

IS THERE A THEORY OF NUCLEAR PROLIFERATION? AN ANALYSIS OF THE CONTEMPORARY DEBATE

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The theoretical debate over how nuclear proliferation should be explained, and whether future nuclear proliferation can be predicted or not, has been given fresh impetus since the end of the Cold War. The debate has been particularly lively, as the new international environment has brought new challenges to conventional wisdom about the spread of nuclear weapons. However, although some very important contributions have been made, the dynamics of nuclear proliferation remain largely a mystery. This article does not claim to have found the answers, but it does attempt to show the limitations of the existing debate, and in doing so, highlights areas which require further research.

Those involved in the debate have focused on trying to find solutions to what has been called the “proliferation puzzle.”¹ But exactly what is

meant by this term is not always made clear, and this lack of academic rigor has led to the misinterpretation of key contributions, and, ultimately, to theoretical confusion. Three problems lie at the root of this confusion. Firstly, the concept of nuclear proliferation has not been adequately defined, making a rigorous approach more difficult. Secondly, the word “puzzle” has been used to refer to different aspects of nuclear proliferation, such as its causes and effects, and it is not always obvious which aspect is being addressed. To further complicate matters, theoretical debates exist within the nuclear proliferation debate, as both the levels of analysis problem² and the agent-structure problem³—subjects of debate in their own right—are also involved centrally in the proliferation debate.

The debate has also been hampered by the difficulty of trying to

acquire evidence about such a sensitive subject, causing doubts over the adequacy of our knowledge and questions about whether nuclear proliferation can be separated from other processes and phenomena, such as arms racing and domestic coalition-building. The fundamental question is: what actually constitutes knowledge in the area of nuclear proliferation? Official documents on the subject are scarce, and it is difficult to establish what kinds of evidence can be relied upon. These empirical difficulties have caused the debate over proliferation dynamics to be particularly abstract; have led to doubts over whether a positivist approach to the study of nuclear proliferation is possible,⁴ and have left the debate open to criticism on epistemological and ontological grounds.⁵ Of particular concern is the tendency of analysts and policymakers to focus on the causes and consequences of nuclear proliferation in the nuclear

weapon states, where governments have been more open about their nuclear weapons programs. This becomes a problem when conclusions reached about the dynamics of nuclear proliferation in the nuclear weapon states are used to explain proliferation dynamics in states where proliferation is opaque and evidence can be even more difficult to obtain. This has led to a distorted and ethnocentric analysis of proliferation dynamics and to inappropriate non-proliferation policies.

Despite these problems, the bold claim made by Bradley A. Thayer that "the cause of the spread of nuclear weapons is clear"⁶ and Shai Feldman's claim that the nuclear proliferation debate is dead or dying,⁷ might lead one to conclude that the subject does not require further attention. However, as the discussion of the conceptual approaches to nuclear proliferation below aims to show, this phenomenon has not been adequately explained, much to the detriment of policymakers in this field. In other areas, policymakers can usually rely on substantial information based on past experiences to inform their decisions. But when reliable information is difficult to obtain due to foreign secrecy and the small number of cases to date (as with nuclear proliferation), strategic concepts and heuristics developed by political scientists can become even more influential than would normally be the case. With this in mind, the confusion surrounding the theoretical debate over the dynamics of nuclear proliferation acquires added significance.

Until recently, two general classes of hypotheses have dominated research into the causes of nuclear proliferation. The first class, known as

the technological determinist hypotheses, posits that nuclear technology itself is the main driving force behind nuclear proliferation, and therefore that nuclear weapons will be produced as soon as it becomes technologically feasible to do so in each country.⁸ This has led to some pessimistic predictions about the future spread of nuclear weapons, including President John F. Kennedy's famous prediction in 1962, that the United States could be facing the threat of 15 to 25 nuclear powers by the 1970s. The second class of hypotheses posits that the dynamics of nuclear proliferation cannot be understood unless the difficult question of what motivates states to acquire nuclear weapons is addressed. This has led to a profusion of attempts to analyze proliferation dynamics using theories based on the rational actor assumption, in an effort to move away from technological determinism to an approach with more predictive and explanatory power.⁹

This article deals specifically with one area of the nuclear proliferation debate, that is the debate over what causes nuclear weapons to spread. Its aim is to provide a survey of existing conceptual approaches to this question, identifying areas where confusion has occurred, and pointing out the strengths and weaknesses of each approach. It begins with an assessment of classical realist and neo-realist approaches to the nuclear proliferation puzzle. The second section focuses on organizational and domestic determinants theories. The aim of this section is to show how these approaches represent an advance on realist analyses of proliferation dynamics, but at the same time suffer from their own shortcomings. The final section analyzes psychological and sociological

approaches, revealing that multi-disciplinary approaches can lead to a greater understanding of proliferation causes, despite the problems associated with quantifying sociological and psychological factors. The conclusion summarizes the strengths and weaknesses of existing approaches to nuclear proliferation and highlights areas for future research.

CLASSICAL REALISM AND NEO-REALISM AS THEORIES OF NUCLEAR PROLIFERATION

Realist explanations of nuclear proliferation have dominated thinking about nuclear weapons since the 1950s. This is partly because realist theory provides a convincing justification for the acquisition of weapons of mass destruction, and partly because, in the relative absence of reliable information about security decisionmaking during the Cold War, realism provided a framework for analysis which could side-step, or "black box" domestic issues, and still provide a persuasive explanation for nuclear proliferation.

Classical realism is perhaps the most elegant theory (and oldest) of motivations to be applied to the proliferation puzzle. Ranging from the narrow military focus of rational deterrence theory, to approaches that are based on a broader definition of power, classical realist explanations of international politics are based on the assumption that states are unitary actors that seek to maximize their power in order to survive in a competitive international system. When analyzing what causes nuclear weapons to spread, classical realists therefore focus on external pressures. Most argue that the acquisition of nuclear weapons should be

seen as the rational response of states attempting to protect their interests, since security represents the ultimate challenge to a state's survival. The limited empirical evidence that has come to light suggests that perceived threats from neighboring states, and from enemies further afield, have played a crucial role in the process of nuclear proliferation during the Cold War and since, providing important pieces of the puzzle.¹⁰ However, as the following analysis illustrates, classical realism can only explain some of the dynamics of nuclear proliferation, leading to a distorted and over-simplified view of nuclear decisionmaking and nuclear behavior.

Kenneth Waltz (1981¹¹ and 1990¹²) uses rational deterrence theory to explain the slow spread of nuclear weapons and their impact on the international system. According to this theory, once more than one state has acquired a second-strike nuclear capability, war between the nuclear armed states is unlikely to occur, due to the fact that mutual destruction is virtually assured.¹³ This creates an incentive for many states to acquire nuclear capabilities to guard against war and to ensure their survival.¹⁴ It follows from this argument that nuclear weapons will inevitably spread, and that the more they spread the *better* it will be for international stability,¹⁵ since they induce caution and restraint.¹⁶ The argument is simple and was particularly influential among academics during the Cold War, but it is important to point out that rational deterrence theory has not completely monopolized thinking in the field. While such theories held sway among academics and policymakers alike in the 1940s and early 1950s, during the mid-1950s and especially

in the 1960s, nuclear weapons came to be seen in a different light.¹⁷ There was a shift from awe to fear: from the security created by a belief in rational deterrence theory to the insecurity which fueled the creation of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).¹⁸

The problems which undermine the validity of rational deterrence theory stem from two of the basic assumptions of classical realism: that the state is a unitary actor and that the state is a rational actor. It also suffers from a narrow military focus, which discounts both economic and political aspects of power. The first two problems are acknowledged indirectly by Waltz, and explain his idiosyncratic approach. When Waltz uses rational deterrence theory to help explain and predict nuclear behavior, he abandons the usual realist framework for analysis and brings in political psychology to reinforce his argument. He states that "military leaders dislike uncertainty" and are therefore unlikely to want to develop nuclear weapons.¹⁹ In doing this, Waltz brings the debate down to the level of the organization or even the individual, abandoning the realist assumption of the state as a unitary actor. This caveat also brings in cognitive psychology, which most realists would dismiss as a reductionist and unnecessary factor in the proliferation puzzle. However, Waltz's conclusion would suggest that when faced with explaining the complex dynamics of nuclear proliferation, rational deterrence theory alone is not suited to the task.

Waltz (1990) also undermines the rational actor assumption, bringing the realist approach into further doubt. If the logic of deterrence is followed, then it would seem that a nuclear

arms race would be futile, as Waltz points out at length.²⁰ Vertical proliferation²¹ drains state coffers without contributing to strengthening state security. Indeed, it should be avoided in order to prevent the undermining of a state's economic strength. Therefore, if the United States and the Soviet Union had been acting "rationally" during the Cold War vertical nuclear proliferation would never have occurred. Yet, of course, such policies dominated the 1960s and 1970s, leaving rational deterrence at a loss to explain them.²²

There are also numerous other questions that have been raised that challenge the validity of rational deterrence as a theory of nuclear proliferation. For example, the fact that some states have decided not to develop nuclear weapons, despite strong incentives to do so, exposes the theory's poor predictive power. In addition to this, not all nuclear weapons programs appear to have a strategic rationale even in the initial stages of development. In South Africa's case, it is difficult to view its nuclear program as a rational response to its strategic situation. For a start, Pretoria's neighbors did not possess nuclear weapons, and South Africa was not capable of targeting the Soviet Union. Moreover, had South Africa decided to use its nuclear devices against its neighbors in its own "back yard," its own survival would have been under threat.²³

With some of these problems in mind, Zachary S. Davis and Richard K. Betts developed broader approaches to explain nuclear weapons proliferation, which remain in the classical realist mold, but provide a more convincing explanation of proliferation dynamics. Davis (1993)

claims that "Classical realism provides a complete explanation for the causes of nuclear proliferation and international responses to it—nonproliferation."²⁴ While this is certainly an exaggeration, it does succeed in moving away from the narrow military focus of rational deterrence theory by disaggregating power into different types, including political and economic. He argues that states are driven to acquire nuclear weapons only if they feel that they will contribute in some way to their national security. In many cases, states will decide that their security will actually be threatened by the presence of nuclear weapons, and this is their incentive to cooperate with other states in the nonproliferation regime.²⁵ Although this approach represents an important advance, because it helps explain why the gloomy predictions of the 1950s and 1960s were so inaccurate, it cannot provide a convincing explanation of why some states decide to acquire nuclear weapons *despite* the possibility that it might undermine their security,²⁶ and why other states have not cooperated with the nuclear nonproliferation regime despite powerful *incentives* to do so.²⁷ Many of the answers to these questions can be explained in terms of domestic politics and the influence of sub-state organizations, but Davis dismisses these factors as "secondary" to international incentives.

Betts (1993) appears to recognize the importance of domestic politics and the internal characteristics of the state indirectly.²⁸ He accepts that there are different types of states within the international system and that they are likely to react differently to the nonproliferation regime. However, Betts's argument is based on an incomplete analysis of why

states take on different characteristics. He argues that the shoving and shaping forces of the anarchic international system cause some states to become stronger and others weaker, some to be internationally isolated, and others to become aggressive. In other words, states behavior is determined by international anarchy.²⁹ Consequently, a state is likely to pursue nuclear weapons because it seeks international prestige, is isolated, or is threatened by a larger neighbor or an adversary.³⁰ Research shows that these are indeed important incentives to acquire nuclear weapons, but it also shows that there may be *domestic* reasons why a state wishes to acquire, abandon, or reject the nuclear option.³¹ Betts has glossed over the issue that some states are isolated in the international system due to their domestic political systems. For example, in South Africa's case, international isolation occurred because of apartheid. The fact that South Africa was a pariah had more to do with its white minority government than it did with its position in the international system. Other notable examples of the domestic sources of international isolation include North Korea and Iraq.

The theory of so-called "neo-realism" has also been used to explain the dynamics of nuclear proliferation and has provided some controversial explanations of the phenomenon. It is based on the same assumptions as classical realism, but adds an extra dimension to it: based on the idea that the structure of the international system (whether unipolar, bipolar, or multipolar) influences international politics and can explain international outcomes. Waltz (1979) originally developed the theory to explain why the world enjoyed such a long period of peace between the great powers

during the Cold War, concluding that the bipolar structure of the international system caused this peace. However, he made it clear at the time that the theory was developed to explain how states are *constrained* by the structure of the international system, and not to explain the more complex problem of how states would react to these constraints.³² In other words, it was originally intended to explain systemic outcomes such as war and peace, and was too general to explain unit level outcomes, such as the decision to acquire nuclear weapons. He admits that both unit level and external factors would need to be taken into account to explain behavior of this kind, and that neo-realism was not developed for this task.³³

However, recently, in his sections of the co-authored book *The Spread of Nuclear Weapons: A Debate* (1995), Waltz does make predictions about the spread of nuclear weapons using a combination of neo-realism and rational deterrence theory. Until the publication of this study, Waltz had not addressed the question of how polarity would affect nuclear proliferation, partly because bipolarity and nuclear weapons had emerged at about the same time, so it was virtually impossible to assess the impact of one on the other. There had never been a multipolar nuclear world, so there was no information on which to build an argument. All Waltz was able to suggest was that a bipolar nuclear world would be more stable than a multipolar conventional world. However, at the end of the Cold War, the change in polarity brought with it a renewed interest in the question of nuclear proliferation dynamics.³⁴ The interaction between polarity and nuclear weapons became a key concern for

neo-realists, and particularly for Waltz, who was tempted to tackle the question, despite his earlier reservations about the uses of neo-realism.

Although most of his 1995 arguments are based on rational deterrence theory, he also argues that since the end of the Cold War, the transition from a bipolar to a multipolar international system may cause the proliferation process to speed up.³⁵ Waltz suggests that the disintegration of the Soviet Union is likely to weaken alliances established during the Cold War, and this in turn is likely to mean the removal of a nuclear umbrella for some states. He argues that the increased insecurity resulting from this situation is likely to drive some states to acquire nuclear weapons to make up for this loss. He uses the example of renewed tensions in Northeast Asia to back up this point, claiming that the shift away from bipolarity will cause the extended deterrent (provided during the Cold War by the United States) to wane, creating insecurity in the region that could lead to the formation of a proliferation chain.^{36,37} However, it is only fair to point out at this stage that, despite these loose predictions, Waltz has never claimed that neo-realism can provide a satisfactory explanation or prediction of nuclear proliferation. In response to authors who have criticized his recent work, he has revealed that he still believes that nuclear proliferation dynamics are far too complex for general theories of international relations to explain.³⁸

Despite Waltz's reservations, some theorists do believe that neo-realism provides a convincing explanation of nuclear proliferation dynamics. Benjamin Frankel believes that neo-realism is an "...explicit and

accessible...theory of nuclear weapons proliferation."³⁹ He argues that the shift from bipolarity to multipolarity since the end of the Cold War is the most important incentive for intensified proliferation, as states attempt to ensure their survival after the removal or loosening of superpower "overlay."⁴⁰ By focusing on structural considerations, Frankel attempts to avoid being drawn into the complexities of the proliferation puzzle, concentrating on developing an abstract theory without sifting through complex empirical research. In his 1993 article, Frankel admits that: "...in the absence of historical experience, the conclusion that multipolarity is conducive to intensified proliferation of nuclear weapons has to be logically deduced."⁴¹ In this sense, neo-realism provides the theorist with a distinct advantage, allowing him or her to side-step the problem of acquiring information about such a sensitive subject, but it also presents serious problems. The main one is that neo-realism's predictive power is frustratingly low, as the activities of nuclear threshold states and nuclear aspirants, during and after the Cold War reveal.

Mearsheimer's attempted explanation of Ukraine's nuclear diplomacy between 1991 and 1993 is a case in point. In his much-discussed article "Back to the Future: Instability in Europe After the Cold War," he argues that the transition from bipolarity to multipolarity will increase the possibility of war in Europe, and that the cause of peace would be forwarded if both Ukraine and Germany acquired nuclear forces as a deterrent against possible Russian aggression.⁴² He continued to stress the logic of this argument even in 1993, when the United States was trying to persuade Ukraine to trans-

fer the nuclear weapons on its territory to Russia.⁴³ Arguing against U.S. policy, Mearsheimer asserted that Ukraine's nuclear diplomacy should be understood purely from a strategic perspective, and predicted that—due to Ukraine's insecurity and natural fear of Russian aggression—"Ukraine is likely to keep its nuclear weapons, regardless of what other states say and do."⁴⁴ The problem is that Ukraine *did* eventually agree to transfer its nuclear weapons to Russia in return for U.S. aid and security assurances, having signed the NPT in November 1994.⁴⁵ It has also survived the completion of this process without experiencing threats to its security.⁴⁶

Barry Buzan, Charles Jones, and Richard Little (1993) have attempted to rectify some of the problems of traditional neo-realism by bringing the state back in.⁴⁷ They began their work in response to Waltz's brand of neo-realism, which could not explain the dramatic system change that occurred with the disintegration of the Soviet Union.⁴⁸ This version of what they term "structural realism" argues that ultimately, unit level characteristics must be brought back into neo-realist theory to explain the shift from the bipolar structure of the international system during the Cold War to the multipolar structure of the post-Cold War world. As a result they have developed a more complex form of neo-realist theory that allows for functional differentiation among states, accepts that states do not necessarily imitate each other in their battle for survival, and shows the system to be more dynamic and more difficult to predict than traditional neo-realists had claimed.^{49,50} However, although Buzan, Jones, and Little suggest that their version of neo-realism should shed some light

on domestic and foreign policy decisions, they admit that their theory may still be too general and abstract for this purpose.⁵¹

Buzan, Jones, and Little do not touch on the question of nuclear proliferation, but it is interesting to see whether their theory would provide a different perspective from those of Waltz and Frankel. Ideally, their approach should allow more variables to be brought into the proliferation puzzle, based on the idea that all states face a double security dilemma involving the internal stability of the state and its survival in the competitive international system. Domestic concerns—such as political stability, social cohesion, economic strength, environmental well-being, and technological development—would perhaps be factored in with more traditional strategic concerns about the existence of adversaries, the reliability of alliances, and the distribution of power in the international system. All of these would need to be taken into account by any state confronted with the decision of whether or not to go nuclear. If it were possible to apply structural realism in this way to the question of what causes nuclear weapons to spread, it would present a better picture of the factors that influence nuclear decisionmakers than traditional neo-realism can. However, unfortunately, structural realism suffers from too many conceptual contradictions to be of much use. The problem is that the decision to acquire nuclear weapons is a domestic outcome—not a systemic one—and it is therefore incompatible with systemic realist theories.⁵²

Classical realist and neo-realist approaches are too general and too simplistic to explain the complex dy-

namics of nuclear proliferation. Their explanatory and predictive powers are frustratingly low because they cannot explain what is, after all, a unit level outcome. The decision to acquire nuclear weapons is taken at the unit level, yet these theories leave out unit level characteristics in the interests of parsimony. These theories overlook the point that states have multiple goals, both domestic and international, and that these goals are interlinked. This is worrying from a policy perspective, because if policymakers accept the arguments of the realist school, as they have in the past, it leads to an unnecessarily narrow set of policy options. If nuclear proliferation is regarded purely as a security issue determined by external pressures, policy recommendations will tend to focus on external constraints such as arms control, security assurances, and confidence-building measures, overlooking other options, such as the diffusion of ideas, the provision of economic aid, and the possibility of designing custom nonproliferation packages for specific states. Moreover, if policymakers accept the apolitical, security perspective of the realist school, it will be even more difficult to devalue nuclear weapons and redirect national priorities. With this in mind, the fact that the nuclear weapon states continue to justify their own possession of nuclear weapons using rational deterrence theory, is particularly worrying.

DOMESTIC DETERMINANTS AND ORGANIZATIONAL THEORIES

One of the most important books to delve into the domestic determinants of nuclear proliferation is

Mitchell Reiss's *Without the Bomb: The Politics of Nuclear Proliferation* (1988).⁵³ Although he does not address theoretical issues directly, Reiss provides a comprehensive "bottom-up" analysis of the dynamics of nuclear proliferation and presents some crucial insights into the proliferation process. Reiss sets out to try and explain why nuclear weapons have not spread as quickly as the technological determinists and classical realists predicted, concluding that these approaches underestimate the sources of nuclear restraint. He points out that domestic pressures, such as the cost of nuclear arms, the opposition of political elites, and environmental risks, combined with bilateral disincentives, international constraints, and the power of "world public opinion," convinced many states that it was not in their interests to develop an overt nuclear arsenal.⁵⁴ Government leaders and military planners therefore started to believe that the advantages of nuclear weapons had been exaggerated and that they could not be considered as useful instruments for achieving policy objectives.

Reiss argues that a decision on whether or not to develop nuclear weapons, if it is to be explained, must be placed within the larger framework of a country's domestic and foreign policies. In the case of South Africa, he argues that the internal characteristics of the state drove Pretoria's nuclear diplomacy and that as "it was the maintenance of the distinctive Afrikaner *volk* that commanded not only the country's internal policies, but also dominated its external affairs."⁵⁵ However, Reiss argues that motivations for and against nuclear weapons acquisition vary from one state to another, and that it is unwise to generalize about

proliferation dynamics. This has important policy implications, underlining the need for policymakers to try and understand the idiosyncrasies of all potential nuclear states in order to devise successful international nonproliferation strategies.⁵⁶

Despite Reiss's reservations over the use of general theories to solve the proliferation puzzle, many scholars have attempted to develop theories that take domestic sources of nuclear proliferation into account, with some success. Building on classical realist assumptions, neo-liberal institutionalists argue that the internal characteristics of a state are likely to play a vital role in determining its attitude towards nuclear weapons and nonproliferation, reducing the dichotomy that neo-realists and classical realists draw between domestic and international politics. Etel Solingen (1994) examines those states that have felt the need to develop a "nuclear option," but not an overt nuclear arsenal.⁵⁷ She asserts that democratic states pursuing liberal economic policies may decide that it is not in their interests to develop an overt arsenal, due to their extensive reliance on the global economy and the international community. As a result, they decide to keep their options open. This approach represents an important advance on realist explanations of proliferation dynamics, because it acknowledges that states have multiple goals, and that these goals link foreign and domestic policies inextricably.

Glenn Chafetz (1993) provides a more wide-ranging application of neo-liberal institutionalist theory.⁵⁸ He argues that the world is divided into "core" states and "periphery" states. According to Chafetz, the fact

that domestic political systems of the core states are dominated by liberal democracies leads them to develop shared norms and values, which is likely to result in international cooperation rather than arms racing.⁵⁹ This is because the members of the core no longer regard each other as military threats, but rather as partners in a "pluralistic security community."⁶⁰ The incentive for these states to acquire nuclear weapons is dramatically reduced, as they are more secure and able to achieve their national security interests through international cooperation rather than self-help. However, the states on the periphery have had little experience of liberal democracy and, as a result, have not developed these shared values. Such states are more likely to regard each other as military threats, and so respond by seeking to develop nuclear weapons.⁶¹

The recent nonproliferation decisions of South Africa and Ukraine can be explained, to a certain extent, using neo-liberal institutionalist theory. In South Africa's case, the transition from apartheid to democracy coincided with de Klerk's decision to dismantle Pretoria's nuclear weapons and terminate the program. It could be argued that this was motivated by a change in South Africa's goals, as its leaders attempted to join the core states in order to enjoy the benefits of international political and economic cooperation.⁶² A similar argument could be adopted to explain Ukraine's decision to abandon the nuclear weapons that it had inherited from the Soviet Union. It could be argued that uncertainty over whether Ukraine would be accepted as a member of the core and whether economic and political cooperation would be forthcoming delayed the final decision to remove the nuclear

weapons from its territory. Following this logic, it could also be argued that once Ukraine had elected a new parliament headed by the centrist reformer Leonid Kuchma—and had begun an extensive program of liberal economic reform—it became clear that Ukraine did, in fact, share the liberal democratic values of the core states. This then led the United States to accept Ukraine as a member of the core, which, in turn, led Ukraine to sign the NPT in November 1994.⁶³ This analysis of the dynamics of nuclear proliferation has been so persuasive that it has led the United States to tie its nonproliferation efforts to its more general aim of supporting democracy and economic liberalism worldwide. However, it would be a mistake to base nonproliferation policy on the ideas of the neo-liberal institutionalists alone, because empirical evidence suggests that their theory can only explain part of the puzzle. In South Africa's case, it is possible that Pretoria's white leaders were motivated not only by the rational desire to improve their political and economic position, but also by the irrational belief that they would be under threat if the democratic government possessed a "black bomb." Neo-liberal institutionalist analysis also oversimplifies the situation in Ukraine, making its nuclear diplomacy between 1991 and 1994 appear much more rational and less confused than it was.⁶⁴

It also follows from neo-liberal institutionalist theory that classical realism should be able to explain and predict proliferation dynamics on the periphery as long as these states continue to reject democratic forms of government, and that neo-liberal institutionalist theory ought to explain the core states' commitment to the

nuclear nonproliferation regime. The flaw is that this does not stand up to empirical testing and, in addition, is guilty of ethnocentrism.⁶⁵ If the periphery states do not share any common values, then it is difficult to explain the existence of the Non-Aligned Movement. Moreover, if the liberal democracies of the core states ensure cooperation on the nuclear issue, it is difficult to explain France's decision to go ahead with nuclear testing, despite international condemnation. In the case of North Korea, neo-liberal institutionalism also cannot also explain why Kim Jong-il agreed to freeze and eventually abandon North Korea's nuclear weapons program in 1995, as it appears that he has no intention of abandoning *juche* socialism.⁶⁶ Chafetz's approach can help to explain cooperation among certain democratic states to an extent, just as it can shed some light on how the internal political systems of other states can lead to isolation and insecurity and, therefore, might make those states more prone to proliferation. However, neo-liberal institutionalism, in common with classical realism and neo-realism, leaves important variables related to state decisionmaking out of the picture, causing us to miss other pieces of the proliferation puzzle.

As Stephen M. Meyer (1984) points out: "...nuclear weapons do not generate spontaneously from stockpiles of fissile material." He adds that "the decision to 'go nuclear' is the crucial step in the nuclear proliferation process."⁶⁷ Meyer accepts that motivations need to be identified and intentions analyzed, but argues that, ultimately, nuclear proliferation cannot be understood unless the process of decisionmaking is taken into account.⁶⁸ He presents nuclear decisionmaking as a three-stage pro-

cess, beginning with an explicit government decision to develop a latent capacity, followed by a decision to transform the latent capacity into an operational capability, followed by a decision to begin an operational nuclear weapons program.⁶⁹ The second stage is referred to as the proliferation decision, and is therefore the pivotal point in the proliferation process. This stage occurs when strong motivational factors coincide with a latent capacity to build nuclear weapons, leading the state to believe that the acquisition of nuclear weapons will allow it to accomplish foreign, defense, and domestic policy objectives. However, Meyer points out that the time it takes to proceed from the second to the third stage can vary from one state to another, as domestic and international aids and restraints can either speed up or slow down the process. In addition to this, proliferation decisions can be reversed if this is considered to be in the interests of the state, since the balance between the motivational and dissuasive conditions—according to his model—can change over time.⁷⁰

Meyer's approach is an important contribution to the proliferation puzzle, as it presents nuclear proliferation as a continuing process which is part of the broader picture of domestic politics. As a result, Meyer can explain why nuclear diplomacy is sometimes inconsistent, reflecting technological hurdles, the process of nuclear decisionmaking, and the need for most states to evaluate the advantages of developing a nuclear program from different perspectives.⁷¹ His focus on the decisionmaking process can also help explain the existence of "opaque" nuclear proliferation. A state may decide that it is not in its interests to develop an

overt nuclear weapons program, and so either remains fixed at a certain point between stages two and three, or fluctuates between them as internal and external conditions change.⁷² However, as with all the approaches discussed so far, Meyer continues to regard the state as a rational actor, and evidence suggests that states do not always behave rationally where nuclear weapons are concerned.⁷³

The problem of how to explain state behavior that appears counter-productive or irrational led Graham Allison (1971) to develop a model that denies the unitary character of state policymaking and assumes that state actions are the consequence of rational but self-interested bargaining between intrastate state actors (his "Model III").⁷⁴ In other words, seemingly irrational behavior is explained by examining the bureaucratic political process of decisionmaking and the "parochial priorities and perceptions" of those involved.⁷⁵ In this way, Allison attempts to reinforce the notion that there is a predictable relationship between interest and action in human affairs, by moving away from the assumption that the state is a unitary actor. Although this model is only applicable to foreign policy areas that are not politically salient ones,⁷⁶ and therefore are more likely to be influenced by the self-interested pushing and pulling of bureaucratic politics (rather than the overriding views of the president or of groups of experts), it does make an important contribution to the proliferation debate. In moving away from the notion of the state as a unitary actor, the bureaucratic politics model opens up an important area of research that focuses attention on the individuals and organizations that are involved in nuclear decisionmaking.

Scott Sagan (1993, 1995) develops an approach which is based on many of the same assumptions as the bureaucratic politics model, but is more relevant to the politically salient issue of nuclear policy. Focusing on the role of organizations in the sphere of nuclear decisionmaking, Sagan's work is central to this debate about proliferation dynamics, as he has been one of the most ardent critics of Waltz and of rational deterrence theory. Like Waltz, Sagan's main concern has been to understand the impact of nuclear weapons on international peace and stability. But, unlike Waltz, Sagan reaches the conclusion that nuclear weapons are likely to destabilize the world and create catastrophic consequences. He uses organizational theory to challenge the central assumptions of classical realism and neo-realism: that states are unitary and rational actors that act in the interests of the state. As Sagan explains in *The Spread of Nuclear Weapons: A Debate*, government leaders intend to behave rationally, but are influenced by powerful domestic organizations whose decisions often conflict with the decisions taken by political leaders. This is because "they often become fixated on narrow operational measurements of goals and lose focus on their overall objectives."⁷⁷ These general statements are based on earlier, more comprehensive research in which Sagan focuses specifically on the role that the U.S. military plays in controlling nuclear weapons. He shows how safety measures to prevent nuclear accidents have on occasion failed, and how these incidents have been covered up by military leaders wishing to promote the reputation of their command.⁷⁸ As Sagan argues, this behavior can hardly be seen as pro-

moting the interests of the state and raises serious doubts about rational deterrence theory, whose central assumption is that a nuclear war cannot occur unless political leaders decide it is in the interests of the state.

Sagan deals specifically with the *consequences* of nuclear proliferation, and his approach certainly provides a convincing contribution to the nuclear *pessimists* camp. However, it is interesting to explore whether organizational theory can shed any light on the *causes* of nuclear proliferation. This approach would allow the influence of sub-state organizations to be taken into account, and, if expanded from Sagan's narrow focus on military organizations, could help explain the complex dynamics that affect nuclear decisionmaking. For example, in South Africa's case, it might help explain why inspectors from the International Atomic Energy Agency (IAEA) found evidence that research had been carried out into advanced delivery systems and thermonuclear weapons.⁷⁹ This technology would not have been necessary if Pretoria's nuclear weapons were intended for use as political bargaining chips, as South Africa's political leaders have claimed. Organizational theory could help explain the existence of this advanced technology, by focusing on the role of the scientists within Armscor, who, it could be argued, took matters into their own hands due to organizational pressures and incentives to produce advanced weapon systems.⁸⁰ In the case of North Korea, the seemingly irrational nuclear brinkmanship of Pyongyang's leaders over the last four years could also be explained using organizational theory. Scholars trying to explain North Korea's erratic nuclear diplomacy have high-

lighted the role played by a powerful group of conservatives (consisting of influential members of the army and the nuclear establishment) who influenced the country's nuclear policies.⁸¹

Organizational theory helps explain proliferation dynamics because it shifts away from the rational actor assumption. But its explanatory power is limited for the following reasons. Firstly, in focusing on structural explanations of behavior—the power of social forces to determine outcomes, such as organizational culture in this case—the theory loses sight of the role that individuals have played in influencing nuclear decisionmaking.⁸² This introduces an agent-structure problem. Put simply, organizational theory exaggerates the power of organizational culture by denying the role of individual beliefs in changing these cultures.⁸³ Second, although organizational theory is based on the assumption that organizations can influence policy, it cannot explain which organizations are likely to be most influential and why.⁸⁴ Thirdly, by concentrating narrowly on the power of organizational culture to influence decisionmaking, organizational theory leads to an unnecessarily deterministic and pessimistic outlook for nonproliferation attempts, because it overlooks the point that individuals and organizations can and do learn as a result of new information that challenges past assumptions and beliefs.

COGNITIVE AND PSYCHOLOGICAL APPROACHES

Cognitive and psychological approaches to nuclear proliferation provide more pieces to the puzzle, helping to explain behavior that can-

not be explained by any of the approaches discussed so far. For example, Allison's bureaucratic politics model and Sagan's use of organizational theory cannot explain the seemingly irrational decisions made at the pinnacle of the government hierarchy by leaders and national elites who are relatively free from organizational constraints. The concept of "belief systems" has been applied to explain exactly this type of phenomenon.⁸⁵ The approach is based on the assumption that beliefs and actions are linked, and that foreign policy decisionmaking (and instances of irrationality) cannot be fully understood unless the beliefs of the decisionmakers are taken into account.⁸⁶ For example, psychologists argue that irrational behavior often occurs during crisis situations, which increases the tendency of decisionmakers to apply simplified images of reality that are highly resistant to change. This simplification often ignores valid information contradicting their beliefs.⁸⁷ Irrational foreign policy decisions are also taken because decisionmakers have a tendency to presume that others share their world view and because they are not always aware of the impacts that their decisions will have.⁸⁸ Moreover, because decisionmakers' understandings of the behavior of others is shaped by their own beliefs, they sometimes misinterpret the signals they receive from others, leading to unexpected behavior.⁸⁹ In psychoanalytical terminology: "belief systems impose cognitive restraints on rationality...erecting barriers to the types of information that [decisionmakers] consider valuable."⁹⁰

A common criticism of the belief systems approach is that it is most suited to explaining the actions of in-

dividuals, but that it is difficult to explain why groups adopt similar or identical beliefs about certain issues, even in the absence of objective information. Peter Lavoy (1993) addresses this question specifically in relation to nuclear proliferation, and develops what he calls the "myth maker" model as a solution.⁹¹ Lavoy's main aim is to explain why nuclear weapons spread, despite the uncertainty surrounding them and despite their potentially disastrous consequences. He argues that this occurs because those national elites who want the state to develop nuclear weapons, emphasize the country's security problems and the political and military strength that nuclear weapons will provide, creating the nuclear myth.⁹² The concept of the nuclear myth is important, because—due to the lack of objective information about the relationship between nuclear weapons and war—beliefs about nuclear weapons are based on "logic and faith" and therefore constitute myth rather than fact.⁹³

The myth maker model is a useful one, and can help explain the role of influential elites in the nuclear proliferation process. As Lavoy points out, the role of the Indian Atomic Energy Commission, and particularly its chairman Homi Bhabha in creating the nuclear myth in India cannot be ignored.⁹⁴ However, it is not without problems. Lavoy argues that the myth is likely to be perpetuated until well-placed and talented individuals challenge it and spread another myth—the myth of nuclear insecurity.⁹⁵ He therefore hopes that his model can explain both nuclear proliferation and nonproliferation. The question is: should beliefs about the insecurity caused by nuclear weapons be defined as myths? As more

and more information about the negative effects of nuclear accidents becomes available and as the allegedly stabilizing effects of nuclear weapons are called into doubt, is it accurate or useful to refer to beliefs about nuclear weapons, whether positive or negative, as myths? Apart from anything else, if the belief that nuclear weapons cause insecurity is labelled a myth, this sends out worrying signals to nuclear aspirants. The salient point here is that the myth maker model does not take into account the impact of new information on proliferation dynamics, a point which will be discussed later.

The so-called "epistemic communities" approach to nuclear proliferation also focuses on the role of elite beliefs, but is based on the more specific assumption that cross-national groups of experts sharing common professional interests, technical knowledge, and assumptions about cause-and-effect relationships in the realm of international security can and do influence proliferation decisions. One of the advantages of this approach to understanding proliferation dynamics is that it moves away from the assumption that individuals or groups involved in nuclear decisionmaking are driven by national interests. This allows for a broader interpretation of the motivations for human action, opening up the possibility that beliefs can be based on trans-national scientific information and shared beliefs. Just as psychological approaches help explain how a belief in the value of nuclear weapons can lead to nuclear proliferation, the epistemic community literature helps explain how particular weapons or deployment strategies can be devalued by trans-national, technical experts upon whose advice policymakers rely.⁹⁶ Emmanuel

Adler (1992) uses this approach to explain how, at the height of the Cold War, the shared strategic assumptions of the U.S. and Soviet arms control communities became embodied in the 1972 Anti-Ballistic Missile Treaty.⁹⁷

The notion that groups of experts can influence nonproliferation decisions is persuasive, but it leads to the important question of how experts can change the beliefs of policymakers. In other words, what makes political leaders prepared to accept the ideas of one group of experts over another? Why were they willing to accept the concept of rational deterrence theory during the 1950s? Why is this concept no longer as convincing? Not all the answers to these questions are encouraging. For example, political leaders sometimes use the ideas of experts to justify or legitimate policies that they wish to pursue for political ends.⁹⁸ This can be seen in the case of the nuclear weapon states, who continue to justify their nuclear arsenals on the grounds of rational deterrence theory, but are prepared to accept the arguments of experts who doubt the logic of deterrence, when dealing with nuclear threshold states and nuclear aspirants. However, it is also possible that beliefs can change as a result of learning based on shared technical information, and this learning can lead to new policies.⁹⁹ Learning models could therefore help explain why political leaders are beginning to doubt the value of nuclear arsenals, based on new information highlighting the negative environmental, economic, and political effects of nuclear weapons. These models could certainly help explain Ukraine's current non-nuclear stance, which has been adopted despite the presumed nuclear threat from Russia.

Kiev's political leaders have frequently pointed out that Ukraine does not view security from a narrow self-help perspective and looks to international regimes to help restrain Russia and provide meaningful security guarantees. Such policies are supported by deep-rooted anti-nuclear feelings among the political elite and the Ukrainian people in general, which stem from Ukraine's experience with nuclear contamination, radiation sickness, and deaths following the Chernobyl disaster in 1986.¹⁰⁰

Although psychological approaches show that belief change and learning can occur, which is cause for optimism, they also emphasize that states interested in preventing further nuclear proliferation should lead by example. With this in mind, it is possible that recent U.S. policy statements about its own national security strategy may have had damaging effects on the process of devaluing nuclear weapons.¹⁰¹ The United States and the other nuclear weapon states continue to promote the concept of nuclear deterrence where they consider their own interests to be at stake, but at the same time attempt to destroy the "nuclear myth" where other states are concerned. This stance is not only hypocritical but is also detrimental to nonproliferation efforts, as negotiations with India over the Comprehensive Test Ban Treaty have shown.¹⁰² The United States and the other nuclear weapon states have a responsibility to practice what they preach, and, at the very least, to make strenuous efforts to continue their rejection of the use of nuclear weapons against non-nuclear states (or to adopt China's unqualified no-first-use pledge).¹⁰³

These are important insights into proliferation dynamics and policy

options, but psychological approaches also have their drawbacks. The main problem is that psychological factors are difficult to quantify, and can only provide limited explanations of nuclear dynamics. Psychological approaches can lead to greater understanding of belief systems and learning processes and their impact on nuclear decisionmaking, but they are too narrow and specific to explain the relationship between beliefs and other factors in the proliferation process.¹⁰⁴ The crucial questions that still need to be addressed are: what causes actors to believe that something is true, and what is the relationship among beliefs, events, traditions, technology, and political processes? These are the areas where sociological approaches can be of some use, because not only do they disaggregate the state, they disaggregate decisionmaking. This allows the analyst to go beyond political leaders and elites in their search for proliferation causes and to focus on the influence of society as a whole.

HISTORICAL SOCIOLOGY AS AN ALTERNATIVE APPROACH

In his groundbreaking work *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (1990), Donald Mackenzie argues that nuclear technology is part of the "ordinary world" of mundane social processes.¹⁰⁵ He delves beneath the surface of missile technology, using history and sociology to explain the development of intercontinental ballistic missiles in the United States and the Soviet Union during the Cold War. He argues that missile accuracy was not the inevitable consequence of tech-

nological change (or the desires of political leaders), but instead the product of “a complex process of conflict and collaboration between a range of social actors including ambitious, energetic technologists, laboratories and corporations and political and military leaders and the organizations they head.”¹⁰⁶ He shows how the activities and beliefs of these actors were shaped by events, how obstacles were overcome, and how greater missile accuracy was eventually achieved as a result of complex social processes stretching through decades.

There are many advantages to using a similar approach to explain nuclear proliferation. Firstly, research has shown that technological factors do matter in the proliferation process, as they can expand or restrict options and alter conceptions. Yet, most theories focus entirely on human actors, shifting technological factors to the sidelines. However, scholars using historical sociology can explain the role of technology in a social context, without adopting a deterministic approach. Secondly, historical sociology can be used to delve beyond interests, to examine how interests are shaped, who defines them and how they interact. This insight is important because it moves away from the political determinism associated with many structural and domestic politics approaches, which assume that nuclear weapons proliferate because political elites desire them. This focus allows cultural and psychological factors to be taken into account, and, in addition, leads to the conclusion that nuclear proliferation need not be explained only in terms of narrow rationality. Thirdly, by treating structures as social processes rather than as “givens,” approaches based on historical

sociology do not separate levels of analysis, thus overcoming the agent-structure problem.

Steven Flank (1993) shows how this approach presents a different understanding of the nuclear proliferation puzzle in his article “Exploding the Black Box: The Historical Sociology of Nuclear Proliferation.”¹⁰⁷ He uses social construction of technology (SCOT) theory to provide an historical sociology of nuclear proliferation, showing how an analysis of technological systems can provide some insight into nuclear development in India and South Africa. In the Indian case, Flank shows how alliances between different individuals, organizations, and corporations provided the driving force behind India’s nuclear development. These alliances affected the direction of nuclear research as the scientists first allied with the government (from 1947 to 1962), then with agribusiness (during the 1950s to the early 1970s), and finally with the military (from the 1970s onwards).¹⁰⁸ According to Flank, these alliances can help explain the nature of the Indian program, as it became more and more involved in military-security projects. In South Africa’s case, Flank shows how a network of allies, inside and outside South Africa, provided the specific components needed for the construction of a workable weapon and how these alliances were affected by internal and external events. He also explains nonproliferation in South Africa from this perspective, arguing that nuclear weapons were abandoned when these alliance networks broke down.¹⁰⁹

One of the main advantages of SCOT theory is that it takes into account many more of the factors that

make up the complex proliferation process than traditional approaches do. As Flank (1994) argues, nuclear weapons:

do not spring into being in isolation from the rest of society. Our analyses and recommendations need to recognize instead how the process of proliferation is intimately connected to broader political and international issues.¹¹⁰

Although this represents an important step forward for those who hope to understand and explain the proliferation process, the main drawback of sociological approaches is that they involve so many dependent variables that it makes it difficult, if not impossible, to predict future proliferation. Nevertheless, it does have important policy implications. Firstly, it encourages policymakers to recognize that—in most countries—nuclear weapons are not detached from the rest of politics, meaning that solutions for their control should be broadened in scope to target their social (not just security-induced) causes. In some cases, this could mean providing development assistance, in order to prevent the nuclear establishment from binding with the military. In others, this could mean helping to resolve ethnic conflict or tackle environmental problems. Secondly, it encourages policymakers to acquire as much information as possible about the technological, political, social, and cultural processes that are linked to nuclear proliferation in order to shift from the traditional narrow security focus to an interdisciplinary approach. Lastly, and on a more general level, the historical sociology of nuclear proliferation could encourage action and provide inspiration to many who have traditionally believed that nuclear proliferation is the *inevitable* consequence of in-

security, because it shows that nuclear technology is socially constructed and therefore open to change.

CONCLUSION

This article has analyzed the contemporary debate over the dynamics of nuclear proliferation, exposing the areas where confusion has occurred due to the multi-faceted and complex nature of proliferation dynamics. It has also argued that the nuclear proliferation process itself must be viewed as the consequence of a combination of internal and external pressures and constraints, involving influential organizations,

groups, and individuals, and their ideas, beliefs, and interests. When the complexities of this process are considered, it is not surprising to discover that none of the existing theories of nuclear proliferation provide a satisfactory explanation of proliferation dynamics, although many provide important pieces of the puzzle. *Figure 1* highlights this point, summarizing the strengths and weaknesses of the most significant theories and models discussed.

As shown below, new information has proved to be the worst enemy of deductive explanations of nuclear proliferation, raising serious questions about the validity of realist ap-

proaches, and opening up new areas for research within the “black box” of nuclear decisionmaking. New and imaginative conceptual routes are now being explored, as the interdisciplinary character of the recent psychological and sociological approaches have shown. While this is encouraging, these approaches remain underdeveloped, and questions remain unanswered as indicated in *Figure 2*.

The importance of finding answers to these questions cannot be overestimated. Recent U.S. nonproliferation policies have shown that policymakers in the United States have been prepared to break out of

Explanatory Powers/Limitations of Existing Proliferation Theories

Theory or model	Strengths as a theory of nuclear proliferation	Weaknesses as a theory of nuclear proliferation
Classical realism	Explains role of security considerations.	Ignores domestic determinants.
Neo-realism	Presents an elegant, logically deduced explanation of nuclear proliferation, but side-steps empirical difficulties.	Explains systemic outcomes not unit level outcomes. Predictions and explanations are misleading and inaccurate.
Neo-liberal institutionalism	Explains domestic determinants, such as economic and political factors.	Leaves decisionmaking out of analysis.
Organizational theory	Analyzes implementation of decisions. Explains role of organizations in irrational behavior.	Underestimates impact of individuals and new information.
Belief systems theory	Focuses on role of individuals and groups and explains irrational decisions.	Difficult to quantify. Cannot explain causes of beliefs.
Learning models	Explain impact of new information.	Cannot explain what lessons are likely to be learned under what circumstances.
SCOT theory	Explains role of technology. Places nuclear proliferation in historical and social contexts.	Very descriptive.

Figure 1

Questions Remaining in the Proliferation Puzzle

Questions about psychological factors	<ul style="list-style-type: none"> * How much behavior can belief systems theory explain? * Why do belief systems change? * How does new information affect proliferation dynamics? * How can states be persuaded to adopt policies that are contrary to their conceptions of self interest?
Questions about political and organizational factors	<ul style="list-style-type: none"> * How do different domestic political structures and traditions affect proliferation dynamics? * How do bureaucratic compromises and group dynamics affect nuclear diplomacy? * What determines the nature of civil-military relations and how does this affect nuclear proliferation?
Questions about cultural and societal factors	<ul style="list-style-type: none"> * How are nuclear interests formed, who defines them, and how do they interact? * What impact do cultural factors, such as religion, have on proliferation dynamics? * What effect does public opinion and "world opinion" have on nuclear proliferation? * Is there a relationship between social cohesion and nuclear proliferation?
Questions about economic and environmental factors	<ul style="list-style-type: none"> * How do trade relations affect nuclear proliferation? * What influence does the health of the domestic economy have on nuclear decisionmaking? * Are states that seek economic autarky more likely to develop nuclear weapons? * What is the relationship between aid and nuclear diplomacy? * How do environmental concerns affect nuclear decisionmaking?

Figure 2

the realist mold and to apply some of the lessons that experience and new conceptual routes to understanding nuclear proliferation have provided. For example, when dealing with threatening and seemingly irrational nuclear behavior in North Korea and Ukraine, U.S. policymakers accepted the argument that the provision of economic aid and development assistance would persuade these recalcitrant states to abandon their nuclear weapons programs. Thus, a new theory was put into practice, and, in both cases, it translated (to date) into successful nonproliferation policies. While it is encouraging that policymakers are prepared to expand their repertoire, other analysts have argued that the policy of rewarding

nuclear threshold states and nuclear aspirants is a dangerous one and could lead to long-term problems of encouraging proliferation (or near-proliferation).¹¹ This highlights the need for scholars to explore as many new conceptual routes as possible, in order to build on existing explanations of nuclear proliferation and to develop new policy options.

It also emphasizes the need for policymakers to broaden their understanding of proliferation dynamics still further. While their acceptance of neo-liberal institutionalism represents an advance on narrow strategic approaches to the problem, the complex domestic sources of nuclear proliferation require more attention. This article has shown how organi-

zational, psychological, and sociological factors affect proliferation dynamics, revealing domestic causes that could illuminate alternative policy options, ranging from the diffusion of new information to the shifting of domestic alliances. With this in mind, it is vital that scholars tackle the proliferation puzzle with renewed vigor, in order to provide suitable advice for policymakers involved in nonproliferation efforts.

¹ This phrase was coined by Zachary S. Davis and Benjamin Frankel, eds., *The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results* (London: Frank Cass, 1993).

² The concept of levels of analysis is an abstract construct invented by theorists trying to understand and explain behavior. The levels

of analysis represent the different levels of explanation: the individual level, the state level, and the international level. Few theories have provided explanations of behavior at all levels, and those that have, have tended to be ahistorical and apolitical, leading to distorted explanations of behavior.

³ Structural explanations of international relations often turn human agents into puppets whose behavior is determined by impersonal social forces, whereas explanations based on agency generally presuppose that human beings control events. The problem is that agents and structures are inextricably linked, but most social science theories cannot synthesize these two extreme positions. For an introduction to the agent-structure debate, see Barry Buzan, Charles Jones, and Richard Little, eds., *The Logic of Anarchy: Neo-realism to Structural Realism* (New York: Columbia University Press, 1993), pp. 102-114.

⁴ Research in the social sciences can be broadly divided into three main perspectives: positivism, interpretivism, and postmodernism. Positivists believe that truth is pre-existent and that it is the researchers task to discover it. Their aim is to use reason and gather evidence to arrive at objective truth. In this sense, knowledge is only valid if it is backed up with scientific evidence. In contrast, interpretivism is based on the idea that truth is socially constructed, and that knowledge is concerned with interpretation, meaning and illumination. Interpretivists believe that it is the researchers task to discover meaning within social interactions. Postmodernists believe that there are no secure foundations for knowledge, and that all knowledge claims are open to challenge. The goal of postmodernists is not to arrive at the truth, whether pre-existent or socially constructed, but to demonstrate the fallibility of all over arching theories, and to focus on what has previously been taken for granted, neglected, or regarded as insignificant. The problem with taking a positivist approach to explaining nuclear proliferation dynamics, is that information is scarce due to the nature of the subject, and it is therefore difficult, if not impossible, to use scientific methods to arrive at the "truth."

⁵ Epistemology is concerned with the relationship between knowledge claims and how the truth is constructed: it looks at what distinguishes different kinds of knowledge claims and the criteria used to distinguish them. Ontology is about what exists, what is the nature of the world, what is reality. The two are related since claims about what exists in the world imply claims about how what exists may be known. The discussion in endnote number 4 shows how positivism, interpretivism, and postmodernism offer different approaches to ontology and epistemology.

⁶ Bradley A. Thayer, "Nuclear Weapons as a Faustian Bargain," *Security Studies* 5 (Autumn 1995), pp. 150-151.

⁷ Shai Feldman, "Is There A Proliferation De-

bate?" *Security Studies* 4 (Summer 1995), p. 790.

⁸ Various versions of the technological imperative were developed, including Charles W. Kegley's capabilities model, which is based on the assumption that states develop nuclear weapons when they possess the technological and the economic capability to do so. Kegley used his model to draw up a list of future proliferants, which includes, among others, Japan, Spain, Italy, and Australia, but omits Iraq, Iran, and North Korea on the basis that they could not meet the high economic and technological standards that he set to distinguish realistic nuclear aspirants from non realistic aspirants. In his self-critique he admits that his model is flawed because the motives, incentives and intentions of the state need to be taken into account, as well as psychological and cognitive variables, which are difficult to quantify. See Kegley, "International and Domestic Correlates of Nuclear Proliferation: A Comparative Analysis," *Korea and World Affairs* 4 (Spring 1980).

⁹ Most theories of international relations are based on the rational actor model, which presupposes that individuals, and by extension states, are driven by goals, and that they strive to be rational in their attempts to achieve these goals. It follows that it is possible for the social scientist to explain and predict the behavior of individuals/states once their goals have been identified.

¹⁰ The fact that the United States had developed nuclear weapons clearly provided the most important incentive for the Soviet Union to do the same. To use the example of India, China's nuclear test in 1964 led to calls for an Indian device, and played a fundamental role in persuading Prime Minister Lal Bahadur Shastri that India should at least research the benefits that a nuclear test might have for the country. In Ukraine's case, the nuclear threat from Russia after independence, played an important role in delaying President Leonid Kravchuk's decision to abandon nuclear weapons.

¹¹ Kenneth N. Waltz, *The Spread of Nuclear Weapons: More May Be Better*, Adelphi Paper 171 (1981).

¹² Kenneth N. Waltz, "Nuclear Myths and Political Realities," *American Political Science Review* 84 (Fall 1990).

¹³ *Ibid.*, p. 734.

¹⁴ Andrew Mack has used rational deterrence theory to explain North Korea's nuclear intentions and motivations from the 1970s to the 1990s. He argues that nuclear weapons provided Pyongyang with a "strategic equaliser" in the inter-Korean military competition, and provide a deterrent to the use of American nuclear weapons against the north in the face of deteriorating alliance relationships. See Andrew Mack, "North Korea and the Bomb," *Foreign Policy* 83 (Summer 1991), pp. 91-93. However, this analysis is open to question. Firstly, North Korea's nuclear capability ap-

pears to have been limited, and could not be described as a credible deterrent. Secondly, Kim Il-Sung himself admitted that it was illogical for North Korea to challenge the power of the United States. Lastly, if Pyongyang's nuclear behavior was being driven by strategic considerations, why was the framework agreement signed at a time when North Korea's strategic position had not improved? Rational deterrence theory cannot explain this. See Seong W. Cheon, "National Security and Stability in East Asia: The Korean Peninsula," PPNN Core Group Meeting Paper, Japan (November 1992), p. 39.

¹⁵ In this context, stability is used to describe the absence of war.

¹⁶ Waltz (1990), p. 737.

¹⁷ As Scott Sagan notes, leaders trying to justify the existence of existing nuclear weapons systems took a long time to recognize the truly devastating power of nuclear weapons. For more information about the changing perceptions of nuclear weapons, see Scott Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton, New Jersey: Princeton University Press, 1993), pp. 259-260, and Robert Frank Futrell, *Ideas, Concepts, Doctrine: A History of Basic Thinking in the United States Air Force, 1907-1964* (Maxwell AFB, Ala.: Air University, 1971), p. 122. For an introduction to the debate on how perceptions of nuclear weapons have changed, see Gregg Herkin, *The Winning Weapons* (New York: Vintage, 1982), and Eric Herring, "The Decline of Nuclear Diplomacy" in Ken Booth, ed., *New Thinking About Strategy and International Security* (London: Harper Collins, 1991).

¹⁸ Notice how policymakers in the nuclear weapons states justified their nuclear status using rational deterrence theory, but completely abandoned the concept of rational deterrence when justifying their attempts to prevent the further spread of nuclear weapons, as they became increasingly concerned about the possibility of irrational behavior and accidents if nuclear weapons got into the "wrong hands." Brahma Chellaney is particularly critical of this hypocritical and ethnocentric reasoning in his article "Naiveté and Hypocrisy: Why Anti-Proliferation Zealotry Does Not Make Sense," *Security Studies* 4 (Summer 1995), pp. 780-781.

¹⁹ Waltz also claims "the more unstable a government, the shorter the attention span of its leaders." See Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W. W. Norton and Company, 1995), p. 9.

²⁰ Waltz (1990), pp. 738-741.

²¹ Vertical nuclear proliferation refers to the accumulation of nuclear weapons within the nuclear weapon states (NWS), which occurred during the Cold War, as the United States, Soviet Union, Britain, France and China built up their stockpiles of nuclear weapons. Horizontal proliferation refers to the spread of nuclear

weapons to non-nuclear weapon states (NNWS). The existence of the former was stressed particularly by policy makers and academics in India during negotiations over the NPT, who were keen to point out the discriminatory nature of the Treaty, which the NWS were "forcing" on the NNWS.

²² This has been pointed out on many occasions, most recently and almost gleefully by Peter D. Feaver in "Optimists, Pessimists, and Theories of Nuclear Proliferation Management," *Security Studies* 4 (Summer 1995), p. 755-756.

²³ See C. Raja Mohan, "Atomic Teeth To Apartheid: South Africa and Nuclear Weapons," *Institute for Defense Studies and Analysis* 12 (January-March 1980), and D. Venter, "South Africa and the International Controversy Surrounding its Nuclear Capability," *Politikon* 5 (Spring 1978).

²⁴ Zachary S. Davis, "The Realist Nuclear Regime," *Security Studies* 2 (Spring/Summer 1993), p. 79.

²⁵ Davis's approach could provide a more convincing explanation of why South Africa developed its nuclear weapons program in the 1970s and 1980s than if he used rational deterrence theory. South Africa's nuclear weapons program lacked a strategic rationale, and appears to have been driven by political rather than military considerations. Rather than functioning as a conventional deterrent, Davis could argue that Pretoria's leaders intended to use its nuclear weapons as a diplomatic bomb, to obtain concessions and assistance from the United States. Moreover, he could assert that once it became clear that this "diplomatic bomb" was having a detrimental effect on South Africa's diplomatic relations and economy, nuclear weapons were abandoned. This is the official explanation provided by South Africa's leaders, who argue that the diplomatic bomb was developed in response to South Africa's deteriorating security situation in 1974, when it was believed that Communist involvement in Angola would threaten Pretoria. However, it does over simplify the situation, justifying and rationalizing South Africa's nuclear activities, ignoring complex internal dynamics that were driving South Africa's nuclear behavior.

²⁶ North Korea began a nuclear weapons program in the 1970s despite the strong possibility that this might jeopardize its survival. Ukraine also played a game of nuclear brinkmanship in the early 1990s, which is impossible to explain if only external factors are taken into account.

²⁷ India continues to refuse to sign the NPT, despite strong pressure to do so. External factors, such as the nuclear threat from Pakistan, certainly play a part in this, but India's long held belief that the NPT is discriminatory, and India's determination to be treated as an equal, also play a role in its refusal to sign.

²⁸ Richard K. Betts, "Paranoias, Pygmies, Pariahs and Non-proliferation Revisited," *Security Studies* 2 (Spring/Summer 1993).

²⁹ Following criticism from proliferation pes-

simists, Waltz has made it clear recently that different types of state are likely to behave differently once they possess nuclear weapons. In line with Betts, Waltz argues that "pariah" states such as Libya and Iraq should be prevented from acquiring nuclear capabilities. See Kenneth N. Waltz, "A Reply," *Security Studies* 4 (Summer 1995), p. 804. This is inconsistent with his argument in *The Spread of Nuclear Weapons: A Debate*.

³⁰ Betts, pp. 107-109.

³¹ Indira Gandhi's initial decision to go ahead with a peaceful nuclear explosion (PNE) in 1971, appears to have been influenced by concerns about India's deteriorating strategic position. However, by the time the test was carried out in 1974, India's international relations had improved considerably. The fact that India experienced serious domestic unrest between 1971 and 1974 could shed some light on the Prime Minister's decision to go ahead with the test anyway, in an attempt to improve domestic morale and divert attention from the internal economic and political problems that were plaguing the government. See Shyam Bhatia, *India's Nuclear Bomb* (Ghaziabad: Vikas Publishing House, 1979).

³² Waltz states that structural theory will not show how "systems determine the behavior and interaction of their units" but only how "the structure of the system affects the interacting units and how they in turn affect the structure" (emphasis added). Later on he explains that the structure of the system only partly explains behavior and outcomes. Kenneth N. Waltz, *Theory of International Politics* (Reading, MA: Addison-Wesley, 1979), p. 40 and 73.

³³ Waltz admits that "structures condition behaviors and outcomes, yet explanations of behaviors and outcomes are indeterminate because both unit-level and structural causes are in play." See Robert O. Keohane, ed., *Neo-Realism and Its Critics* (New York: Columbia University Press, 1986), p. 343.

³⁴ The concept of polarity has been the subject of great debate in the field of international relations since the 1960s. However, the end of the Cold War has given the debate new life. The main questions that have been addressed are: How should polarity be defined? What is the relationship between polarity and stability? Should the structure of the international system be described as unipolar or multipolar? See John J. Mearsheimer, "Back to the Future: Instability in Europe After the Cold War," *International Security* 15 (Summer 1990), pp. 5-56; Kenneth M. Waltz, "The Emerging Structure of International Politics," paper presented at the annual meeting of the American Political Science Association, San Francisco, August 30-September 2, 1990; Richard Ned Lebow, "The Long Peace, the End of the Cold War, and the Failure of Realism," *International Organization* 48 (Spring 1994), pp. 249-279; R. Harrison, "What Was Bipolarity?" *International Organization* 47 (Winter 1993), pp. 77-107.

³⁵ Steve Weber also links the proliferation issue

and the nuclear issue directly, attempting to develop a modified form of neo-realism in order to explain the absence of war between the great powers during the Cold War, and since. He argues that the presence of nuclear weapons in the international system is bringing about a slow structural change, from the anarchic ordering principle of the conventional world, to a more hierarchic structure, in which nuclear weapon states, acting as "joint custodians" of the international system, take on the role of the overarching power which acts as a structural constraint, reducing the incentives to go to war. However, Weber focuses on explaining international outcomes (the absence of war), and does not get involved in the more complex debate about the dynamics of nuclear proliferation, as Waltz does. See Steve Weber, "Realism, Detente, and Nuclear Weapons," *International Organization* 44 (Winter 1990). Daniel Deudney takes Weber's approach even further, arguing that nuclear weapons have eclipsed the role of the state in the international system. See Daniel Deudney, "Dividing Realism: Structural Realism Versus Security Materialism in Nuclear Security and Proliferation," *Security Studies* 2 (Spring/Summer 1993).

³⁶ Sagan and Waltz, p. 41.

³⁷ The concept of the proliferation chain was developed by Lewis A. Dunn and William H. Overholt. According to their model, proliferation occurs in the first link in the chain when constraints (such as domestic opposition, cost and technological barriers) are relaxed and underlying pressures (such as prestige considerations and security calculations) coincide with triggering events (such as foreign or domestic crises, nuclearization of another country or reduction of alliance credibility). Once proliferation has occurred in the first link, other links soon emerge and a chain begins to form as adversaries feel insecure and acquire nuclear weapons in an attempt to overcome the nuclear threat. Eventually a proliferation turning point is reached, when the proliferation chain gathers a momentum of its own, and will spiral out of control unless an "anti-proliferation crackdown" is imposed by the international community. Using this model, Dunn and Overholt predicted that an Indian chain would emerge, and would eventually include: Pakistan, Iran, Iraq, Syria, Israel, Saudi Arabia, Egypt, Libya, Argentina, and Brazil, by 1995. See Dunn and Overholt, "The Next Phase in Nuclear Proliferation Research," *Orbis* 20 (Summer 1976).

³⁸ Waltz (1995), p. 803.

³⁹ Benjamin Frankel, "The Brooding Shadow: Systemic Incentives and Nuclear Weapons Proliferation," *Security Studies* 2 (Spring/Summer 1993), p. 37.

⁴⁰ *Ibid.*, pp. 37-38.

⁴¹ *Ibid.*, p. 40.

⁴² Mearsheimer (1990), pp. 38-39.

⁴³ John J. Mearsheimer, "The Case for a Ukrainian Nuclear Deterrent," *Foreign Affairs* 72

(Summer 1993), p. 54.

⁴⁴ *Ibid.*, p. 58.

⁴⁵ For information about the negotiations between the United States and Ukraine over the nuclear issue between 1991-1995, and the terms of the agreements, see James Gow, "Ukraine, the NPT and a Model Security Policy: to Have and Have Not?" in J. B. Pole and R. Guthrie, eds., *Verification 1995* (Boulder, CO: Westview Press, 1995), pp. 115-131; Marco de Andreis and Francesco Calogero, *The Soviet Nuclear Weapon Legacy*, SIPRI Research Report No. 10 (January 1994).

⁴⁶ Irene Marushko, "Ukraine Becomes Nuclear Weapons Free Country," *IAEA Daily Press Review*, June 4, 1996.

⁴⁷ It is interesting to note that Waltz stated that a separate theory dealing with the politics and policies of states would be valuable, but that it would be impossible to combine systems theory and domestic politics theory into one theory. See Waltz (1986), p. 344.

⁴⁸ Barry Buzan, *et al.*, p. 9.

⁴⁹ *Ibid.*, pp. 11-13.

⁵⁰ It should be noted here that Buzan *et al.* use the label structural realism to refer to their more wide-ranging form of neorealism. Buzan *et al.*, p. 9.

⁵¹ Buzan *et al.* state that "Structural logic can certainly be used to shape and inform the analysis of foreign and domestic policy...but it is mostly to abstract and large scale to be used prescriptively." They suggest that their theory is better suited to interpret history—especially grand history. See Buzan *et al.*, p. 13.

⁵² Jack Snyder's approach suffers from the same conceptual contradictions. He constructs a domestic politics model that he claims stays within the realist tradition, in an attempt to combine domestic and international levels of analysis. His aim is to explain the over expansion of the great powers over the last 200 years, which he argues occurred as a result of industrialization and domestic coalitions, combined with systemic pressures. In common with Buzan *et al.*, Snyder focuses on explaining systemic outcomes, which makes it particularly difficult to apply his model to the specific dynamics of nuclear proliferation. See Snyder, *Myths of Empire: Domestic Politics and International Ambition* (Ithaca, New York: Cornell University Press, 1991).

⁵³ Mitchell Reiss, *Without the Bomb: The Politics of Nuclear Non-proliferation* (New York: Columbia University Press, 1988).

⁵⁴ *Ibid.*, pp. 248-263.

⁵⁵ *Ibid.*, p. 173.

⁵⁶ *Ibid.*, p. 268.

⁵⁷ Etel Solingen, *The Domestic Sources of Nuclear Postures: Influencing Fence-sitters in the Post-Cold War Era*, IGCC Policy Paper Number 8, University of California, October 1994.

⁵⁸ Glenn Chafetz, "The End of the Cold War and the Future of Nuclear Nonproliferation: An Alternative to the Neo-realist Perspective," *Security Studies* 2 (Spring/Summer 1993).

⁵⁹ *Ibid.*, p. 133.

⁶⁰ *Ibid.*, p. 128.

⁶¹ *Ibid.*, pp. 139-146.

⁶² See David Fischer, "South Africa," in Mitchell Reiss and Robert S. Litwak, eds., *Nuclear Proliferation After the Cold War* (Washington: The Woodrow Wilson Center Press, 1994).

⁶³ Olli-Pekka Jalonen's analysis of the dynamics of nuclear proliferation in Ukraine is based on neo-liberal institutionalism. See Jalonen, "Spiral Into Hopelessness? Post-Soviet Ukraine's Foreign and Security Policy," in Clive Archer and Olli-Pekka Jalonen, eds., *Changing European Security Landscape* (Tampere: Tampere Peace Research Institute, 1995).

⁶⁴ For an insight into the complexities of Ukraine's nuclear diplomacy, see Natalya Yakovenko, *Independent Ukraine 1991-1995: A Difficult Stage of Development* (Lancaster: Centre for Defence and Security Studies, 1995).

⁶⁵ Neo-liberal institutional theory cannot explain why India, which is arguably the largest democracy in the world, took the decision to develop a nuclear capability in the 1960s and 1970s, despite domestic and international opposition to nuclear weapons. It also fails to explain why, in the lead up to the general election, between December 1995 to April 1996, India appears to have made arrangements to carry out another nuclear test, and why in August 1996, India test-fired its medium-range Agni missile, which is capable of carrying nuclear warheads. See Christopher Thomas, "India Puts Range of Weapons to the Test," *The Times* (U.K.), August 27, 1996, p. 11.

⁶⁶ See *The Advent of Kim Jong-il's Regime in North Korea and Prospects for its Policy Direction*, Policy Studies Report, The Research Institute for National Unification, Seoul, December 1995.

⁶⁷ Stephen M. Meyer, *The Dynamics of Nuclear Proliferation* (Chicago: The University of Chicago Press, 1984), p. 6.

⁶⁸ The most recent attempt to incorporate the decisionmaking process into armament dynamics has been made by Jean Pascal Zanders, who set out to develop a model to explain the proliferation of chemical weapons. His "assimilation model" treats proliferation as a process, showing how obstacles have to be overcome in a dual political and military decisionmaking track. However, although he addresses the question of *how* proliferation occurs, he does not address the question of *why* it occurs, arguing that realist, neo-liberal and technological determinants theories already provide a satisfactory answer to this question. See Zanders, *Dynamics of Chemical Armament: Towards a Theory of Proliferation* (Brussels: University of Brussels, 1996).

⁶⁹ Meyer, p. 5.

⁷⁰ *Ibid.*

⁷¹ Meyer's analysis of the careful balance that decisionmakers have to achieve between internal and external concerns helps explain why India's Prime Minister, Baladur Shastri, secretly sanctioned work to begin on a PNE in 1964 in re-

sponse to China's first nuclear test, but made announcements that India would not develop a nuclear capability. This shows Shastri trying to balance external threats to India's security with internal pressures, as most of India's elites were opposed to nuclear weapons during the 1960s and remained committed to Nehru's vision of a peaceful and non-aligned India. For information about the public debate in India over nuclear weapons, see Frank E. Couper, "Indian Party Conflict on the Issue of Atomic Weapons," *Journal of Developing Areas* 3 (January 1969). For information about Shastri's response to China's nuclear tests, see A. G. Noorani, "India's Quest for a Nuclear Guarantee," *Asian Survey* 5 (July 1967).

⁷² India has fluctuated between stages two and three since the PNE in 1974, although more recently scholars have claimed that India possesses a secret operational nuclear weapons program. See Warren H. Donnelly, "India and Nuclear Weapons," Congressional Research Service Issue Brief, The Library of Congress, January 27, 1989.

⁷³ In India's case, it is difficult to see the final decision to carry out the PNE in 1974 in rational terms. Indira Gandhi's initial decision to go ahead with the PNE in 1971 appears rational as deteriorating regional and international relations at that time raised concerns about India's strategic position, but by 1974 this situation had changed as India's international relations had improved. However, between 1971 and 1974 India experienced serious domestic unrest, and it has been suggested that this explains the timing of the PNE, as India's leaders attempted to divert attention away from its internal problems. Yet, evidence suggests that the PNE was actually carried out as a result of an ad hoc decision taken by an elite group of political leaders and members of the atomic energy agency (AEC), who were aware that the timing was not ideal, but took the decision to go ahead with the test anyway because it was too late to turn back for practical reasons. Should this be seen as a rational response? See Raja Ramanna, *Years of Pilgrimage: An Autobiography* (New Delhi: Viking, 1991).

⁷⁴ Graham Allison, *Essence of Decision* (Boston: Little, Brown, 1971).

⁷⁵ *Ibid.*, pp. 164-171.

⁷⁶ This issue is discussed by Morton H. Halperin in *Bureaucratic Politics and Foreign Policy* (Washington D.C.: Brookings Institution, 1974), pp. 29-58.

⁷⁷ Sagan and Waltz, pp. 49-53.

⁷⁸ Sagan, pp. 251-262.

⁷⁹ Mark Hibbs, "South Africa's Secret Nuclear Programme: The Dismantling," *Nuclear Fuel* (24 May 1993).

⁸⁰ Professor John Simpson, of the Programme for the Promotion of Nuclear Non-proliferation (PPNN), has pointed out this possibility in an interview with Mark Hibbs. See Hibbs, p. 6.

⁸¹ Alexandre Y. Mansourov, *North Korean Decision-Making Processes Regarding the Nuclear Issue* (Berkeley: Nautilus Institute,

1994), pp. 2-3; Selig S. Harrison, "The North Korean Nuclear Crisis: From Stalemate to Breakthrough," *Arms Control Today* 24 (November 1994), p. 18.

⁸² Striking parallels exist between the attitude towards nuclear weapons of the different heads of India's atomic energy commission (AEC), and India's proliferation decisions, leading to the conclusion that individuals can play a key role in influencing nuclear weapons programs. For example, Bhabha, head of the AEC in 1964, persuaded Shastri to give the go-ahead for work to begin on the PNE. Indira Gandhi reversed this decision in 1966, possibly after advice from Vikram Sarabhai, the new head of the AEC, who was bitterly opposed to nuclear weapons and to testing. This decision was then over turned again in 1971, immediately after a new chairman of the AEC had been appointed. It does not come as a surprise to discover the H. N. Sethna was in favor of nuclear weapons. See Ramanna, pp. 88-89.

⁸³ Vikram Sarabhai, Chairman of the AEC between 1966 and 1971, was fiercely opposed to nuclear weapons. His beliefs appear to have had an important influence on the AEC, and on India's nuclear decisionmaking elite. See Ramanna.

⁸⁴ The military has not played a significant role in India's nuclear decisionmaking. The organization with the most influence over nuclear decisions in India is the AEC. Why has the military traditionally been excluded from nuclear decisionmaking circles in India, and why has the AEC played such a pivotal role? Organization theory cannot explain this. See Feaver, p. 763.

⁸⁵ The concept of belief systems was first introduced into international relations theory by Ole Holsti. A good introduction to belief systems in general, and to Ole Holsti's work in particular, is provided by Steve Smith, "Belief Systems and the Study of International Relations," in R. Little and Steve Smith, eds., *Belief Systems and International Relations* (Oxford: Blackwell, 1988).

⁸⁶ Niall Michelsen points this out in relation to U.S. and Russian nuclear policies, arguing that the beliefs of the presidents of both states have an important impact on policy. See Michelsen, "Presidential Views of Nuclear Trends," *The Journal of Strategic Studies* 17 (September 1994).

⁸⁷ See Janice Gross Stein, "International Negotiation: A Multidisciplinary Perspective," *Negotiation Journal* (July 1988), pp. 221-230; Ole Holsti, "Crisis Decision Making," in Philip E. Tetlock, ed., *Behavior, Society and Nuclear War*, Volume 1 (New York: Oxford University Press, 1989); Jean Lave, *Cognition in Practice* (Cambridge: Cambridge University Press, 1988).

⁸⁸ See Robert Jervis, *Perception and Misperception in International Politics* (Princeton, New Jersey: Princeton University Press, 1976).

⁸⁹ Glenn H. Snyder and Paul Diesing, *Conflict*

Among Nations (Princeton, New Jersey: Princeton University Press, 1977).

⁹⁰ Peter Haas, "Epistemic Communities and International Policy Coordination," *International Organization* 46 (Winter 1992), p. 29.

⁹¹ Peter R. Lavoy, "Nuclear Myths and the Causes of Nuclear Proliferation," *Security Studies* 2 (Spring/Summer 1993).

⁹² *Ibid.*, p. 199.

⁹³ *Ibid.*, p. 200.

⁹⁴ *Ibid.*, p. 202.

⁹⁵ *Ibid.*, p. 199.

⁹⁶ Haas, p. 21.

⁹⁷ Emmanuel Adler, "The Emergence of Co-operation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control," *International Organization* 46 (Winter 1992).

⁹⁸ Haas, p. 15.

⁹⁹ The idea that foreign policy learning is possible is not new. For early explorations into this subject see Ernest R. May, "*Lessons of the Past*" (New York: Oxford University Press, 1973), and Jervis, chapter 6. However, interest in learning models has increased recently, inspired by the inability of structural theories to explain the end of the Cold War, and in particular the foreign policy changes that occurred under Mikhail Gorbachev. See George W. Breslauer, "Explaining Soviet Policy Changes: Politics, Ideology and Learning," in George W. Breslauer, ed., *Soviet Policy in Africa: From the Old to the New Thinking* (Berkeley: University of California Press, 1992), pp. 196-216; Janice Gross Stein, "Political Learning By Doing: Gorbachev as Uncommitted Thinker and Motivated Learner," *International Organization* 48 (Spring 1994).

¹⁰⁰ Recently, President Leonid Kuchma declared that "the Ukrainian people, having suffered from the Chernobyl nuclear accident, are well acquainted with the potential disaster that nuclear weapons can bring...Ukraine calls on other nations to follow our path and do everything to wipe nuclear weapons from the face of the earth as soon as possible." See Marushko.

¹⁰¹ In February 1995, the White House issued a report to define the long-term U.S. strategy in the post-Cold War environment, which provides important insights into the thinking of the Clinton administration on the issues of nonproliferation and arms control. The report stressed the need for the United States to retain "robust" strategic nuclear forces sufficient to deter any future hostile foreign leadership. In doing this, it reinforces the idea that nuclear weapons play a vital role in national security policy. At the same time, the report stated that "the United States seeks to cap, reduce and, ultimately, eliminate the nuclear and missile capabilities of India and Pakistan." It is unwise for the nuclear weapons states to continue to define their own security needs in nuclear terms, and at the same time to try and convince other states that it is not in their interests to maintain or acquire a nuclear capability. See *The Monitor* 1 (Spring 1995), pp.

8-10.

¹⁰² India has refused to sign the comprehensive test ban treaty (CTBT), claiming that it does not go far enough towards global nuclear disarmament, and also due to the hypocrisy of the nuclear weapon states. Speaking at the disarmament conference in Geneva in June, Ms. Arundhati Ghose, India's ambassador to the United Nations stated that "we cannot accept that it is legitimate for some countries to rely on nuclear weapons for their security while denying this right to others." *Financial Times*, June 21, 1996.

¹⁰³ There are fears that the United States intends to keep its nuclear options open, even at the expense of negating its non-use pledges, on which the extension of the NPT was built. At a special White House briefing on April 11, 1996, Robert Bell, special assistant to President Clinton, and senior director for defense policy and arms control at the National Security Council (NSC), made a statement implying that the United States intended to retain the option of using nuclear weapons if subjected to a chemical or biological attack. See George Bunn, "Expanding Nuclear Options: Is the U.S. Negating Its Non-Use Pledges?" *Arms Control Today* 26 (May/June 1996).

¹⁰⁴ Lavoy points this out in his article. See Lavoy, pp. 202-204.

¹⁰⁵ Donald MacKenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (Cambridge, Massachusetts: The MIT Press, 1990).

¹⁰⁶ *Ibid.*, p. 3.

¹⁰⁷ Steven Flank, "Exploding the Black Box: The Historical Sociology of Nuclear Proliferation," *Security Studies* 3 (Winter 1993-1994).

¹⁰⁸ *Ibid.*, pp. 270-272.

¹⁰⁹ *Ibid.*, pp. 276-277.

¹¹⁰ Steven Flank, "Nonproliferation Policy: A Quintet For Two Violas?" *The Nonproliferation Review* 1 (Spring/Summer 1994), p. 71.

¹¹¹ See Michael J. Engelhardt, "Rewarding Nonproliferation: The South and North Korean Cases," *The Nonproliferation Review* 3 (Spring-Summer 1996).