WHY DO STATES BUILD NUCLEAR WEAPONS?

Proliferation Models as Concurrent Pressures on a State

Scott Curtice, Major, USA

Wright Flyer Papers

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Contents

Foreword

It is my great pleasure to present another issue of The Wright Flyer Papers. Through this series, Air Command and Staff College presents a sampling of exemplary research produced by our resident and distance-learning students. This series has long showcased the kind of visionary thinking that drove the aspirations and activities of the earliest aviation pioneers. This year's selection of essays admirably extends that tradition. As the series title indicates, these papers aim to present cutting-edge, actionable knowledge—research that addresses some of the most complex security and defense challenges facing us today.

Recently, The Wright Flyer Papers transitioned to an exclusively electronic publication format. It is our hope that our migration from print editions to an electronic-only format will foster even greater intellectual debate among Airmen and fellow members of the profession of arms as the series reaches a growing global audience. By publishing these papers via the Air University Press website, ACSC hopes not only to reach more readers, but also to support Air Force–wide efforts to conserve resources. In this spirit, we invite you to peruse past and current issues of The Wright Flyer Papers at https://www.airuniversity.af.edu/AUPress/Wright-Flyers/.

Thank you for supporting The Wright Flyer Papers and our efforts to disseminate outstanding ACSC student research for the benefit of our Air Force and war fighters everywhere. We trust that what follows will stimulate thinking, invite debate, and further encourage today's air, space, and cyber war fighters in their continuing search for innovative and improved ways to defend our nation and way of life.

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Abstract

Why do states acquire nuclear weapons? In this paper, I look at three primary theoretical models of nuclear proliferation—Security Concerns, Domestic Politics, and Norms—and argue that the models inform why states seek nuclear weapons more accurately when applied together as distinct pressures on a state instead of as separate instances of reasoning. These three models are not always complete by themselves, but instead, each model is actually a definition of a pressure or force that acts upon states to move them towards or away from nuclear weapons. When present, these pressures act simultaneously with each other such that there is consistent force working on a state's decisions, potentially over the course of many years with changes to each of the pressures over time. By applying each proliferation model together, I argue that nuclear proliferation occurs when Domestic Politics-Positive pressures and Normative-Positive pressures are greater than Domestic Politics-Negative pressures and Normative-Negative pressures given that a state is facing a Security threat. This hypothesis is scrutinized through the case study of India's proliferation and shows the progressive increase of nuclear positive pressures vis-à-vis nuclear negative pressures. Ultimately, the nuclear positive pressures exceeded nuclear negative pressures and propelled India from an avowed nuclear disarmament champion to conducting a nuclear test in the span of one decade. In support of current US efforts to prevent the spread of nuclear weapons, this enhanced model can be used by policy makers to better understand the nuclear positive and negative pressures on a potential proliferator, which will allow for nonproliferation actors to intervene at critical points and prevent nuclear positive pressure from pushing a state to proliferate as seen in the Indian case.

Introduction

As politics and competition remain at the forefront of the international stage, nuclear nonproliferation strategies need to be examined—not only by the great power states, but by all states—to prevent a future breakout of nuclear weapon acquisition. The three great power states, the US, Russia, and China, arguably would not wish to see their relative power diminished across their regional spheres of influence by a spread of nuclear weapons. Additionally, nonnuclear states would not want to see rival neighbors acquire nuclear arms and potentially gain a method of coercion over them. Despite this common inclination to prefer nonproliferation, concerns about a future breakout remain at the forefront of government activity and academic thought. In an Institute for Defense Analysis report, researchers cataloged 52 countries with some level of nuclear technical capability and categorized them by level of nuclear latency from nil to serial weapons production potential.[1]

Why have certain countries remained under the threshold? What caused other states to cross the threshold? Knowing those key factors, how can the international community prevent future nuclear proliferation? In this paper, I look at three primary theoretical models of nuclear proliferation—Security Concerns, Domestic Politics, and Norms—and argue that these models inform why states seek nuclear weapons more accurately when applied together as distinct pressures on a state instead of as separate instances of reasoning. This theoretical combination of models is then applied to India's proliferation case to show how each model provided positive or negative pressure toward its decision to seek nuclear weapons or abstain.

Nonproliferation studies and articles abound with different theoretical models to explain why states pursue nuclear weapons, sometimes arguing that a model is fully explanatory in itself and other times offering different models for different situations.[2] I take the three most definitive models of Security Concerns (*S*), Domestic Politics (*D*), and Norms (*N*) and argue that they are not always complete by themselves, but instead, each model is actually a definition of a pressure or force that acts upon states to move them toward or away from nuclear weapons. When present, these pressures act simultaneously with each other so that there is consistent force working on a state's decisions, potentially over the course of many years with changes to each of the pressures over time. This can be likened to a game of tug-of-war where each participant continually pulls on the rope in the hopes of progressing toward the goal and winning the game. If the game ran long enough, one would see waxing and waning of each participant's ability to keep pulling on the rope as well as participants potentially dropping out of the competition or

new participants coming into the game. Similarly, in nuclear proliferation, each theoretical model explains a different kind of pressure that will move a state closer to or farther away from building nuclear weapons. This concept is like Ariel Levite's argument about nuclear reversal which "is typically driven not by one factor but by a combination of factors, the exact combination of which varies between the cases (or clusters thereof) and over time," but the factors, or pressures as I describe them, can be applied equally to nuclear proliferation, nuclear reversal, and nuclear restraint events.[3]

Within these three models, Security Concerns hold the most influence in a state's decision about nuclear weapons and have been a necessary condition for all past proliferation events, but proliferation decisions can also be affected by Domestic Politics and Norms either positively toward nuclear acquisition or negatively away from it. Without the inclusion of Domestic Politics and Norms, Security models cannot explain why states do not proliferate when faced with a clear security threat and, therefore, are incomplete. However, by applying each proliferation model together, I argue the following explanatory hypothesis for nuclear proliferation as a more complete model:

Nuclear proliferation (Pr) occurs when Domestic Politics-Positive (D_P) pressures and Normative-Positive (N_P) pressures are greater than Domestic Politics-Negative (D_N) pressures and Normative-Negative (N_N) pressures given that a state is facing a Security threat (S).

$$\text{Proliferation} = \Pr (D_P + N_P > D_N + N_N \mid S)$$

Of note, as the Security threat increases, the likelihood of acquiring nuclear weapons increases and could arguably be a sufficient condition within itself, given an overwhelming existential threat, regardless of the number of negative pressures placed on the state. Although the formula above is simple, each variable within this equation is complex and has a multitude of interconnected issues that affect whether the result positively or negatively impacts a state's proliferation decision. Therefore, the equation itself cannot be mathematically "solved," per se. The framework of this equation is intended to drive recognition about the relationship between each model as the combination of Domestic and Normative pressures acting with or against Security threats provides leverage to move a state either further into nuclear weapons production or away from it.

Three Models

Much work has been done in the past on understanding the root causes of nuclear proliferation. Although many different ideas have been born from

this effort, the results can be mostly grouped into three theoretical models—Security Concerns, Domestic Politics, and Norms. In the following sections, I will outline the specifics of each model as well as provide examples for when the model applies positive or negative pressure for proliferation and finish with a defense on why other models were not included in this study.

Security Concerns

Proliferation models centered on security concerns or dilemmas dominate nuclear literature because of the simple and intuitive nature of the argument. Security models maintain that the fundamental motivation to acquire nuclear weapons is that nuclear weapons will improve the state's security.[4] Nuclear weapons provide an overwhelmingly destructive force that increases a state's relative power in comparison to its neighbors, providing a powerful tool in an anarchic system. Realist claims about proliferation events hold sway due to their concern with state survival and security by defining nuclear weapons as particularly effective power balancing or power maximizing state tools.[5] However, realists are not the only theorists interested in state security, and liberal and constructivist theories can offer their own security-driven explanations for nuclear proliferation, whether it is a hard power solution to secure a vital national interest for liberalism or as a response to a threat to a state's identity for constructivism.

Regardless of international theory subscriptions, 24 states have crossed the initial threshold in pursuit of nuclear weapons, and all but two of those states had a security concern during their periods of nuclear research.[6] Using this empirical evidence, security provides a strong foundational explanation for past nuclear proliferation behavior. Furthermore, for the ten states that completed the steps required to obtain nuclear weapons, all had significant security concerns of an immediate or historical nature, which indicates that security is a necessary condition for proliferation.[7] Security concerns can be exacerbated by historical rivals, revisionist neighbors, or significant military losses, which can increase the inclination for a state to proliferate making it more difficult to be influenced by domestic or normative negative pressures. However, security assurances or extended deterrence agreements from a nuclear state to a nonnuclear state can dampen the security concerns, which has been a significant goal of US foreign policy.[8]

Despite the historical necessity of a security concern to complete a nuclear weapons program, the security model alone cannot explain why states do not proliferate, as noted by many nonproliferation scholars.[9] According to the security model, nuclear weapons provide a guarantee of security which should

be an irresistible pull for any state technologically capable of producing one. Yet despite this pull, only nine states now have nuclear weapons (since South Africa dismantled its program and weapons), and no states are openly pursuing nuclear weapons programs. The lack of widespread and continued proliferation indicates that other pressures can influence a state's nuclear proliferation decision-making besides security concerns.

Domestic Politics

The next model of nuclear weapons proliferation holds that domestic actors can have positive or negative effects on governments seeking nuclear weapons.[10] These actors have a vested interest in nuclear acquisition outside of national strategy and are able to control the government's decision-making process through direct political power or indirectly through influence and information.[11] Common examples found in historical case studies point to the military industrial complex and associated scientific community, professional military units, economic institutions and business coalitions, and politicians who feel they have a mandate from their party or the people either for or against nuclear weapons.[12] Instead of a primary causal factor in this model, domestic actors use security subjectively to provide opportunities for interests to gain from.[13]

Nuclear positive domestic politics pressures are forces that increase the likelihood of a nuclear proliferation event. These pressures often come from the scientific and military communities, usually as a joint effort. Military services utilize nuclear weapons as methods to acquire greater budgets or control existing budgets through perceived needs for nuclear weapons from security threats or prestige of ownership.[14] Scientific communities tied to the military industrial complex seek military innovation because of "technical excitement" and the associated funds and reputation for their laboratories.[15] Coalitions of these two entities can provide pressure as technical experts in their fields by shaping the discussion of foreign threats and the benefits and costs of nuclear weapons programs.[16] Another common domestic politics pressure comes from political systems that view nuclear weapons as a tool to prop up their party or protect key constituencies. Nuclear weapons programs allow for dense and interconnected interest groups in the scientific, military, industrial, and bureaucratic communities that consume large amounts of capital and can often operate with minimal budgetary oversight because of the complexity and secrecy surrounding nuclear programs.[17] State leaders reliant on these communities to maintain power have a vested interest in securing their continued goodwill. Nuclear weapons also provide a powerful source for myths

of invincibility and modernity to enhance domestic appeal, which can outwardly cause a spiral effect of regional security competition thereby validating the state's original decision.[18]

Nuclear negative domestic politics pressures are forces that decrease the likelihood of a nuclear proliferation event. A dominant example of this pressure comes from a state's economic internationalization and domestic sectors and industries that favor openness of global markets and capital.[19] The Treaty on the Nonproliferation of Nuclear Weapons (NPT) poses significant threats of sanctions which can limit economic exchange, including limits on goods and services unrelated to weapons technology, so entities focused on imports and exports and suppliers for those entities who rely on open markets have strong incentives to maintain nonproliferation status.[20] Just as with nuclear positive pressures, politicians who represent these economic sectors or are reliant on these entities for political survival work to protect their constituencies through negative pressure. Another negative pressure comes from the nonproliferation regime itself by providing domestic tool sets for signatory states. These tools include security guarantees, economic incentives, and technical information sharing to provide domestic opponents of nuclear weapons programs with the requisite means to combat weapons programs and provide other avenues for domestic scientific and industrial communities.[21]

Taken by themselves, domestic politics models offer greater explanatory power for nuclear behavior as time continues forward. At the onset of the nuclear age in 1945, the US had no domestic political pressure to explain a nuclear weapons program nor did the Soviet Union or China which presents domestic models with difficulty explaining early proliferation events.[22] However, as time has progressed, domestic political pressure is clearly a factor for nuclear behavior. Even for states that have authoritarian regimes such as Iran or North Korea, domestic coalitions are required to support the expense of a nuclear weapons program.[23] Zulfikar Ali Bhutto, former Prime Minister of Pakistan stated, "If India makes an atom bomb, then even if we have to feed on grass and leaves—or even if we have to starve—we shall also produce an atom bomb as we would be left with no other alternative."[24] Bhutto still relied heavily on domestic coalitions, Pakistani scientists from abroad, and the military to support the project.[25] Evidence suggests that for modern states seeking to proliferate, nuclear positive domestic politics has become a necessary condition for success. Nevertheless, as argued above, every state that has completed a nuclear weapons program also had a current security concern, so domestic politics does not seem to be a sufficient condition for proliferation.

Norms

Norms models argue that socialization processes of nuclear weapons norms shape a state's identity in international relations and create the conditions to change an actor's beliefs and identities to ultimately change their definitions of interest.[26] Nuclear weapons provide a powerful identity-shaping force in actors that alters state behavior positively or negatively at individual, domestic, and structural levels, and norms models look at the norms of nuclear weapons acquisition through the lens of what actions are legitimate and appropriate in international relations.[27] An authoritarian state leader, an anti-nuclear domestic populace, and international beliefs about nuclear weapons can each provide a different pressure on a state's decision about nuclear weapon acquisition. The established international norms governing nuclear behavior can also shift over time, as seen in the transition from nuclear weapons prominence from 1945–1968 to nuclear restraint following the signature of the NPT in 1968.[28]

Nuclear positive norms arise primarily from the belief that nuclear weapons have significant symbolic value and prestige, conferring an elite international status upon the acquirers.[29] 2005 Nobel Peace laureate Mohamed ElBaradei stated that "nuclear weapons have continued to have a position of prominence as the currency of ultimate power."[30] British and French proliferation are often advocated as examples of prestige-driven weapons programs as both countries sought to retain great power status after WWII.[31] States seeking to enhance their identity in international affairs or states who believe their position as world leaders are in peril without nuclear weapons feel pressure from these kinds of norms to build nuclear weapons programs. Additionally, while there is disagreement over whether the security gained from the prestige of having nuclear weapons is the main goal or simply a fortunate byproduct, states that do acquire nuclear weapons obtain additional national security as norms have precluded major conflict against a nuclear power thus far.[32]

Nuclear negative norms pressure mostly stems from the NPT and associated nonproliferation culture. When the NPT was signed in 1968, the international community attempted to create a new norm that shifted the prestige away from nuclear ownership to nuclear nonparticipation. State legitimacy and inclusion into international institutions can hinge upon acceptance of NPT requirements, particularly for states seeking admission into Western institutions.[33] Ironically, these nuclear negative norms could not have been created without the support of the most powerful states in the system who are nuclear powers themselves, and who also ended up constrained by these same norms.[34] International normative pressure against nuclear weapons can also

be seen by the approximately ten percent of Nobel Peace prizes awarded to individuals since 1968 who were actively seeking a diminishment of nuclear influence and armaments.[35]

Critics of norms models argue that prestige alone is an insufficient requirement for either nuclear proliferation or nuclear restraint in many cases. Nuclear proliferation in states such as Israel and South Africa where the nuclear weapons were created in secret and are or were not discussed openly seem to counter ideas that prestige was the only driving factor in proliferation.[36] Additionally, the prestige of adherence to the NPT has not prevented North Korea from withdrawing from the NPT and acquiring nuclear weapons or Iran from covertly attempting to bypass NPT obligations and international sanctions in pursuit of a nuclear program.[37] Some scholars are also skeptical of the ability of the NPT and associated regime to actually change international beliefs of the importance of nuclear weapons for security and cite the behavior of the US, Russia, China, Great Britain, and France's continued reliance on nuclear weapons for strategic policy and their lack of progress toward NPT disarmament agreements.[38] Discussing the effects of nuclear negative norms, Thomas Schelling states that the "most severe inhibitions are undoubtedly those on the actual use of nuclear weapons, not on the possession of them."[39] These counterarguments against norms models preclude it as a sole model for explaining states' nuclear behavior.

However, normative pressures can clearly be identified in several proliferation events as having significant effect on a state's decision. For example, positive pressure can be seen in Charles de Gaulle's statement to Dwight D. Eisenhower that, "a France without world responsibility would be unworthy of herself, especially in the eyes of Frenchmen . . . It is for this reason too that she intends to provide herself with an atomic armament."[40] Additionally, negative pressure from the NPT and nonproliferation regime is arguably a strong consideration for why countries such as Sweden became vocal opponents of nuclear proliferation after having a nascent program themselves or why Ukraine opted to relinquish its nuclear weapons after the collapse of the Soviet Union.[41]

Other Models

Another commonly argued model is technological pull theory which states that technology can compel actors to take an action (design nuclear weapons in this case) that they would not have in the absence of that technology.[42] J. Robert Oppenheimer summed up this theory when he stated, "When I saw how to do it, it was clear to me that one had to at least make the thing. Then the only problem was what one would do about them when one had them."[43]

However, critics of this model simply point to the abundance of states that have the requisite scientific and industrial capability but have not acquired nuclear weapons.[44] While some might argue that technological pull is another pressure upon nuclear behavior, I leave it out of the discussion for two reasons. First, although requisite technological capability is necessary for nuclear proliferation, any country with 1945 US technology can produce a nuclear weapon. The fundamental science behind nuclear weapons is no longer the tightly guarded secret of 1945, and technological proliferation comes down more to having the necessary materials and engineering expertise to put together a weapon. Second, supply side nonproliferation policy and strategy such as the NPT and associated nonproliferation organizations are entirely focused on preventing or at least delaying proliferation through denial and safeguarding of nuclear technology acquisition.[45] My theory seeks to provide an explanation of demand side proliferation events and is therefore more interested in the pressures that affect a state's decision to proliferate or refrain from proliferation. For my purposes, technological pull on the demand side would be argued as part of the source of domestic pressure from interested scientist groups or similar agencies seeking nuclear programs.

Case Study: India

This case study provides insights into the proliferation pressures on states that have exercised nuclear restraint or proliferated. The Indian case study was chosen from a population of states who thought about or did proliferate after the NPT was signed because of the differences in domestic and normative pressures before and after that event. India provides an excellent case study since its proliferation process stretched over multiple decades allowing for a historically broad selection of evidence under multiple leaders, political events, and changing world dynamics to show the push and pull of different pressures on India's decision to proliferate.

Nuclear Program Background and Security Concerns

India is an interesting case of a country that initially rejected military solutions to international conflict as a fledgling country in 1947, yet ultimately declined to sign the NPT to keep nuclear options open to the state which turned into full proliferation. Most of this initial reluctance to use military means was based largely on how India formed as a country after centuries of colonial rule by the British and the lingering effects of a subcontinent that had previously been largely isolated from attack due to geographical barriers. In

the events leading up to the independence of India, the Hindu population with leaders like Mahatma Gandhi espoused a primary strategy of nonviolence and diplomacy to solve conflict, which was retained for several years after independence and championed by Prime Minister Jawaharlal Nehru. Nehru and India maintained a strong preference for nonalignment with either of the two superpower blocs and for "peaceful co-existence" agreements to secure its national borders from China.[46]

As Prime Minister, Nehru held additional power as the Minister of External Affairs and as head of the Department of Atomic Energy. With this power, Nehru made nuclear weapons a taboo topic which only entered Indian discussion once international nuclear arms control agreements began to force the issue upon them.[47] Despite this forcing mechanism, Nehru categorically committed India to a path of peaceful nuclear energy and sought to increase India's prestige through a staunch international disarmament stance.[48] While outwardly aligning with the principles of Gandhi, the coexistence and antinuclear weapon stances also provided India with additional domestic benefits. Hoping for peaceful coexistence with China allowed India to reduce conventional military spending to focus on socioeconomic development favoring domestic nuclear energy research to drive the country's progress.[49] The antinuclear weapon stance protected India's nonaligned image and attracted greater foreign cooperation to assist its civil nuclear industry under the Atoms for Peace initiatives.[50] H. J. Bhabha, a prominent physicist and Atomic Energy Commission (AEC) Chair, maintained a favorable disposition to acquiring nuclear weapons, although these views were kept private in accordance with the taboo.[51]

India's stance quickly began to change in the face of new international pressures. From 1959 to 1962, India conducted border skirmishes with China in the Aksai Chin region of Kashmir, which lead to full conflict in 1962 despite previous Indian claims of peaceful coexistence. Chinese forces soundly defeated the Indian Army and penetrated Indian territory before withdrawing after international intervention. The Chinese seized the opportunity presented by the Cuban Missile Crisis which prevented major world powers and the UN from immediate intervention, and only the quick resolution of the crisis allowed the US and Britain to offer aid to prevent significant loss. This event led to a growing belief that India's military and diplomatic means were inadequate to deal with India's strategic environment and international realities; strategic military balance of power and strong national defense began to replace peaceful coexistence and diplomatic appeals.[52]

This reevaluation of policy quickened after the Chinese nuclear test in October 1964 and Nehru's death later that year.[53] The nuclear test increased ten-

sion and pressure on the Indian government to provide a response to China's nuclear weapons program in light of the recent conventional defeat, which continued to mount with subsequent Chinese tests in 1965 and 1966. Amid these continued tests and heightened tension, Pakistan, believing that India was politically weakened by the 1962 Sino-Indian conflict and Nehru's death, attempted to seize Kashmir from Indian control which resulted in a fierce three weeks of conflict. After the US declined to intervene on either side, the Soviet Union mediated a return to the status quo.[54] Along with this incursion, India's attempts to find a guarantee from the existing nuclear weapon states to protect against nuclear aggression were only successful in obtaining the unconvincing pledge of support within the UN framework already available.[55] India faced two significant security challenges from its neighbors in a period of three years with resulting fallout for its policy of diplomatic mediation and coexistence. China's nuclear tests proved to India that the nuclear weapon states were unwilling to provide security against nuclear coercion, and the Pakistan conflict confirmed that the UN was unable to enforce international order without a nuclear armed superpower intervening on its behalf.

After this sequence of events, security models would clearly indicate for India to start nuclear proliferation. To defend against a nuclear armed rival, security models point to either internal balancing by development of nuclear weapons or an external balancing alliance with a nuclear power to guarantee state security.[56] India's initial belief in international organizations and diplomacy to protect against aggression had been shaken as argued above, and its no entanglement foreign policy had left it without any strong allies or security partners, leaving it with only self-help options to ensure state survival against a nuclear armed rival to the north and a belligerent, revisionist adversary to the west. India's nuclear technology was advanced enough to begin a serious weapons program (at least per Atomic Energy Commission Chair Bhabha, who claimed that India could produce a weapon in 18 months immediately after the 1964 Chinese nuclear test), so why did the first Indian test not occur until 1974 followed by two decades of nuclear latency before more tests in 1998?[57] Even assuming that building a nuclear weapon proved more difficult for India than Bhabha claimed which led to a delayed first test in 1974, security model arguments about nuclear deterrence against Pakistan's nascent program and China's expanding arsenal based on India's demonstrated but latent nuclear capability seem to be nullified by its need or desire for a second round of tests two decades later. Logic indicates that other factors influence the decision to proliferate and the process by which it occurs. However, India's security concerns clearly played a catalytic role in driving the country away from a policy of nonproliferation and global disarmament to producing nu-

clear armaments, which supports the premise of security as a necessary condition for proliferation.

During this period when India reevaluated its security options in the international arena, another event occurred which allowed the Parliament and India's elites to publicly debate nuclear options as a response to India's security dilemmas. The death of Nehru in 1964 effectively ended the taboo on nuclear weapons discussion within India as his successors did not hold the same high level of political stature to prevent open criticism of their policies that Nehru had enjoyed.[58] This freedom allowed both foreign and defense policy debate on the value of an Indian nuclear weapon both within the government and in elite circles. This debate was further stimulated by the subsequent Chinese nuclear tests and the requirement to respond to the ongoing negotiations of the NPT which began in Geneva in 1964.[59] The NPT negotiations and impending ratification forced the Indian government to actively consider India's previous international nonproliferation and disarmament stance in the context of the ongoing and unresolved security threats to create future nuclear weapons policy.

Ultimately, India declined to sign the NPT, under protestations against the nuclear weapon states' (NWS) nuclear hegemony and significant domestic pressure from political and scientific elites who wanted to see a nuclear armed India on the world stage.[60] The AEC, under new leadership from Vikram Sarabhai after Bhabha's untimely death in a plane crash, was reluctant to pursue nuclear explosives until 1971, despite India not signing the NPT three years prior.[61] This initial reluctance from the AEC combined with the domestic nuclear compromise to not sign the NPT dampening internal pressure and India's foreign policy retention of nuclear disarmament led to a surprise in 1974 when India detonated what they called a Peaceful Nuclear Explosion (PNE) under Prime Minister Indira Gandhi.[62] The timing of this test at a juncture of strategic events also muddies the waters on why India chose to make a public nuclear test in 1974 instead of opting for either nuclear weapon latency or retaining a diplomatic option.[63] India had proven its conventional dominance over Pakistan in 1971 after Pakistan made another failed attempt to claim Kashmir. This conflict downgraded Pakistan from a major conventional threat to a minor security annoyance while at the same time increasing deterrent concerns from Pakistan's professed nuclear aspirations and US involvement in the region as a potential rival.[64] China was in the later stages of Mao's Cultural Revolution, focused on internal struggles more than border disputes with India. Neighboring conventional security concerns had eased, but India retained a perceived nuclear security threat to its regional aspira-

tions from Pakistan's nascent program, China's existing arsenal, and potential interference from the US.

Despite these security concerns, senior defense and foreign officials were not notified or given guidance on national policy for India's newly demonstrated capability nor were they given options to discuss effects on their spheres of influence in preparation for the 1974 test.[65] At the same time, Indira Gandhi's government's popularity dropped to dangerously low levels of support because of severe domestic recessions, rioting, and political upheaval, while the nuclear industry had become a politicized and domestically popular focal point of India's economic modernization programs.[66] Additionally, the NPT's associated norms loomed in the background preceding the test, so although India as a nonsignatory state was legally free to acquire nuclear weapons, concerns about criticisms from other states were present prior to the PNE. Considering those events, why did India delay a nuclear explosives program until after the signature of the NPT? According to Bhabha, India could have tested a nuclear weapon before the 1967 deadline and joined the official nuclear weapon states. Also, why did India call the 1974 test a PNE instead of a nuclear weapons test? Security models suggest that India should have seized the opportunity to demonstrate to rival states its nuclear capability and establish deterrence to prevent future aggression, but that did not appear to happen until 1998. Instead, India attempted to toe the line between retaining its image as a nonproliferation state arguing for nuclear disarmament and developing a full weapons program to deter adversaries by demonstrating a capability but calling it peaceful. Regardless of how India defined it, the 1974 nuclear test clearly marked a change in India's capability from a purely civil industry to a latent weapons program that would mature in a heated nuclear test exchange with Pakistan in 1998.

Nuclear Positive Domestic Pressure

During India's nuclear development, nuclear positive domestic pressure grew rapidly from the political parties and the scientific community who banded together to push the nuclear agenda after China's nuclear test and Nehru's death. The most influential critic of India's antinuclear stance was H. J. Bhabha, chair of the Atomic Energy Commission, who intervened publicly in two key instances to catalyze the nuclear debate and push India's antinuclear leaning government under Lal Bahadur Shastri and the dominant Congress party to openly discuss a nuclear option. Immediately after the 1964 Chinese test, Bhabha called a news conference and claimed that India could also produce a nuclear bomb in 18 months.[67] Shortly after that

proclamation, Bhabha also claimed that India could produce a nuclear weapon for $368,000 to challenge government officials who said a weapons program would be too expensive.[68]

Although Shastri continued to oppose nuclear weapons publicly, he compromised with Bhabha and supporting members of the Congress party to begin a classified research and development of a program to detonate a PNE if the government felt it was required.[69] While Bhabha opened the door for increased domestic pressure from other government and outside entities, his death in 1966 eased the pressure on his AEC successor, Vikram Sarabhai, who took a more conservative view on the timeline and cost of a nuclear program.

Another factor pushing Shastri to this compromise was the vocal debate ongoing in Parliament over India's necessary reactions to the second and third Chinese nuclear tests. Pro-bomb factions within the Parliament sided with Bhabha to convince Shastri of the necessity for a nuclear option. Of the five major parties represented in Parliament, two parties—Jan Sangh and the Praja Socialist Party—wanted a physical nuclear weapons program. The Swatantra party wanted nuclear latency in case the US would not provide a nuclear guarantee. The Communist Party of India was split between the USSR and China, but both advocated against an Indian bomb. The Congress party, the fifth and most dominant party, publicly retained the government's anti-nuclear weapon stance but privately had a vocal minority that backed an Indian weapon.[70] B. K. Nehru was the Indian Ambassador to the US at this time and acknowledged, "there is great pressure on the Indian government to explode a nuclear bomb. This pressure has come after the Chinese nuclear explosion."[71] In addition to the internal compromise with the AEC to create a latent capability, the domestic political pressure also could arguably be considered as a key factor in India's decision to refrain from signing the NPT and opt instead to retain a nuclear option.

Along with the political pressure inside the Parliament, a new advocacy began to build from outside the government in the academic and scientific communities. In the interim between Nehru's death and the deadline for the NPT, a large number of academic studies appeared both defending and attacking the government's antiweapon policy, along with a symposium on the need for an independent nuclear deterrent.[72] Nuclear scientists within the AEC had to wait until the death of Chairman Sarabhai in 1971 to begin dedicated lobbying of Prime Minister Indira Gandhi along with a coalition of defense industries necessary to fabricate other necessary parts for a nuclear test.[73] India's desire for social and economic progress had imbued the nuclear industry with great power and status as the showpiece of the country's modernization, leading to a politicization of scientists and the nuclear industry.

The nuclear industry became a "government within a government," focused on sustaining India's image and retaining their political power, and a nuclear test provided a tangible result compared to less visible socio-economic improvements to satisfy the public and ruling elites.[74]

Besides the domestic pressures from political and scientific communities, the political survival of Indira Gandhi and the Congress party in 1974 was at stake. Bueno de Mesquita et. al discuss the causes of many political decisions as "leaders are interested in enhancing their own welfare and so seek to produce what their supporters want."[75] These supporters may be the public, factions of government, outside elite interests, or some combination of these factors who the leader must satisfy to hold onto power.[76] Internally in 1974, Gandhi's government faced a prolonged economic recession, mass strikes, large-scale riots, and a fragmented ruling party.[77] As George Quester notes, "it would be a mistake to exaggerate Mrs. Gandhi's freedom to ignore popular sentiment during the emergency, or to underrate the popularity of the nuclear programme . . . For her to have responded to outside world sentiment by renouncing nuclear explosives might have amounted to a comparable political disaster."[78] Although Gandhi later denied that domestic concerns were a part of her decision, public opinion polls of Gandhi and her government increased significantly after the test. While not conclusive proof of a regime survival theory, the surprise nature of the test as shown above viewed in light of the pressures from the social unrest and political detractors indicate the test was designed for an immediate issue, not long-term security and industry benefits.[79]

Nuclear Negative Domestic Pressure

Negative domestic pressure on India's nuclear weapon program came in two stages. After the founding of India until the Chinese test in 1964 and Nehru's death, India was guided by a policy of peaceful coexistence and diplomacy of peace through disarmament, which were legacies of India's struggle for independence and Mahatma Gandhi's teaching of nonviolent resistance.[80] Nehru's tight control over the nuclear apparatus of government and his domestic antiweapon stance combined with India's foreign policy of nonproliferation effectively closed off any avenues for a nuclear debate to emerge in the Parliament or academic circles. Added to this silence, the Indian press was confined to reporting nuclear pronouncements, presumably for the progress and achievements of the civilian nuclear industry during this time, leading to a largely uninformed and disengaged public prevented from considering the merits of an Indian nuclear weapon program.[81]

While this policy of peaceful coexistence and diplomacy came under scrutiny in the years following the Sino-Indian War and Nehru's death, the dominant Congress party and the Communist Party of India both maintained a strong antiweapon preference, and they reconfirmed in 1964 and 1965 during the All India Congress Committee the national focus on peaceful uses of nuclear energy and disarmament.[82] Even Indira Gandhi largely ignored nuclear issues and refrained from nuclear decisions until her secretive decision to conduct the first test in 1974.[83] In reference to the NPT, India's reluctance to sign seems to primarily have been concerned with fair treatment under the NPT by the NWS and providing a way to make India's civil nuclear industry independent from the International Atomic Energy Agency (IAEA) and possible interference in what they viewed as part of their national security. In fact, Ziba Moshaver suggests that the Indian government came close in 1967 to signing the treaty and only ultimately declined due to the nuclear positive domestic pressures described above.[84]

Additionally, a new argument began to push forward in the post-1964 nuclear debate about the economic feasibility of a nuclear weapons program. This argument pulled in both domestic concerns and foreign concerns if India were to begin a weapons program. Domestically, concerns were voiced over the cost of a weapons program that would divert resources away from economic and social development, bolstered by AEC Chairman Sarabhai's estimate that a program would require a total commitment of national resources.[85] With these domestic concerns, there was also the fear that India's nuclear industry would be cut off from foreign nuclear material and equipment supplies. The Atoms for Peace program and India's bilateral agreements with the US and Canada that supplied India's reactors with nuclear fuel stipulated that the supplied material would be used only for peaceful purposes, and a nuclear weapons program would effectively terminate those sources of foreign aid.[86] This prediction ultimately turned out to be true, when Canada and the US terminated supplies ultimately forcing India to turn to the Soviet Union who coopted India into settling for IAEA safeguards in exchange for nuclear material to prevent India's nuclear industry from complete failure.[87]

Nuclear Positive Normative Pressure

Nuclear positive normative pressure initially arose from the 1964 Chinese test. Nuclear testing during the 1950s and 1960s was considered highly prestigious, a sign that a state has "arrived" technologically and could join the other nuclear elites in the world.[88] Sagan makes the point that there was an internal belief that, "nuclear power and nuclear weapons were deeply linked

to a state's position in the international system" in his case for normative pressures causing French proliferation in the 1950s.[89] The Chinese test came as a shock to India, particularly Bhabha, who had long argued India's superiority over China in nuclear technology.[90] Within the Lok Sabha of India's Parliament, ideas were pushed which noted the need for a nuclear program. Without this program, India would be reduced to reliance on foreign powers and become an insignificant actor in international relations.[91] Outside the government, noted academics also pushed for India to closely consider issues of regional power and prestige.[92] Sisir Gupta, a prominent advocate of Asian balance stated:

> In the world today, five nations have got the veto, bomb, and what is more, each has a sphere of influence . . . Faced with this situation, India as a sixth power in the world where only five are recognized to be great, is obviously at a policy crossroad. It can either enter the club by defying the world and making a bomb, or see to it that the bomb as a status symbol loses its significance because of effective progress towards disarmament.[93]

Important for the Indian debate was the topic of why prestige even mattered in this situation. Security models would argue that prestige only matters in that it contributes to the security and deterrence benefits from nuclear weapons, but in the Indian case, we see significant discussion over India's role in the regional and world order. This debate was not simply focused on the prestige of having nuclear weapons, which would indicate a security focused model, but instead, the considerations were on how India could gain admittance into the top tier of states with world influence. Indian leaders had generated an internal vision of Indian influence and prestige in the region and among the nonaligned states, beginning with Nehru in 1949 who argued that India could become the meeting ground between East and West, a neutral power to provide diplomatic balance to the bloc powers.[94] This vision was maintained past Nehru, although the methods to achieve international prominence changed as championing decolonization and disarmament efforts failed to gain India the requisite status increase.[95] As nuclear weapons seemed to gain tangible prestige benefits, and as Indian views of the 1964 and 1965 Chinese tests confirmed, India increasingly debated the value of nuclear weapons as the tool to gain inclusion into the elite club of international decision makers.

Included in this bid for elite inclusion came an Indian belief that nuclear testing was a manifestation of Indian socioeconomic progress.[96] To alter world opinion of India as an under-developed state with a significant poverty issue, India sought a focus on economic progress shown through tangible improvements in technical-scientific advancement. These perceptible improvements in India's development provided symbolic reinforcement to the government's

agenda of progress when socioeconomic factors and growth could prove elusive and slow.[97] Indian technological advancement would also contribute to Indian designs to be a leader of nonaligned countries, most of which faced similar economic situations, by allowing India greater leverage to challenge the policies of more developed nations on an equal footing.[98]

Nuclear Negative Normative Pressure

India's nuclear negative normative pressure stemmed from two primary sources. The first and most significant source was the newly instituted NPT and the associated Indian ideals of global nuclear disarmament. The treaty provided unified, legal action from the collection of nonnuclear weapon states and nuclear weapon states to India's agenda of nuclear restraint and disarmament that it had vocally championed since its independence in the 1940s.[99] Under Nehru, India remained categorically committed to peaceful nuclear use, although antinuclear sentiment remained in Parliament past his death among leading political parties. Nehru's belief was that actively participating in arms negotiations would improve India's international image as a leader of the nonaligned states as well as encouraging greater foreign cooperation with India's economic development.[100]

Although this nuclear negative pressure slowed with Nehru's death, the NPT, and the treaty discussions leading to the NPT, reinforced antinuclear members of Parliament with an international system that promoted their ideals and provided prestige through inclusion in the NPT regime. Alongside the NPT were the public and unqualified commitments that India had made to nuclear disarmament, and many felt a nuclear weapons program would mean breaking those promises and loss of prestige among the nonaligned states.[101] While the negative pressure from the early NPT regime failed to provide enough force to prevent proliferation, it is interesting to note that the proponents of nonnuclear norms in India were proven accurate in their assessment of reactions to Indian proliferation. States from the developing world and the nonaligned movement did not approve of India's new nuclear status, and India failed to gain the desired prestige.[102] This is the first evidence of the effect that the NPT regime had begun to shift accepted norms from acquiring nuclear weapons to adhering to nonproliferation.

The second nuclear negative pressure was short lived but important in understanding initial Indian reluctance to consider nuclear weapons and Nehru's staunch antinuclear policies which prevented nuclear debate from occurring. Faith in nonviolent resistance was a legacy from India's struggle for independence which considered nuclear weapons to be immoral means of warfare.[103]

Indian Minister of Defense from 1957–62, V. K. Krishna Menon, replied to detractors about the lack of debate, "why should I debate mass suicide. A nuclear bomb is not a weapon of offense or defense, it is a weapon of mass extermination."[104] This internal norm prevented Parliament from debating the strategic value of nuclear weapons and helps explain why India was both reluctant to join the nuclear weapon states before the 1967 NPT deadline as well as reluctant to sign the NPT. Without an educated government and elite to debate how India would utilize nuclear weapons as tool of national power, no consensus could be reached which would allow the Indian scientific community to produce Bhabha's bomb "in 18 months." At the same time, reservations over the NPT language which seemed to divide international society between the NWS and Non-nuclear weapon states (NNWS) and permanently preventing India from gaining its desired international status, especially in relation to China, ultimately led to India's refusal of the NPT.[105]

The influence of this pressure from the India's history of disarmament and faith in nonviolent means could still be felt in 1974 when the Indian government deemed the nuclear test a "peaceful nuclear explosion" in what seemed to be an attempt to balance displaying a technological and military capability while also remaining true to Indian former principles of disarmament. India—or at least Indira Gandhi's government—wanted a visible display of its technological progress regardless of whether that was to gain international recognition and prestige or circumvent the domestic crisis, but was unwilling take a definitive nuclear weapons stance in the process.

Results

In the evidence above, we see the interplay of security, domestic, and normative pressures on India's nuclear program. Security clearly played a significant role in shifting India from a staunch nonproliferation and denuclearization stance to a secretive and hastily executed nuclear test. The Sino-Indian War, subsequent Chinese nuclear tests, and conflicts with Pakistan pushed a nonaligned India to debate a nuclear security option and decline membership in the NPT. These security concerns were never truly alleviated either through diplomatic agreements or with nuclear guarantees from an NWS. However, security concerns alone cannot explain why India failed to conduct a nuclear test before the 1967 NPT deadline nor why its 1974 test was declared a PNE instead of a weapons test nor why India even required a test instead of simply improving its weapon capability and holding a latent option to prevent international censure.

To complete the picture, we must include domestic and normative pressures on the Indian decision. Nuclear positive domestic pressure from political parties in Parliament as well as the AEC and associated industries combined with the nuclear positive normative pressure from the prestige that India had seen China receive after its nuclear testing and India's desire to lead both as a regional power and among the nonaligned states. Conversely, the nuclear negative domestic pressure from India's political old guard under Nehru and domestic economic concerns are added to the nuclear negative normative pressure from India's history of nonviolent resistance and past support to the global nonproliferation and denuclearization stances. In this case, we see two key periods of spikes in nuclear positive pressure that led to India's proliferation. The first is the Chinese nuclear test in 1964 that reinvigorated Indian security fears and confirmed Indian beliefs about the value of nuclear weapons coinciding with Nehru's death which opened India's nuclear debate. The second is the amassing of political power by Indian nuclear organizations combined with significant domestic troubles faced by Indira Gandhi in 1974. These combined spikes in nuclear positive pressure along with the steady nuclear positive pressure of an unalleviated security concern overwhelmed the nuclear negative pressures, which led to India's nuclear proliferation.

Policy Implications

By utilizing the models of nuclear proliferation together to view past proliferation events, some interesting implications can be derived. These implications can be utilized for future policy directions and to strengthen nonproliferation work.

The first implication is that security concerns are a constant nuclear positive pressure that cannot be completely removed, only alleviated. While security models cannot provide a complete theory of proliferation, evidence shows that security is an underlying factor in all cases of nuclear proliferation. To have an effective nonproliferation strategy, security concerns must be addressed for potential proliferators. While unproveable, it would be interesting to note the effect of a security guarantee from either the USSR or US for India in 1964 after the Chinese test would have had on India's path to proliferation. Current evidence suggests that security assurances are effective in keeping countries below the nuclear threshold as in the cases of the US guarantees to Japan and South Korea.[106] However, India's unmitigated security concerns opened the initial path to move a resolute nuclear disarmament state toward proliferation.

Another implication is that nuclear positive domestic and normative pressures can be significantly increased during a crisis event which can over-

whelm nuclear negative pressure. In India's case, we see the two spikes in nuclear positive pressure as shown above without any corresponding spikes in nuclear negative pressures until after India conducted the 1974 test. In 1964, proliferation pressures were trending negative due to Nehru's influence and Indian disarmament policies until the Chinese test and Nehru's death. These events caused an increase in positive pressures that continued to move India closer to proliferation until the 1974 crisis which caused a tipping point in the pressures and Indian proliferation. The corresponding negative pressures were not bolstered enough to deal with the increased positive pressures since no Indian politician had the same level of clout as Nehru nor did the NPT regime have enough influence yet nor were economic concerns about loss of foreign support fully realized until after the test.

These spikes in pressures also led to the final implication, which is the proliferation process likely has critical points where intervention from outside sources can stop or slow the process. As already mentioned, in 1964 a security guarantee could have had a lasting effect on Indian nuclear policy. Additionally, Canada and the US failed to make apparent the loss of nuclear material and support if India utilized its reactors for other purposes. I argue that had India known the repercussions of an open test on the domestic nuclear energy program, it would have foregone the test in favor of not begging for reactor fuel and signature on IAEA safeguards which directly went against Indian goals for energy independence. If a state is a potential candidate for nuclear proliferation, care can be taken to ensure that negative pressures are heightened during crisis events. The increases in negative pressures could include both reward and punishment initiatives to ensure that nuclear negative pressure remains greater than crisis level nuclear positive pressures. Long term actions should also be taken post-crisis to help nuclear positive pressures return to previous levels without continued intervention.

Future Research

Although I used the models concurrently to study India's path to proliferation, this model could effectively be applied to all countries exercising nuclear proliferation or nuclear restraint. The models together provide necessary explanatory power when one alone fails to provide a complete picture. Continued study of each past proliferation can draw out the critical events that lead to spikes in nuclear positive pressure to help future policy makers identify states in need of intervention and prevent proliferation. Additionally, studies of nuclear restraint can allow policy makers to identify which negative pres-

sures are most effective to curtail a state's proliferation given its current situation as well as ensure effective practices are shared among NPT states.

Conclusion

Nuclear proliferation occurs when Domestic Politics-Positive pressures and Normative-Positive pressures are greater than Domestic Politics-Negative pressures and Normative Negative pressures given that a state is facing a security threat. As seen in the Indian proliferation study, this appears to be true. Without an understanding of each pressure working concurrently on the state, single proliferation models are incomplete explanations of India's path. Security models cannot explain the Indian reluctance to proliferate before the NPT nor why its eventual test was labeled a PNE. Domestic models are missing a cause to shift India from its avowed disarmament stance and ignore the significant security and prestige debates in Parliament following Nehru's death. Norms models also do not support this shift in Indian policy and are missing a cause for the secretive and rushed process to conduct the 1974 test by Indira Gandhi. Only by applying the formula that models collective pressures and viewing the effects of nuclear positive and negative pressures from each model together over time can India's proliferation be explained fully.

As the US seeks to prevent the spread of nuclear weapons, efforts by policy makers to understand the nuclear positive and negative pressures on a potential proliferator can pay dividends by allowing nonproliferation actors to intervene at critical points and prevent positive pressure from pushing a state to proliferate as seen in the Indian case. Without this application, key opportunities to prevent a new nuclear state may be lost, and the nuclear dominos may start to fall.

Notes

(All notes appear in shortened form. For full details, see the appropriate entry in the bibliography.)

1. Blanc and Roberts, "Nuclear Proliferation: A Historical Overview," 1.
2. See John Deutch, "The New Nuclear Threat," 120–34, and Bradley A. Thayer, "The Causes of Nuclear Proliferation and the Utility of the Nuclear Nonproliferation Regime," 463–519, for examples of a single model approach utilizing only security concerns. See Scott Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," 54–86, for an example of using different models to explain proliferation events.
3. Levite, "Never Say Never Again: Nuclear Reversal Revisited," 69.

4. Deutch, "The New Nuclear Threat," 124–5.

5. Thayer, "The Causes of Nuclear Proliferation," 483–6; Mearsheimer, *The Tragedy of Great Power Politics*, 145–7.

6. Singh and Way, "The Correlates of Nuclear Proliferation," 872; Bleek, "When Did (and Didn't) States Proliferate?"

7. Thayer, "The Causes of Nuclear Proliferation," 486–96.

8. Knopf, ed. *Security Assurances and Nuclear Nonproliferation*, 1–3.

9. See Solingen, *Nuclear Logics Contrasting Paths in East Asia and the Middle East*; Sagan, "Why Do States Build Nuclear Weapons?" Both provide serious counterarguments to security models.

10. Sagan, "Why Do States Build Nuclear Weapons?" 63.

11. Sagan, 63–4.

12. Sagan, 63–4; Solingen, *Nuclear Logics*, 40.

13. Sagan, 65.

14. Flank, "Exploding the Black Box: The Historical Sociology of Nuclear Proliferation," 259–94.

15. Sagan, "Why Do States Build Nuclear Weapons?" 64.

16. Sagan, 64–5.

17. Solingen, *Nuclear Logics*, 42.

18. Solingen, 42.

19. Solingen, 40.

20. Solingen, 40–1.

21. Sagan, "Why Do States Build Nuclear Weapons?" 72.

22. Thayer, "The Causes of Nuclear Proliferation," 478.

23. Solingen, *Nuclear Logics*, 40.

24. Khan, *Eating Grass: The Making of the Pakistani Bomb*, 7.

25. Khan, 95–123.

26. Sagan, "Why Do States Build Nuclear Weapons?" 73.

27. Solingen, *Nuclear Logics*, 32.

28. Sagan, "Why Do States Build Nuclear Weapons?" 76.

29. Solingen, *Nuclear Logics*, 35.

30. Quoted in Solingen, 35.

31. Thayer, "The Causes of Nuclear Proliferation," 469–70.

32. Sagan, "Why Do States Build Nuclear Weapons?" 76; Solingen, *Nuclear Logics*, 35.

33. Solingen, 43.

34. Sagan, "Why Do States Build Nuclear Weapons?" 76.

35. "All Nobel Peace Prizes."

36. Thayer, "The Causes of Nuclear Proliferation," 473–4.

37. Solingen, *Nuclear Logics*, 32–3.

38. Solingen, 33.

39. Schelling. "Who Will Have the Bomb?" 80.

40. Quoted in Sagan, "Why Do States Build Nuclear Weapons?" 79.

41. Levite, "Never Say Never Again," 65; Sagan, "Why Do States Build Nuclear Weapons?" 80–2.
42. Thayer, "The Causes of Nuclear Proliferation," 478.
43. Quoted in Lavoy, "Nuclear Myths and the Causes of Nuclear Proliferation," 195.
44. Thayer, "The Causes of Nuclear Proliferation," 481–2.
45. Thayer, 463–7.
46. Moshaver, *Nuclear Weapons Proliferation in the Indian Subcontinent,* 9–16.
47. Moshaver, 28–30.
48. Moshaver, 28.
49. Moshaver, 16, 30.
50. Moshaver, 29–30.
51. Moshaver, 31.
52. Moshaver, 33–4.
53. Moshaver, 33.
54. Moshaver, 20-1.
55. Moshaver, 33-5.
56. Sagan, "Why Do States Build Nuclear Weapons?" 57.
57. Moshaver, *Nuclear Weapons Proliferation*, 36
58. Moshaver, 34.
59. Moshaver, 35–7.
60. Moshaver, 44.
61. Sagan, "Why Do States Build Nuclear Weapons?" 66.
62. Moshaver, *Nuclear Weapons Proliferation*, 43.
63. Moshaver, 44–5.
64. Moshaver, 46–7.
65. Sagan, "Why Do States Build Nuclear Weapons?" 67.
66. Sagan, 67–8.
67. Lavoy, "Nuclear Myths," 201–2.
68. Lavoy, 201–2.
69. Sagan, 66.
70. Moshaver, *Nuclear Weapons Proliferation*, 38–9.
71. Moshaver, 37.
72. Moshaver, 40.
73. Sagan, "Why Do States Build Nuclear Weapons?" 67.
74. Moshaver, *Nuclear Weapons Proliferation*, 50–1.
75. Bueno de Mesquita, Morrow, Siverson, and Smith, *The Logic of Political Survival*, 32.
76. Bueno de Mesquita, Morrow, Siverson, and Smith, 10.
77. Sagan, "Why Do States Build Nuclear Weapons?" 67–8.
78. As quoted in Moshaver, *Nuclear Weapons Proliferation*, 51.
79. Sagan, "Why Do States Build Nuclear Weapons?" 67–8.
80. Moshaver, *Nuclear Weapons Proliferation*, 32.
81. Moshaver, 32.

82. Moshaver, 38.
83. Moshaver, 34.
84. Moshaver, 44.
85. Moshaver, 37, 42.
86. Moshaver, 36, 42.
87. Moshaver, 57.
88. Sagan, "Why Do States Build Nuclear Weapons?" 76.
89. Sagan, 78.
90. Moshaver, *Nuclear Weapons Proliferation*, 36.
91. Moshaver, 40.
92. Moshaver, 41.
93. As quoted in Moshaver, 41–2.
94. Moshaver, 15.
95. Moshaver, 15–6.
96. Moshaver, 49.
97. Moshaver, 49.
98. Moshaver, 50.
99. Moshaver, 29.
100. Moshaver, 29–30.
101. Moshaver, 35–9.
102. Moshaver, 54.
103. Moshaver, 32.
104. Quoted in Moshaver, 31.
105. Moshaver, 116–18.
106. Knopf, *Security Assurances and Nuclear Nonproliferation*, 137–88.

Abbreviations

AEC	Atomic Energy Commission
IAEA	International Atomic Energy Agency
NNWS	Non-nuclear weapon states
NPT	Nonproliferation Treaty
NWS	Nuclear weapon states
PNE	Peaceful Nuclear Explosion

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