an arrangement of facilities, personnel, procedures, and means of information acquisition, processing, and dissemination used by a commander in planning, directing, and controlling military operations." See Paul Bracken, *The Command and Control of Nuclear Forces* (New Haven: Yale University Press, 1983), p. 3.

¹⁹ Although this project uses the terminology of assertive/delegative control, the concept is not without issue. Specifically, the concept typically assumes that civilians are the actors asserting or delegating control. In practice, however, this is not universal. For instance,

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over nuclear matters, the command and control system becomes more assertive. As authority is delegated to lower levels of leadership, command and control becomes more delegative. ²⁰ To be sure, these two outcomes of assertive and delegative control specify the ends of a spectrum rather than the binary values of a dichotomous variable. Various degrees of assertive and delegative control certainly exist, but it is nevertheless important to understand these ideal types as distinct before attempting to measure any particular patterns of command and control.²¹

The most basic tension in command and control systems is the always/never dilemma. This dilemma is the core problem for nuclear command and control²² and embodies the central tradeoffs that must be made when developing command and control systems.²³ Because this concept is crucial to understanding command and control, it is worth discussing at length. The always/never dilemma presents political leadership two considerations to weigh when determining whether to delegate or assert authority over nuclear forces. On the one hand, leaders seek to ensure that nuclear weapons *always* launch when leaders order their use. The basic goal of favoring "always" is to ensure a state's nuclear arsenal and communication links to decision-makers survive an initial attack long enough to perform retaliatory strikes.²⁴ Without such a survivable,

the vast majority of Pakistan's nuclear history has been conducted under a military dictatorship. As an alternative to assertive/delegative control, Jordan Seng promotes the use of positive/negative control. These terms have the advantage of specifying the center-periphery tension inherent in command and control systems, but the concept is hardly intuitive and has been used with multiple meanings. For an example of the positive/negative terminology being misapplied, see Feroz Hassan Khan, "Nuclear Command-and-Control in South Asia during Peace, Crisis, and War," *Contemporary South Asia*, Vol. 14, No. 2 (June 2005), p. 168. For an elaboration of the benefits of the positive/negative control terminology, see Seng, p. 56, n14.

²⁰ This approach–systematizing a concept, specifying the indicators, and systematically scoring cases–draws heavily upon Robert Adcock and David Collier, "Measurement Validity: A Shared Standard for Qualitative and Quantitative Research," *American Political Science Review*, Vol. 95, No. 3 (September 2001), pp. 529-546.

²¹ For a full discussion on assertive/delegative versus negative/positive control, see Peter Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca: Cornell University Press, 1992), pp. 7-12.

²² Feaver, "Command and Control in Emerging Nuclear Nations," p. 163.

²³ Seng, p. 55.

²⁴ Feaver, *Guarding the Guardians*, p. 13.

second-strike capability, a state would be susceptible to preemption and decapitation, rendering the state insecure and vulnerable.²⁵

At the same time, political leaders aim to guarantee that nuclear weapons are never used without proper authorization. This analysis focuses on two types of undesired use of nuclear weapons: accidental and unauthorized.²⁶ Accidental use refers to the unintentional launch of nuclear weapons due to "sloppy handling, faulty design, or some other cause."²⁷ To address this concern, leaders can implement administrative steps guaranteeing oversight and requiring safety measures to be built into the nuclear weapons. Unauthorized use, in contrast, refers to when "military personnel decide to use nuclear weapons without receiving the proper authorization from civilian leadership."28 This unauthorized use could occur for two reasons. First, an individual or group could purposefully subvert the chain of command to achieve parochial interests. A second type of unauthorized use could occur in a moment of crisis when a field commander felt the need to use nuclear weapons to prevent defeat. As this example shows, leaders face a significant challenge. Overly prioritizing the "always" side of the dilemma facilitates unauthorized use, but enough attention must be given to this side of the dilemma to guarantee that nuclear weapons are survivable and will be fired whenever the order is given.

In order to observe whether a state favors "always" or "never" positioning, this essay focuses on two specific tradeoffs that result from the dilemma.²⁹ The first tradeoff

²⁵ "Preemption refers to an enemy nuclear attack destroying all or a significant portion" or nuclear forces. "Decapitation involves an enemy nuclear attack against command and control centers." Ibid., p. 73.

²⁶ Feaver also cites "third party" use as a form of unintended use in his US-based analysis. This argument does not figure prominently in his discussion on emerging nuclear nations, however, so it is omitted from this essay. For an explanation of third-party use, see ibid., pp. 18-20.

²⁷ For a full discussion of accidental use, see ibid., pp. 13-15.

²⁸ See ibid., pp. 15-18 for a discussion on unauthorized use.

²⁹ This project focuses on central command versus peripheral launch capabilities and procedural pre-specification versus operational flexibility. This differs from Seng's characterization in one important way: Seng characterizes the always/never dilemma as a distinct tension that is separate from these other two considerations. A more precise relationship, however, is to observe that central command/peripheral launch and procedural pre-specification/operational flexibility decisions are subcomponents of the always/never

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is the balance between central command and peripheral launch capacities. Highly centralized command places launch authority in the hands of political leaders and requires peripheral commanders to report and request authorization for use. Peripheral launch capacity, in contrast, predelegates a set of circumstances under which military leaders can launch nuclear weapons without seeking higher approval.³⁰ In general terms, a state with central command structures has a more assertive command and control structure; a state with peripheral launch capacity has a more delegative command and control structure.

More specifically, this project identifies two indicators that are necessary to classify cases by launch capacity. First, a state's nuclear deployment patterns reveal a great deal about administrative aspects of launch authorization. Specifically, if a state's nuclear arsenal is disassembled and dispersed, this is a reflection of centralized command authority that favors "never" launching without proper authorization. An arsenal with warheads fixed to delivery vehicles, in comparison, signifies an increase in peripheral launch capacity that favors "always" launching missiles when authorized. The second indicator of launch capacity is absence or presence of technological controls on nuclear use. Permissive action links (PALs), for instance, ensure that a nuclear weapon cannot be launched unless the necessary launch codes are provided by a state's central authorities. Electronic permissive enable systems (PESs) are another form of technological controls that prevent an individual from launching nuclear weapons by requiring the involvement of other operators in the launch process.³¹ The presence of technological controls indicates assertive control, whereas the absence of such controls indicates more delegative control.

The second tradeoff faced by leaders as a result of the always/never dilemma is between procedural prespecification and operational flexibility. Procedural prespecification establishes a series of standard operation procedures (SOPs) that shape

dilemma. Because both of these decisions are made in order to address the always/never dilemma, the concepts are highly endogenous. For Seng's description, see Seng, pp. 55-57.

³⁰ Ibid., pp. 55-56.

³¹ Ibid., p. 57.

actors' behavior during a crisis. By clearly specifying the proper protocol for numerous contingencies, this approach aims to maintain assertive control by defining appropriate action during a crisis. If a state's nuclear forces are bound by extensive standard operating procedures, then that state's command and control system is more assertive. By their very nature, however, crises are unpredictable.³² "The procedural prespecification required by SOPs," Jordan Seng notes, "is in tension with the unpredictable nature of crisis events."³³ Accordingly, some states may elect to risk contextual uncertainty and rely upon operational flexibility. If a state has nuclear weapons but no accompanying SOPs, the in-theater military commanders are granted operational leeway and the command and control structure is more delegative. As a summary, the indicators of delegative and assertive control are presented below:

	Assertive Control	Delegative Control		
Always/Never Dilemma (<i>always</i> launch when leaders order their use/ <i>never</i> used without proper authorization)	Favors never	Favors always		
Launch Capacity	 Centralized Dispersed, decoupled nuclear arsenal Higher technological controls 	 Peripheral Assembled, deliverable warheads Fewer technological controls 		
Crisis Decision-Making	Procedural prespecificationStandard operating procedures	 Operational flexibility Absence of standard operating procedures 		

Table	1.	Characteristics	of	Command	and	Control	Systems
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Case Selection: India & Pakistan

Having fully developed the outcome to be explained, the project now shifts to the empirical strategy for evaluating the framework. This study proposes to conduct a comparative analysis of India and Pakistan to identify factors that affect command and control structures in emerging nuclear nations. Both countries will be measured along

³² For a landmark discussion on decision-making under crisis conditions, see Graham Allison and Philip Zelikow, *Essence of Decision: Explaining the Cuban Missile Crisis*, 2nd edition (New York: Longman, 1999).

³³ Seng, p. 56.

the same profile of variables developed at length below. Four specific reasons justify the selection of these cases and this order of analysis.

First, information on India's nuclear program is simply more available than other cases. Compared to other recent proliferators, namely Pakistan and North Korea, India has made its nuclear policy and procedures the most transparent. However, it must be qualified that data availability alone is *not* a legitimate reason for case selection. Instead, cases should be selected as representative units of a broader population that provide the researcher maximal inferential leverage.³⁴ All else being equal, maximal data availability is preferable, but a researcher must identify the relevance of a particular case to the study at hand.³⁵

The second justification for studying India addresses this concern listed above. This study chooses to analyze the Indian case because it represents a "most-likely" case for Feaver's framework. This is useful because it provides an "easy test" for the theory. If Feaver's framework cannot explain India's command and control systems, its ability to explain a broader set of questions is highly questionable.³⁶ As will be shown, the independent variables collectively take on extreme values in the Indian case that generate strong predictions about the outcome.³⁷ As a result, any hypothesis that cannot explain the Indian case should be viewed with significant skepticism.

The third rationale for studying India and Pakistan results from a unique opportunity to distinguish the phases of theory development from theory testing. Feaver's model could not have been developed in 1992 by using evidence from these

³⁴ John Gerring, *Social Science Methodology: A Unified Framework*, 2nd edition (Cambridge, UK: Cambridge University Press, 2012), p. 411.

³⁵ For a general guideline to case selection, see David Collier, Jason Seawright, and Gerardo L. Munck, "The Quest for Standards: King, Keohane, and Verba's *Designing Social Inquiry*," in *Rethinking Social Inquiry*, pp. 51-53. See also Gary King, Robert O. Keohane, and Sidney Verba, *Designing Social Inquiry: Scientific Inference in Qualitative Research* (Princeton, NJ: Princeton University Press, 1994), pp. 115-149.

³⁶ For a detailed explanation of most-likely cases, Alexander L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, MA: MIT Press, 2005), pp. 121-122.

³⁷ In a "most-likely" test, "the independent variables posited by a theory are at values that strongly posit an outcome or posit an extreme outcome." Ibid., p. 121.

countries' nuclear posture because both countries arrived as nuclear states in 1998. This is important because testing a theory with evidence used to generate that theory leads to "confirmation bias," where the theory is biased towards one's expectations.³⁸ Although India and Pakistan were known to have latent nuclear capabilities when Feaver wrote, the capabilities, deployment patterns, and command and control structures were unknown and could not have been used in the development of Feaver's theory.³⁹

Finally, applying the findings from the Indian case to the Pakistani case significantly increases confidence in any findings that apply to both cases. Any hypotheses passing the Indian case have only passed a most-likely test. In order to have confidence in a causal relationship, these hypotheses need to be subjected to a case that does not meet the most-likely characterization, such as Pakistan. Additionally, studying Pakistan introduces variation on the dependent variable that is not available by conducting a within-case analysis of India.⁴⁰ Adding this variation allows the researcher to investigate whether the proposed hypotheses vary in conjunction with the outcome.⁴¹

Assertive Command & Control in India

Command and control of India's nuclear arsenal strongly favors assertive control. One example of this is the highly centralized nuclear launch authority. A permanent

³⁸ Ibid., pp. 111-112.

³⁹ As mentioned above, India's first nuclear test was conducted in 1974. India clearly played a minimal role in the formulation of Feaver's framework. The country receives one passing mention that is irrelevant to the hypotheses proposed in his article. See Feaver, "Command and Control in Emerging Nuclear Nations," p. 185. Additionally, the differences between a nuclear device and weapon should be noted here. A nuclear device is "an apparatus that presents proof of scientific principle that a nuclear explosion will occur." A weapon, in contrast, is "a rugged and miniaturized version of the device." To be fully functional, it must be weaponized, a "process of integrating the weapon with delivery systems." The development of command and control structures depends upon the presence of a weaponized nuclear capability, which was not developed until 1999 at the earliest. In short, these qualities could not have been accounted for in the development of Feaver's theory. For a full explanation of the development of India's nuclear program and a discussion on nuclear devices, weapons, weaponization, and operationalization, see Gaurav Kampani, "New Delhi's Long Nuclear Journey: How Secrecy and Institutional Roadblocks Delayed India's Weaponization," *International Security*, Vol. 38, No. 4 (Spring 2014), pp. 79-114.

⁴⁰ On the assertive consequences of no-variance research designs, see King, Keohane, and Verba, p. 108.

⁴¹ Comparing India and Pakistan allows for a "diverse" method of case-selection, where the cases demonstrate diverse values of the independent and dependent variables. For a full description on this and other strategies of case-selection, see Jason Seawright and John Gerring, "Case Selection Techniques in Case Study Research: A Menu of Qualitative and Quantitative Options," *Political Research Quarterly*, Vol. 61, No. 2 (June 2008), pp. 294-308.

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fixture in India's command and control structure has been that "civilians not only maintain control over India's nuclear forces, but they maintain *custody* of it."⁴² The two indicators presented above offer a useful framework for supporting this claim. First, analyzing the readiness of India's deployment patterns provides insight into India's preference for centralized launch capacity. India's nuclear weapons are separated from delivery platforms and primarily under civilian control. Civilians centralize command of the nuclear arsenal by "de-mating and dispersing its nuclear components across civilian agencies," leaving only the delivery vehicles under the military's command.⁴³ Although India's doctrine has evolved to include components with a quicker rate of readiness preparation,⁴⁴ these capabilities "could still meet the strict definition of disassembled and/or de-mated systems."⁴⁵

Second, India's nuclear weapons are secured by an extensive layer of technological controls that can only be enabled by central authorities. India's weapons require two codes to be entered simultaneously in order to enable the warhead, which requires the dissemination of codes from civilian authorities in the Nuclear Command Authority (NCA). Even if the weapons are fully assembled, these technological barriers guarantee a strong degree of assertive control.⁴⁶

Additionally, assertive control in India is observed through its crisis decisionmaking behaviors. More specifically, India has assumed a model of procedural prespecification. Although this pattern comes at the expense of operational flexibility during crises, it comports with Indian civilians' belief in "the sanctity of government approval for the use of nuclear weapons."⁴⁷ Recently, efforts have been made to define all potential pathways for transfer of command and control under any circumstance. Additionally, India has attempted to harden its command and control network by providing safe

⁴² Narang, *Nuclear Strategy in the Modern Era*, p. 105. Emphasis in original.

⁴³ Narang, "Posturing for Peace?" p. 46.

 ⁴⁴ For arguments that India's doctrine has become less retaliatory, see Harsh Pant, "India's Nuclear Doctrine and Command Structure," *Armed Forces and Society*, Vol. 33, No. 2 (January 2007), pp. 238-264; Scott Sagan, "Evolution of Pakistani and Indian Nuclear Doctrine," in *Inside Nuclear South Asia*, ed. Scott Sagan (Stanford, CA: Stanford University Press, 2009), pp. 244-254.
 ⁴⁵ Narang, *Nuclear Strategy in the Modern Era*, p. 105.

Narang, Nuclear Strategy in the Modern Era, p. 10

⁴⁶ Ibid., pp. 105-108.

⁴⁷ Pant, p. 250.

locations for individuals with nuclear launch authority to take cover during a nuclear crisis.⁴⁸ This emphasis on procedural pre-specification reflects a more general occurrence of assertive control in Indian command and control systems.

Delegative Command & Control in Pakistan

In contrast to India, Pakistan's command and control systems provide an example of strong delegative control. Unlike the de-mated and dispersed Indian arsenal, Pakistan's nuclear weapons platforms suggest a higher state of readiness and an ability to rapidly mate and deploy warheads. Although the weapons appear to be dispersed and at least somewhat subject to civilian oversight during peacetime, the military retains the capacity to expunge civilian leaders from the decision-making process.⁴⁹ In practice, Pakistan's weapons can be readily assembled and quickly mobilized when needed. This high degree of readiness will only become more pronounced with the recent shift towards theater nuclear weapons (TNWs), which demand a responsive posture with components that can be readily assembled on short notice.⁵⁰ Additionally, technical limitations have prevented Pakistan from developing robust systems of PALs or PESs to safeguard their weapons.⁵¹ The US has attempted to transfer protection technologies to Pakistan, but it is "unclear" if this transfer has led to an increase in technological control.⁵² Fears that US PAL/PES components would render Pakistan's arsenal inert have inhibited the adoption of these protective technologies and left Pakistan's weapons with fewer layers of centralized control and greater peripheral launch capacity.

Finally, Pakistan's command and control structures exhibit significant degrees of pre-delegated launch authority. Since the weaponization of Pakistan's nuclear forces, "Pakistan has indeed been reported to allow pre-delegation of nuclear release authority

⁴⁸ Ibid. Also see Tellis, pp. 436-440 for a discussion on the vulnerability of Indian command and control systems.

⁴⁹ For a distinction between Pakistan's nuclear command and control during peacetime and moments of crisis, see Sebastien Miraglia, "Nuclear Command and Control in Pakistan," *Journal of Strategic Studies*, Vol. 36, No. 6 (2013), pp. 841-866.

⁵⁰ For details on the shift of Pakistan to TNFs, see Hans M. Kristensen and Robert S. Norris, "Pakistan's Nuclear Forces, 2011," *Bulletin of the Atomic Scientists*, Vol. 67, No. 4 (2011), pp. 91-99.

⁵¹ Miraglia, p. 849.

⁵² Kristensen and Norris, "Pakistan's Nuclear Forces, 2011," p. 95.

to field commanders during military crises."⁵³ Consistent with the observation that Pakistan's broader nuclear strategy "heavily favors the 'always' side of the always/never divide," it appears that "officers have the physical ability to assemble and release nuclear weapons should they deem it necessary, regardless of whether they are vested with the authority to do so."⁵⁴ Combined with a reactive nuclear arsenal and limited technical restraints on nuclear use, this devolution of command to field officers demonstrates Pakistan's reliance upon delegative control over its nuclear forces.

Explaining Command & Control: Civil-Military Relations & Time-Urgency

Having established India and Pakistan's command and control systems as strongly favoring assertive and delegative control, respectively, the paper now turns to two competing explanations for the variation in these outcomes: preexisting patterns of civilmilitary relations and perceptions of time-urgency.

Civil-Military Relations

Feaver's first proposition for explaining command and control systems is: "The more stable the civil-military relations, the more delegative the command and control system; the more volatile the civil-military relations, the more assertive the command and control system."⁵⁵ Stable civil-military relations are observed when "a military that is institutionally strong and has enjoyed a fairly high degree of autonomy, but has eschewed direct intervention in political affairs."⁵⁶ Volatile civil-military relations, in contrast, include "states where political leaders have used extraordinary control measures which politicize military forces, as well as those states with a history of military coups."⁵⁷ In short, this framework proposes that an increase in civil-military relations

⁵⁶ Ibid., p. 175.

⁵³ Miraglia, p. 857.

⁵⁴ Narang, "Posturing for Peace?" p. 70.

⁵⁵ Feaver, "Command and Control in Emerging Nuclear Nations," p. 178.

⁵⁷ Ibid., p. 176.

stability leads to more delegative command and control systems, while a decrease in civil-military relations leads to more assertive patterns of command and control.

According to this hypothesis, the command and control system of a nation can be explained by the nature of pre-nuclear civil-military relations because "[n]uclear weapons are added to an existing power structure and must be wielded by the existing actors in the political spectrum."⁵⁸ Accordingly, command and control measures should be observable through institutional structures that constrain the relative decision-making authority of each group, and these systems should arise as the result of a struggle for autonomy and control between civilians and the military.⁵⁹

India: Civil-Military Relations Stability

Civil-military relations are historically stable in India. Perhaps the most important indicator of stability is that no military coups have been attempted since the country's independence in 1947. The highest probability of military intervention in politics came after the 1962 Sino-Indian War. During the war, India's Prime Minister Jawaharlal Nehru and Minster of Defense Krishna Menon became intimately involved in military planning. Nehru and Menon were instrumental in fashioning the military's "forward policy" doctrine for the conflict, which proved to be a disastrous strategy. When the Indians lost the conflict, "the blame was laid on the doors of Nehru and Menon," leading to the Menon's resignation from office.⁶⁰ The embarrassing performance in the war, combined with military takeover in neighboring Pakistan, increased civilian fears of military action.⁶¹ Despite these troublesome conditions, however, no coup attempts were made in

⁵⁸ Ibid., p. 177.

⁵⁹ The degree of military autonomy in relation to civilian leadership is the central point of study in the civil-military relations literature. For major works on this topic from differing perspectives, see Eliot Cohen, *Supreme Command* (New York: Free Press, 2002); Peter Feaver, "The Civil-Military Problematique," *Armed Forces and Society*, Vol. 23, No. 2 (Winter 1996), pp. 149-178; Samuel Huntington, *The Soldier and the State* (Cambridge, MA: Harvard University Press, 1957); Morris Janowitz, *The Professional Solder* (New York: Free Press, 1971).

⁶⁰ Pant, p. 243. Although Nehru and Menon received a large part of the blame for the failure in the border conflict with China, some more recent accounts suggest that civilian decision-making was not as damaging to the effort as previously thought. For such an argument, see Srinath Raghavan, "Civil-Military Relations in India: The China Crisis and After," *The Journal of Strategic Studies*, Vol. 32, No. 1 (February 2009), pp. 397-446.

⁶¹ For an account of these considerations, see Zillur Khan, "Civil-Military Relations and Nuclearization of India and Pakistan," *World Affairs*, Vol. 166, No. 1 (Summer 2003), pp. 24-25.

the aftermath of the war, nor has any attempt been made since. This pattern operates strongly in the manner proposed above: high levels of stability in Indian civil-military relations appear to correlate with highly assertive control of nuclear forces by civilian authorities.

Such strong civilian control of the military has a long history in India. After independence, "The military was thoroughly indoctrinated with the principle of civilian control" and civilian institutions forced military leaders into lower ranking positions.⁶² Regarding nuclear weapons, the centralization of institutional authority over nuclear development⁶³ and decision-making in the hands of civilians is even more pronounced.⁶⁴ In India, "Nuclear assets would only be constituted, operationalized, and transferred to military end users on orders of the Prime Minster."⁶⁵ Simply put, nuclear weapons use can only be authorized by civilian leadership.

This manner of centralized launch capacity has become deeply institutionalized in the Indian context. For instance, India's current nuclear doctrine states that "retaliatory attacks [are] to be authorized by the civilian political leadership through the Nuclear Command Authority (NCA) only."⁶⁶ Additionally, the military is unable to coordinate with civilians on nuclear matters without receiving approval from the Prime Minister's Office (PMO). Specifically, the military's Strategic Forces Command (SFC) cannot interact with the civilian-led Department of Atomic Energy (DAE) or Defense Research and Development Organization (DRDO) unless approved by the NCA.⁶⁷ On an institutional level, the military has been so thoroughly excluded from launch authority processes that this division has been referred to as "a policy of segregation."⁶⁸ Because civilians were able to eschew the military from political involvement and consolidate

⁶² For this statement and details on institutional changes, see Stephen P. Cohen, *The Indian Army: Its Contribution to the Development of a Nation* (Berkeley, CA: University of California Press: 1971), pp. 170-177.

⁶³ See Kampani for a detailed and updated account of India's nuclear development.

⁶⁴ For an extremely detailed account of centralized control in India, see Tellis, pp. 428-475.

⁶⁵ Narang, *Nuclear Strategy in the Modern Era*, p. 105.

⁶⁶ Pant, p. 249.

⁶⁷ Narang, *Nuclear Strategy in the Modern Era*, pp. 105-106.

⁶⁸ Arun Prakash, "9 Minutes to Midnight," *Force Magazine*, July 2012, p. 4; as cited in Narang, *Nuclear Strategy in the Modern Era*, p. 107.

power over nuclear matters, India has developed tight assertive control measures that seek to guarantee nuclear weapons will not be used accidentally or without authorization.

Pakistan: Civil-Military Relations Volatility

Pakistan's history of civil-military relations stands in stark contrast to the stable patterns in India. Pakistan also gained independence in 1947 as the British left the subcontinent, but has experienced multiple successful coups in that short time period. In 1958, Gen. Ayub Khan successfully led the first military takeover of the Pakistani government. Civilian control was reinstated in 1971, but was short-lived. In 1977, Gen. Zia ul Haq launched another coup that would maintain military rule for an additional 11 years.⁶⁹ During this time period, "The nuclear weapons program operated under the absolute control of the armed forces."⁷⁰ Critically, "Since the military coup of General Zia in 1978, civilian leaders have been excluded from all key decisions regarding the technical development of Pakistan's nuclear arsenal."⁷¹

What little influence the civilians have been able to exert in the nuclear realm appears to be confined to *de jure* political power that will be overridden by the military when deemed appropriate.⁷² During times of crisis, there exists "a legal provision allowing the chairman of the Joint Chiefs of Staff Committee to replace the Prime Minister as Chairman of the NCA" in the event that civilian leadership is seen to be "incapacitated or compromised."⁷³ Regardless of the official chain of command, all indications point to *de facto* control of nuclear matters by the military. In Pakistan, "the military's control over the most lethal coercive resources of the state endows it with the capability to advance those ideas and interests in the political arena."⁷⁴ Through violent

⁶⁹ For a brief overview of military rule in Pakistan, see C. Christine Fair, *Fighting to the End: The Pakistan Army's Way of War* (New York: Oxford University Press, 2014), pp. 19-23.

⁷⁰ Samina Ahmed, "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices," *International Security*, Vol. 23, No. 4 (Spring 1999), p. 186.

⁷¹ Miraglia, p. 850. Also see Ahmed, pp. 178-204.

⁷² Miraglia, pp. 855-861.

⁷³ Ibid., p. 855.

⁷⁴ Aqil Shah, *The Army and Democracy: Military Politics in Pakistan* (Cambridge, MA: Harvard University Press, 2014), p. 26.

interference in political affairs, Pakistan's military has directly shifted the country's command and control system toward a more precarious delegative control not seen in the stable civil-military relations environment of India.

Time-Urgency

Feaver's second proposition is: "The greater the time-urgency, the more likely the command and control system will be delegative."⁷⁵ In this context, "Time-urgency refers to the degree to which the leaders of the new nuclear state require that the arsenal be ready for immediate and rapid use."⁷⁶ An increase in time-urgency places pressure upon a regional nuclear power by threatening the swift destruction of its nuclear arsenal or command and control networks by another state. A new nuclear state is expected to favor delegative command and control systems under conditions of high time-urgency because, unlike assertive control measures that increase the time required to respond to a threat, delegative control allows a state to react more quickly in moments of crisis.⁷⁷ A more precise definition specifies time urgency as a combination of "perceptions about the likelihood of war, the vulnerability of the warheads and delivery vehicles, the vulnerability of the command and control system, and the strategic rationale for the arsenal."78 According to the proposition, an increase in these indicators should be accompanied by a shift toward delegative control. As this section demonstrates, however, the explanatory power of the time-urgency hypothesis is weak, especially when compared to the influence of civil-military relations stability on command and control systems.

Time-Urgency in South Asia

To evaluate the effect of time-urgency on command and control systems, this project focuses on threat perception and strategic vulnerability. The task of measuring

⁷⁵Feaver, "Command and Control in Emerging Nuclear Nations," p. 180.

⁷⁶ Ibid., p. 178.

⁷⁷ As Feaver explains, "Assertive command arrangements usually lengthen the time required for using the weapons, often by requiring complicated assembly or code-clearance steps prior to use. Positive command systems, in contrast, can be highly responsive." Ibid., p. 180.

⁷⁸ Ibid., p. 178.

threat has generated a substantial debate and no definitive agreement has been reached.⁷⁹ This essay assumes a conception of threat as a combination of aggregate power disparity and geographic proximity. If this component of the time-urgency proposition is correct, then states at a relative power disadvantage with nearby adversaries should favor delegative control patterns over their nuclear arsenals.

Much like threat, the definition of power is strongly contested.⁸⁰ This paper employs a basic material definition of power as a state's total economic, military, and population resources. To measure these factors, this paper uses the Correlates of War Composite Index of National Capability (CINC) score, which is an aggregate indicator that directly reflects the provided definition of power. CINC's constituent criteria—iron and steel production, military expenditures, military personnel, primary energy

⁷⁹ For an elaborate argument on the perception of threat, see Stephen M. Walt, *The Origins of Alliances* (Ithaca, NY: Cornell University Press, 1987), especially pp. 21-26. In this influential book, Stephen Walt develops "balance of threat theory." According to Walt, the primary determinants of threat are aggregate power, geographic proximity, offensive power, and aggressive intentions. As each of these components increases, so does the perceived level of threat. However, the latter two components of Walt's balance of threat theory-offensive power and aggressive intentions-yield particular complications. First, offensive power is highly correlated with aggregate power. This creates the potential for double-counting military capabilities, which would overstate the impact of material factors. Furthermore, this component assumes that offensive and defensive capabilities are distinguishable. As John Mearsheimer notes, "it is very difficult to distinguish between offensive and defensive weapons. For example, it is not clear that mobility favors the offense; in fact, we might well argue that mobility favors the defense." For an elaboration of this statement, see John J. Mearsheimer, Conventional Deterrence (Ithaca, NY: Cornell University Press, 1983), pp. 25-27. Simply put, capabilities are very rarely ever purely offensive or defensive. Secondly, the difficulty of discerning intentions is a core premise of international relations theory. It is this challenge that is at the center of the security dilemma. Because intentions of other states are never fully certain, states must pursue policies that promote their own security. This paper's understanding of the security dilemma is in concordance with Mearsheimer, who states that "the measures a state takes to increase its own security usually wind up decreasing the security of other states. When a country adopts a policy or builds weapons that it thinks are defensive in nature, potential rivals invariably think that those steps are offensive in nature." See Mearsheimer, The Tragedy of Great Power Politics, pp. 35-36, 382. In short, this project assumes that, because states must fear the worst possible outcome as potential rivals develop military capabilities, aggressive intentions can be subsumed underneath aggregate power, which serves as the baseline of determining a state's intentions. For arguments that offensive and defensive weapons can be distinguished and state intentions can be discerned, see Charles L. Glaser, Rational Theory of International Politics (Princeton, NJ: Princeton University Press, 2010); Evan Braden Montgomery, "Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty," International Security, Vol. 31, No. 2 (Fall 2006), pp. 151-185; and Stephen Van Evera, Causes of War: Power and the Roots of Conflict (Ithaca: Cornell University Press, 1999).

⁸⁰ For a classic treatment of power as a general concept, see Robert A. Dahl, "The Concept of Power," *Behavioral Science*, Vol. 2, No. 3 (July 1957), pp. 201-215. Additional definitions of power can be found in David A. Baldwin, "Power Analysis and World Politics: New Trends versus Old Tendencies," *World Politics*, Vol. 31, No. 2 (January 1979), pp. 161-194; and Jacek Kugler and William Domke, "Comparing the Strength of Nations," *Comparative Political Studies*, Vol. 19, No. 1 (April 1986), pp. 39-69.

consumption, total population, and urban population—are averaged as a proportion of the international system to reflect a state's relative power in material terms.⁸¹



Figure 1. Relative Power Comparison of India, China, & Pakistan⁸²

The graph above provides a comparison of relative power between India, Pakistan, and China. Although the current study focuses on India and Pakistan, including China in the relative power comparison is necessary for properly evaluating India's perception of threat. Whereas Pakistan's nuclear arsenal is entirely concerned with deterring Indian aggression, India's nuclear arsenal must serve the dual purpose of deterring Pakistan and China from offensive action. Comparing the relative power of each state presents a problem for the time-urgency proposition: although both India and

⁸¹ For a description of each variable and the aggregation procedure for the CINC variable, see J. Michael Greig and Andrew J. Enterline, *Correlates of War Project:National Material Capabilities Data Documentation Version 4.0* (Denton, TX: University of North Texas, 2010). Codebook available online at:

<http://www.correlatesofwar.org/COW2%20Data/Capabilities/NMC_Codebook_v4_0.pdf>

⁸² CINC data are only available through 2007.

Pakistan experience relative power deficits to their adversaries, the two states operate profoundly different command and control systems. Without variation, the threatperception explanation cannot explain the divergent outcomes in India and Pakistan.

A possible objection to this claim is that, although Pakistan is weaker than India by the metric employed, the two nations have nevertheless experienced a long series of destabilizing conflicts that increases India's threat perception, regardless of China.⁸³ However, the increase in fear generated by uncertainty about Pakistani intentions can be said to affect command and control systems in the same way as relative power differentials. In other words, the perception that Pakistan has hostile intentions only serves to increase time-urgency concerns for India. The current model predicts that such an increase in time-urgency should increase delegative control, but assertive control is nevertheless maintained in India. Regardless of the dyadic pairings, threat perception fails to explain changes in South Asia's command and control behavior.

In addition to relative power disparity, an indicator that represents both threat perception and vulnerability is geographic proximity. Because a nearby threat means a state "must contend with very short warning times,"⁸⁴ geographic proximity can greatly affect threat perception.⁸⁵ As two states become more geographically near, both the threat perception and vulnerability aspects of time-urgency increase. In short, states should favor delegative control measures when their adversaries are nearby. In South Asia, however, geographic proximity is unable to explain adjustments in delegative or assertive control systems. India and Pakistan share a common border, making geographic proximity a constant that cannot explain why one state favors delegative control and the other favors assertive control.

A final implication of the time-urgency proposition is that more vulnerable nuclear systems lead to delegative control measures. In order to decrease vulnerability of

⁸³ For a detailed historical account of these crises between India and Pakistan, see P.R. Chari, Pervaiz Iqbal Cheema, and Stephen P. Cohen, *Four Crises and a Peace Process: American Engagement in South Asia* (Washington, DC: Brookings, 2007).

⁸⁴ Feaver, "Command and Control in Emerging Nuclear Nations," p. 178.

⁸⁵ See Mearsheimer, *The Tragedy of Great Power Politics*, pp. 271-272, 342-343 and Walt, pp. 23-24 for a discussion on the relevance of geography to state behavior.

nuclear assets, a state can diversify its nuclear platforms. Developing an ability to deploy air, land, and sea-based nuclear weapons "reduces vulnerability to sudden attack" and ameliorates a state's concerns of time-urgency by promoting the survivability of its nuclear forces.⁸⁶ Accordingly, an increase in the number of platforms used should produce a decreased sense of time-urgency.⁸⁷

India's nuclear program is heavily concentrated in air-based delivery systems. The country's land- and sea-based delivery systems are being developed, but since the nuclear program's development, its "[f]ighter bombers constitute the only fully operational leg."⁸⁸ Currently, India is attempting to supplement its short-range Prithvi I ballistic missile with a long-range Agni V missile that can travel in excess of 5,000 kilometers. Additionally, India is attempting to develop a ship-launched ballistic missile, but a short launch range and small payload has stunted the development of sea-based capabilities.⁸⁹ For the immediate future, India appears to be reliant upon its air-based delivery systems, while its land-based systems will require several more years of testing before they can be fully integrated into India's nuclear force structure. Although India's limited diversification of platforms increases its vulnerability, it still favors assertive control measures. This behavior runs counter to the framework's predictions, suggesting that time-urgency fails to alter India's preference for strong civilian oversight over its nuclear weapons.

Pakistan is also seeking to diversify its nuclear forces, but through different platforms than India. Its heavy reliance upon a series of land-based ballistic missiles overshadows a meager, potentially non-functioning capability for air-based delivery systems.⁹⁰ Instead of air- or sea-based capabilities, Pakistan has prioritized the

⁸⁶ Erik Gartzke, Jeffrey M. Kaplow, and Rupal N. Mehta, "The Determinants of Nuclear Force Structure," *Journal of Conflict Resolution*, Vol. 58, No. 3 (April 2014), p. 482.

⁸⁷ It should be noted presently that nuclear diversification is likely highly correlated with the civil-military relations hypothesis. The hypothesis is developed here in full because it is a natural extension of Feaver's argument.

⁸⁸ Robert S. Norris and Hans M. Kristensen, "Indian Nuclear Forces, 2010," *Bulletin of the Atomic Scientists*, Vol. 66, No. 5 (September 2010), p. 76.

⁸⁹ Hans M. Kristensen and Robert S. Norris, "Indian Nuclear Forces, 2012," *Bulletin of the Atomic Scientists*, Vol. 68, No. 4 (July/August 2012), pp. 96-101.

⁹⁰ Kristensen and Norris, "Pakistan's Nuclear Forces, 2011," pp. 96-101.

development of short-range, theater nuclear forces. This development reflects the fact that "the Pakistan Army is the largest and dominant service," so any issue that is "*military dominated*" is truly "*army dominated*."⁹¹ Although Pakistan's nuclear forces are somewhat vulnerable, this is a reflection of the ability of the Pakistan Army to usurp political authority and develop capabilities that favor offensive, delegative control at the expense of secure, assertive control.

Conclusions

This project has argued that the most powerful explanation of command and control systems in emerging nuclear nations is the stability or volatility of a state's civilmilitary relations. Under conditions of stable civil-military relations, India's civilians have been able to institutionalize civilian control over the development and possession of nuclear weapons. In Pakistan, however, volatile civil-military relations have allowed the military to maintain significant influence over the nuclear program, fostering an organizational bias toward responsive and offensive capabilities and doctrine. The primary alternative explanation—time urgency—fails to account for such a change in outcomes. Because India and Pakistan experience very similar levels of threat perception and vulnerability, time-urgency considerations cannot be said to greatly affect command and control systems in South Asia.

These findings suggest that Feaver's framework—which remains the standard model for the study of command and control in regional nuclear powers—is in need of revision. Time-urgency may have some influence on a state's adoption of command and control systems, but the evidence provided above suggest that its effect is muted. Instead, attention should be given to the underlying civil-military relations of a country when attempting to project the future of that state's command and control systems. Most importantly, and contrary to the predictions of Feaver's model, the countries with the least stable forms of civil-military relations appear to have the most delegative patterns of command and control.

⁹¹ Fair, p. 27. Emphasis in original.

As a result, the primary lesson of this study is that the safety of nuclear weapons in new nuclear states relies significantly upon the preexisting pattern of civil-military relations. If a country's civilians maintain centralized control of the arsenal without interference from the military, then the likelihood of accidental or unauthorized use is slight. A country whose military has forcefully intervened in politics, however, is more likely to have peripheral launch authority and weak safeguards against such use. These are the characteristics of potential proliferators that merit concern from policymakers.



ON THE COVER

An Agni-III intermediate-range ballistic missile developed by India as the successor to Agni-II. It has a range of 3,500 km- 5,000 km, and it is capable of engaging targets deep inside neighboring countries. The first test for Agni-III was conducted from Wheeler Island off the Bhadrak coast on July 9, 2006.



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