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Journal of Conflict Resolution 2013 57: 478 originally published online 9 July 2012

DOI: 10.1177/0022002712448909

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57(3) 478-508

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DOI: 10.1177/0022002712448909

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Abstract

Existing nuclear deterrence scholarship evinces a pervasive “existential bias,” assuming that once a state merely possesses nuclear weapons, it should be able to deter armed conflict. The empirical literature expresses this bias by simply dichotomously coding a state based on whether it has nuclear weapons, thereby treating all nuclear states as equivalent. Thus, whether nuclear weapons deter conflict, and how much is required to do so, is unclear. This article shifts the unit of analysis away from nuclear weapons to postures, hypothesizing that different nuclear postures are distinct and generate differential deterrent power, particularly amongst the non-superpower states which comprise the lion’s share of nuclear powers. I find that an asymmetric escalation nuclear posture uniquely deters conflict initiation and escalation. Not only do small arsenals have little deterrence success, but I find that even assured retaliation postures fail to deter intense conventional conflict. This suggests that the deterrence dividend is distributed unequally across nuclear powers, and that states may need to do more than simply acquire nuclear weapons to successfully deter conventional attacks.

Keywords

nuclear weapons, deterrence, conflict, nuclear posture, nuclear strategy

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What kind of nuclear forces are enough to deter conventional conflict? International security literature evinces a pervasive “existential bias,” arguing that the mere possession of a small nuclear arsenal ought to deter adversaries from initiating conflict. Kenneth Waltz famously argued that nothing more than the “credibility of small deterrent forces” is required to establish Thomas Schelling’s “threat that leaves something to chance,” and ought to deter not just nuclear use but conventional attacks as well (Waltz 2002, 23; Schelling 1960). Existing quantitative work on nuclear deterrence and conflict explicitly expresses this bias by treating all nuclear states as equivalent once they acquire a single nuclear weapon. This assumes that a state with one warhead reaps the same deterrence effect as states with mature second-strike or even first-use capabilities.

Not only is this theoretically suspect, but is it empirically true? The present scholarship is inconclusive. This is largely due to the focus on the superpower experiences of the United States and the Soviet Union (Glaser 1990). As advocated by Albert Wohlstetter, Herman Kahn, and others, the superpowers developed massive nuclear arsenals to deter each other, without first answering how much was actually necessary to deter conventional conflict. Was it the tens of thousands of nuclear weapons that they oriented for first use? Or, as some Cold War theorists ultimately argued, would just a few weapons have sufficed? Decades after the advent of nuclear weapons, we still do not know, particularly because superpower development of overkill arsenals outpaced thinking on this issue.

Indeed, the superpower nuclear balance is a poor guide for analyzing the relationship between nuclear weapons and deterrence for several reasons. First, the superpowers were so much more powerful than the other states in the system that their ability to deter nonsuperpower states was overdetermined. Second, because of resource constraints and simple learning, the superpowers’ large and diverse nuclear architectures have not been, nor are likely to be, replicated by another state. Thus, the superpower deterrence equation is nearly irrelevant to all other nuclear powers. The superpower experience is therefore a methodologically and empirically unreliable guide to identifying the level of nuclear forces required to deter conflict.

However, the experiences of the regional nuclear powers—nonsuperpower states with independent nuclear forces—*can* provide insight into what kinds of nuclear forces are required to deter conflict. These powers developed nuclear forces of similar size (less than several hundred) and faced the constraints imposed by having to operate and maneuver below the superpowers. Unlike the superpowers, regional powers must make critical choices about how to allocate their limited nuclear forces for deterrence. And they have achieved widely different deterrence success. Pakistan has successfully deterred Indian conventional power on numerous occasions, but India has not been able to do likewise, as the 1999 Kargil war demonstrated. Nuclear Israel experienced serious deterrence failures against its Arab opponents in 1973 and 1990. Why have states with similarly sized arsenals had such differential success in deterring conventional conflict? Answering this question is of immediate theoretical

and policy importance, particularly since the future proliferation landscape will, by definition, only include regional powers.

The twin problems of the “existential bias” and the Cold War hangover in theoretical and quantitative studies have clouded our understanding of deterrence. Indeed, the dichotomous focus on whether a state has nuclear weapons or not is a serious conceptual misspecification. This article thus attempts to advance our theoretical and empirical understanding in two ways. First, it focuses on the experiences of the regional nuclear powers, which comprise the lion’s share of existing (and all emerging) nuclear powers and provide the most fertile ground for testing theories of deterrence. Second, it shifts the unit of analysis from the mere possession of a nuclear *weapon* to nuclear *posture*: the forces, organizational procedures, and doctrines states adopt to operationalize their nuclear capabilities. I develop an original classification scheme that identifies three distinct regional power nuclear postures: catalytic, assured retaliation, and asymmetric escalation. Using this new independent variable, I statistically test whether and how variation in nuclear posture affects a state’s ability to deter conflict at various levels of intensity. This is one of the first attempts, both theoretically and empirically, to disaggregate nuclear weapons states by their nuclear postures.

I find that nuclear weapons deter unequally as a function of a state’s nuclear posture. States with different nuclear postures reap different deterrence power, because these postures pose a credible threat to adversaries at different points in a potential conflict. In particular, the asymmetric escalation posture is the only one to exert a powerful deterrent effect on the initiation and escalation of armed conflict. An assured retaliation posture has surprisingly little ability to systematically deter even high-intensity conventional conflict. And the catalytic posture has experienced serious deterrence failures, including several full-blown wars. Contrary to conventional wisdom, there is little evidence that mere possession of nuclear weapons—or even secure second-strike forces—systematically deters conventional conflict. If a state wants to deter conventional conflict, it must explicitly orient its nuclear posture to do so.

These findings have profound implications for theoretical and policy debates about deterrence and proliferation. The fact that states must do more than to simply acquire nuclear weapons to successfully deter conflict suggests to scholars and policy makers alike that the key variable of interest for stability among nuclear powers should not be *acquisition* of nuclear weapons, but nuclear *posture*. The implications for conflict and nonproliferation approaches in South Asia, the Korean peninsula, and the Middle East are significant.

This article proceeds as follows: first, I review the current thinking on nuclear deterrence, illustrating its pervasive existential bias. In the second and third sections, I outline my typology of regional power nuclear postures and present the rationale for shifting the unit of analysis to nuclear posture, hypothesizing that different postures should create different deterrence results. The subsequent sections present the empirical analysis, finding that asymmetric escalation is the uniquely “deterrence

optimal” nuclear posture available to regional powers. I conclude with how this revises our understanding of nuclear deterrence.

Moving Beyond the Existential Bias

A dogma in security studies is that the critical threshold in a regional state’s quest for security is the acquisition of nuclear weapons. In addition to deterring nuclear attack, the mere risk of nuclear use should deter adversaries from initiating *conventional attacks* for fear of escalation to the nuclear level (Waltz 1981). Although the Cold War witnessed the development of massive nuclear architectures, many influential deterrence and proliferation theorists ultimately concluded that the basic existence of a nuclear weapons capability ought to provide sufficient deterrence to conventional conflict (Schelling 1966; Gaddis 1987; Jervis 1988; Mearsheimer 1984/1985).

The logic behind this “existential deterrence”¹ is that the destructive power of a single nuclear weapon is so great that conventional conflict ought to be inhibited even due to a small risk of nuclear escalation. Schelling suggests that even a plausible threat of nuclear use with a small arsenal could inhibit limited wars through the progressive “generation of risk” (Schelling 1960, 187–94). McGeorge Bundy writes that the deterrent effect of nuclear weapons “rests on the uncertainty about *what could happen* . . . deterrent power is unaffected by most changes in the arsenals on both sides” (Bundy 1984). Theorists like Waltz, Jervis, and Mearsheimer argue that this threshold is achieved with just a few nuclear weapons because adversaries can never be certain that a strike will fully disarm or eliminate an adversary’s capacity for nuclear retaliation (Waltz and Sagan 2002, 141–42; Jervis 1989, 35; also Waltz 1981). Waltz writes that once a state “has a small number of deliverable warheads of uncertain location . . .” it should be capable of deterring armed conflict (Waltz and Sagan, 2002, 142). Mearsheimer (2001, 129) similarly concludes that “there is no question . . . the presence of nuclear weapons makes states more cautious about using military force of *any kind* against each other.” In the established logic, the mere acquisition of nuclear weapons is the crucial leap to achieving security, not only against nuclear but also *conventional attack*.

This logic should be even more binding among regional powers. The potential speed of conventional military breakdowns in regional conflict scenarios increases the risk of rapid nuclear escalation by an imperiled state and should thus make any opponent facing a regional nuclear power *extremely* cautious in initiating disputes. Waltz famously writes, “Nuclear weapons lessen the intensity as well as the frequency of war among their possessors. For fear of escalation, nuclear states do not want to fight long or hard over important interests—indeed, they do not want to fight at all. Minor nuclear states have even better reasons . . . to avoid *any fighting*” (Waltz 1981, 25). Bernard Brodie (1959, 275) similarly argues that a “small menaced nation” required only a single nuclear weapon “to give the Soviet government pause,” and achieve protection against conventional threats. Particularly since

the end of the Cold War, the efficacy of “existential deterrence” has been largely embraced and unchallenged by scholars and practitioners.

Existing empirical work, both qualitative and quantitative, expresses the existential bias by assuming that the size, structure, and orientation of nuclear arsenals are all irrelevant. For example, recent qualitative work on crisis-prone South Asia treats India and Pakistan as nuclear equivalents, even though they operationalize their nuclear forces in very different ways (Ganguly 2008; Kapur 2007, 2008; Narang 2010a). The quantitative dispute literature has analyzed large-*n* data sets to estimate the deterrence effects of nuclear weapons by measuring levels of conflict a state experiences pre- and postnuclearization. But the quantitative literature has several problems. First, it explicitly suffers from the existential bias by simply using a dummy variable for whether a state has nuclear weapons or not in a particular year, treating the Cold War Union of Soviet Socialist Republics (USSR) the same as post-1967 Israel (Buono De Mesquita and Riker 1982; Huth 1988, 1990; Huth and Russett 1984, 1988; Geller 1990; Bennett and Stam 2004; Signorino and Tarar 2006; Beardsley and Asal 2007, 2009; Gartzke and Jo 2009; Horowitz 2009; Rauchhaus 2009). This assumes that one nuclear weapon has the same deterrent power as ten thousand, irrespective of how they are deployed. Second, quantitative literature based on dyad-year data sets overweights the superpower experience, since they possessed nuclear weapons for the longest period, were involved in the most politically relevant conflict dyads, and had many crises with each other and by proxy. This has thus generated inconclusive results about the role of nuclear weapons in deterring conflict. For example, Bennett and Stam’s analysis of nuclear weapons and the probability of conflict is indeterminate: “While variables are statistically significant, estimated effects differ in direction across subsets and outcomes.” As a result they are “[u]nable to estimate key effect on war probability” (Bennett and Stam 2004, 112).

Furthermore, as a result of this bias, most post-Cold War theory has focused on how and why states initially acquire nuclear weapons (Sagan 1996/1997; Gartzke and Jo 2007; Singh and Way 2004). Very little has been written on the deterrence effects of choices states make after they acquire nuclear weapons. This lacuna is reinforced by another mostly unarticulated, untested assumption that nuclear postures are optimized for a state’s security environment and are therefore epiphenomenal to deterrence success. The observable implication of this assumption would be equivalent deterrence success across nuclear states, which further reinforces the “existential bias.”

Fortunately, two simple correctives can advance our understanding of how nuclear weapons affect international conflict. First, regional nuclear powers should be analyzed as a separate class of states. I define the regional nuclear powers as the non-superpower states with *independent* nuclear forces: China, France, India, Israel, Pakistan, and South Africa.² For a variety of reasons—financial, technical, and through simple learning—regional nuclear powers have chosen fundamentally different approaches to operationalizing their nuclear arsenals than the superpowers (Narang 2010b). These states developed nuclear arsenals of similar

size and faced similar structural constraints and opportunities. Although substantial variation exists in aggregate power metrics across regional nuclear powers, I posit that their similarity on key relevant dimensions—such as geostrategic situation and size of nuclear arsenal—means that we can reasonably treat them with a common analytical lens. Whereas the superpowers had fundamentally different architectures that could “do it all” with respect to deterrence, and had to worry about extended deterrence commitments, regional powers are forced to make critical decisions about how to allocate their much scarcer nuclear forces and toward what end. Their widely different deterrence successes make them fertile and critical testing ground for the effects of nuclear weapons on conflict. That is, the similar power metrics and arsenal sizes but varying deterrence success among regional nuclear states allows me to theorize and isolate the effects of nuclear weapons in deterring armed conflict.

The second corrective is that the unit of analysis should be shifted from nuclear *weapons* to nuclear *posture*. Nuclear posture is the overall orientation of a state’s nuclear force structure, and includes the number and type of nuclear warheads and delivery vehicles, the rules and procedures governing how and when those weapons are deployed and released, and against what targets. I thus use the term nuclear posture to refer to the capabilities, employment doctrine, and command and control procedures a state establishes to operationalize its nuclear weapons capability. It is nuclear posture, rather than warhead numbers or declaratory doctrine, which should generate deterrent power against an opponent. Numerical estimates are fraught with uncertainty, especially in real time. Moreover, marginal additional nuclear weapons should not affect an adversary’s calculations about initiating conflict absent a change in nuclear posture, particularly since states have moved away from counterforce targeting. Furthermore, because posture focuses on *observable* capabilities, organizational procedures and interests, and patterns of behavior that are measurable both to adversaries and analysts, posture is a more consistent indicator than declaratory doctrine (though the two may be consistent). States care more about what an adversary can do with its nuclear weapons than what it says about them.

As such, I hypothesize that it is differences in peacetime nuclear posture that generate variation in states’ ability to deter conflict. The United States’ and the Soviet Union’s various nuclear postures seemingly had differential deterrent effects during the Cold War (Freedman 2003; also see Lieber and Press 2009). Similarly, regional nuclear powers have adopted identifiable and distinct nuclear postures across a spectrum of capabilities, primary envisioned employment, and management procedures with each having different deterrent effects. By unpacking regional nuclear postures, I move beyond the existential bias to isolate what is precisely required to deter conflict with nuclear weapons. In doing so, I hope to specify which *types* of nuclear states, if any, are best able to deter conflict at various levels of intensity.

A Typology of Nuclear Postures

I identify three analytically distinct regional power nuclear postures: catalytic, assured retaliation, and asymmetric escalation. These postures are clearly

differentiated by their *primary envisioned employment*—political catalysis, nuclear retaliation, and nuclear first use—their *capabilities*, their *command and control*, and the *levels of transparency* regarding the latter characteristics. In practice, regional powers have to make choices under multiple constraints about how to allocate their limited nuclear forces and toward what deterrent end. Unlike the superpowers, who could attempt to deter the full spectrum of conventional and nuclear conflict with their nuclear forces, regional powers operate on relatively thin margins of nuclear force structure and therefore adopt conceptually and empirically distinct nuclear postures that are largely mutually exclusive—for example, only some have developed secure second-strike forces or tactical nuclear weapons. These choices very clearly constrain the type of nuclear posture a regional power can adopt. Furthermore, because these postures are sticky, a regional power's peacetime orientation captures the posture available to it in a crisis or conflict as well, since a state cannot easily develop novel forces or command and control procedures during a crisis or conflict. Although the three postures may have variation within them, each regional nuclear power clearly falls into one of these three categories, suggesting that they are mutually exclusive and empirically exhaustive.³

Catalytic. A catalytic nuclear posture primarily envisions “catalyzing” third-party—often United States—military or diplomatic assistance when a state's vital interests are threatened.⁴ It does so by threatening to break out previously ambiguous or nonoperational nuclear weapons capabilities and escalate conflict if assistance is not forthcoming. It depends on the existence of a more powerful third party whose interests in regional stability—or simply nonproliferation—are sufficiently high that it might be compelled to intercede to effect de-escalation; it is therefore a posture available only to regional powers, who can employ it to augment external balancing. Even a small risk of nuclear use may be sufficient to trigger third-party intercession, so this posture can be executed with a limited arsenal, one that may not be fully assembled or even functional. Because it often relies on high levels of ambiguity surrounding capabilities and conditions of use, the catalytic posture tends to emphasize centralized control and does not integrate nuclear weapons into a state's military doctrine. The key feature of the catalytic posture is that the state in question does not have survivable second-strike forces or tactical nuclear weapons, and deterrent signals are not sent primarily to the envisioned opponent (as required in “existential deterrence”⁵), but rather to a third party in an attempt (successful or not) to induce or blackmail its intervention. Certainly, as an extreme last resort, the state could potentially use nuclear weapons on an adversary, but that is not the primary envisioned employment and, indeed, the nuclear forces may be so recessed that assembly and use is not a trivial matter.

As a quintessential illustration, Israel adopted this posture and executed it during the 1973 Yom Kippur War. Several days into the war, as Israel feared Syrian and Egyptian forces were threatening its survival—Israeli leaders had no way to know at the time whether Arab aims were limited or total—Israel conducted operational checks on delivery vehicles in a manner that was easily detectible only to US

intelligence, signaling that it was considering unsheathing its opaque nuclear weapons capability. Israel's explicit goal was to galvanize the US government into both rearming its military with conventional weapons and pressuring the Soviet Union to rein in its Syrian and Egyptian clients (Hermann Eilts in Parker 2001, 121; Cohen 2003; and Cohen in Lavoy, Sagan, and Wirtz 2000, 118). The distinguishing feature of the catalytic posture is that Israel *first* intentionally directed its nuclear signal at the United States, not at Egypt or Syria (indeed, Israel's known nuclear capabilities failed to deter their initial assaults and subsequent escalation).

Two other states adopted a catalytic posture, anticipating American intervention on their behalf and orienting their very scarce nuclear forces to ensure that Washington might do so if necessary: South Africa during the 1980s and Pakistan in the late 1980s (Lieberman 2001; Narang 2010a). None of these states possessed secure second-strike forces during these periods, and none developed tactical nuclear weapons. Instead, the primary envisioned employment and available nuclear forces were to ensure that their supposed patron, the United States, would come to their assistance if necessary in a conflict.

Assured retaliation. Unlike the catalytic posture, which relies on indirect deterrence through uncertain third-party intervention, the assured retaliation posture seeks to *directly* deter nuclear attack and coercion. It does so by threatening certain nuclear retaliation even after sustaining significant damage. Assured retaliation is therefore distinguished from the catalytic posture by the presence of survivable second-strike forces that are oriented to target an opponent's key strategic centers with definite, though not necessarily immediate, retaliation. Survivability can be achieved by a variety of stewardship procedures (e.g., dispersion, de-mating, concealment, and deception) or technical means (e.g., sea-based systems) that render it impossible for opponents to be confident of achieving a disarming first strike. There must also be greater transparency about capabilities than in the catalytic posture; deployment patterns can be ambiguous to enhance survivability, but the intended opponent must have no doubt about the state's ability to retaliate with nuclear forces following a first strike. In theory, nothing precludes a state with an assured retaliation posture from using nuclear weapons first, but the posture's centralized deployment patterns and procedures would make it difficult for nuclear weapons to be released immediately for battlefield use. Thus, rather than planning for nuclear use in a deterrence by denial mission against conventional forces (indeed, deployment patterns for tactical nuclear use can undermine survivability), the assured retaliation posture is primarily oriented for deterrence by punishment.⁶ The clearest capability indicator of an assured retaliation posture is the development of secure second-strike forces, but no tactical nuclear weapons.

China and India have both adopted assured retaliation postures. Each relies on a small but secure and survivable nuclear force, arrayed for an assured retaliatory strike against their primary opponents' strategic targets (Perkovich 1999; Tellis 2001; Lewis and Xue 2006, 1988; Fravel and Medeiros 2010). Both have paired a declaratory no-first-use policy with operational procedures that make the first use

of nuclear weapons unlikely. But both assure nuclear retaliation should they sustain a nuclear hit or, adversaries must assume, if a level of unacceptable conventional damage were sustained.

Asymmetric escalation. The asymmetric escalation posture is explicitly designed to deter conventional attacks by enabling a state to respond with rapid, asymmetric escalation to first use of nuclear weapons against conventional and/or strategic targets. Peacetime deployments can be centralized but, to credibly deter conventional attack, nuclear weapons must be operationalized as war-fighting instruments. An asymmetric escalator therefore must have the transparent ability to disperse and deploy nuclear assets quickly, predelegating authority for their release to military end users on the front edge of the battle, who would be charged with employing tactical or strategic nuclear weapons in a deterrence by denial mission against an adversary's advancing conventional forces or war-production capacity.⁷ This posture is thus the most aggressive option available to nuclear states. It does not require numerical superiority of nuclear weapons, but depends instead on how a state arrays its nuclear forces and how it could credibly use them. To achieve credibility, asymmetric escalators must be transparent about capabilities, deployment patterns, and conditions of use. The key distinguishing feature of the asymmetric escalation posture is the capability and expressed intention to use nuclear weapons in a tactical setting on an adversary's conventional forces.

France and Pakistan have both adopted asymmetric escalation postures. During the Cold War, French forces faced a conventionally superior nuclear-armed proximate threat: the Soviet Union. In order to deter the Warsaw Pact's superior conventional forces, and seized with the fear that it would be left alone to face the Red Army, France threatened first use of nuclear weapons against Soviet forces and cities should they breach Western Europe (Yost 1984/1985). After testing nuclear weapons in 1998, Pakistan shifted to an overt asymmetric escalation posture to deter Indian conventional power (Narang 2010a). The precise strategy used with an asymmetric escalation posture can vary (e.g., flexible response vs. massive retaliation), but the key feature is the enabling of a credible, asymmetric first use of nuclear weapons against conventional aggression in an attempt to deter its outbreak. The catalytic posture attempts to primarily signal third parties, and assured retaliation attempts to directly deter adversaries by holding strategic targets at risk, but both envision nuclear employment as last-resort measures; asymmetric escalation is oriented for nuclear use as a potential first option.

Although a state with an asymmetric escalation posture may be able to "do more" with its nuclear force structure because of the costlier investment in capabilities and command and control structure, the capabilities and primary envisioned employment of these three postures are mutually exclusive. Thus, for example, although the asymmetric escalation posture may have unintended catalytic effects because an outside party might be alarmed, the critical distinction is that an asymmetric escalator explicitly sends early first-use deterrent threats directly to its *adversary* and not to a third party; and an asymmetric escalator may or may not have

survivable second-strike forces (Pakistan did not for quite a while). However, a state with a catalytic posture cannot achieve either assured retaliation or asymmetric escalation postures; and assured retaliation is both conceptually and practically distinct from a catalytic or asymmetric escalation posture.

Table 1 summarizes the features of these three nuclear postures and the dimensions used for coding them. I code each regional nuclear power below by identifying the primary employment mode a state envisions and then ensuring that the capabilities and command and control architectures align accordingly. Some states, such as India, have maintained the same posture throughout their nuclear histories, while others, like Israel and Pakistan, have each once shifted peacetime postures.

The stickiness of the capabilities and organizational inputs into nuclear posture has two virtues. First, it reduces measurement uncertainty and we can be confident that peacetime postures are both accurate *and* effectively what a state has available to deploy and employ in a *conflict*. A state that physically lacks tactical nuclear weapons or survivable second-strike forces, or the organizations to employ them as such, cannot develop them in the time frame of a crisis or conflict. As Barry Posen put it with respect to conventional posture, which is even less sticky than nuclear posture: “Initial battles of a war are fought with the equipment at hand. Decisions made long before the war will determine some operational possibilities during the war” (Posen 1984, 31). A state may *operationalize* its posture in a conflict or crisis, but it cannot easily *change* its posture. This maintains the mutual exclusivity of these postures, both in peacetime and in war. Second, in practice, it means that regional powers adopt one of these postures toward all of their politically relevant opponents.⁸

Theory and Hypotheses: Deterrence Effects of Nuclear Postures

What effect should we expect these different nuclear postures to have on a state’s ability to deter the eruption of conventional conflict (general deterrence) against both nuclear and nonnuclear opponents?⁹ In theory, different nuclear postures should result in different likelihoods of conflict initiation and escalation because they generate *different spaces for conflict*. Extrapolating from the literature on costly signaling and the credibility of deterrent threats, different nuclear postures create different thresholds at which the threat to use nuclear weapons becomes credible, thereby establishing the point at which a given intensity of conflict should be deterred (Fearon 2002; Schelling 1960, 1966). Differences in this “enforced” conflict space should therefore have a measureable effect on these postures’ ability to deter the frequency and intensity of conflict. That is, these nuclear postures should have different effects on adversaries’ calculations about initiating conflict and how far they are willing to press a conventional conflict before nuclear weapons become relevant to their decisions.

Table 1. Characteristics and Coding Rules for Regional Power Nuclear Postures.

	Catalytic	Assured Retaliation	Asymmetric Escalation
Primary envisioned employment mode	Break out capabilities to accelerate third-party assistance	Nuclear retaliation following highly significant damage	Nuclear first use in denial mission
Capabilities	Ability to assemble a handful of nuclear weapons	Survivable second-strike forces	First-use capabilities (tactical nuclear weapons)
Management	Recessed and opaque	Assertive civilian control	Delegative (assets and authority integrated into military forces and doctrine)
Level of transparency	Ambiguous capability and deployment	Unambiguous capability; ambiguous deployment	Unambiguous capability and deployment
Empirical codings	Israel (1967–1991) South Africa (1979–1991) Pakistan (1986–1998)	China (1964–present) India (1974–present) Israel (1991–present)	France (1960–present) Pakistan (1998–present)

Note. The United States (and the United Kingdom) and the Soviet Union/Russia are coded as Superpower Postures.

Because catalytic postures render the threat of nuclear use very low in most realistic conventional scenarios, and because third-party intervention is only probabilistic, there exists a large space for conventional conflict and escalation before the risk of nuclear use becomes relevant. States with catalytic postures are therefore unlikely to reap a significant deterrent benefit, even against high-intensity conventional conflicts. Likewise, because assured retaliation forces are primarily oriented for strategic retaliation rather than tactical use, this posture may also be incapable of deterring limited conventional attacks. The asymmetric escalation posture, however, compresses the space for conflict, since even limited conventional breaches early in a conflict can credibly trigger nuclear use. Asymmetric escalation postures should thus have a significant effect in deterring armed conflict, more so than the other two postures.

These hypotheses compete with the overall *null hypothesis* suggested by the extant deterrence literature that there should be no variation in the deterrent effect of regional power nuclear postures. This hypothesis might obtain because even small nuclear forces serve as a basic “existential deterrent” against adversaries irrespective of nuclear posture, or because postures are already strictly optimized for a state’s security environment and should therefore deter uniformly well. In contrast, my hypotheses predict that there should be a differential impact of regional nuclear posture. Since the strategic effects might theoretically be expected to differ against nuclear and nonnuclear opponents, the following section derives hypotheses for the effects of nuclear posture on conflict outcomes against both types of adversary.

Catalytic postures are primarily designed to draw international intervention when a state’s existence is imperiled by conventional attack. The ambiguous manner in which its forces are managed makes nuclear use *noncredible* in conventional contingencies short of total war. This posture does not have tactical nuclear forces available for use in a deterrence-by-denial mission and does not have survivable second-strike forces. And because third-party intervention is indirect and uncertain, the catalytic posture may not have a strong deterrent effect on conventional conflict. Adversaries may calculate that they can achieve limited conventional war aims before the catalytic posture’s nuclear weapons are operationalized and before third-party intervention is triggered. Since its primary utility is to compel third-party intervention rather than to directly deter conflict against particular adversaries, there is no reason to expect the catalytic posture to successfully deter even significant conventional conflict. Nonnuclear states are unlikely to be deterred from initiating substantial armed conflict because they do not fear credible nuclear retaliation, and nuclear opponents with their own retaliatory capability are even less likely to be deterred.

H_{catalytic}: A catalytic posture should have little effect in deterring low- or high-intensity attacks by either nuclear or nonnuclear opponents.

According to the prevailing wisdom, *assured retaliation* postures should deter conventional attacks because significant conventional conflict risks nuclear escalation.

However, the effect of an assured retaliation posture on conflict may differ depending on whether the adversary is nuclear or nonnuclear. Two nuclear-armed adversaries with retaliatory capabilities may experience a stability–instability paradox, in which both parties believe that stable mutual nuclearization caps escalation and frees them to engage in more frequent low-intensity conventional conflict (Snyder 1965). Robert Jervis (1984, 31), explicates Snyder’s logic “to the extent that the military balance is stable at the level of all-out nuclear war, it will become less stable at lower levels of violence.” When it comes to attacks from nuclear opponents, then, the hypothesis is that an assured retaliator will experience an increased frequency of low intensity attacks, but a reduced frequency of high intensity attacks, where the risk of nuclear use rises.

Even against nonnuclear opponents, there may still be a wide space for conventional conflict. Assured retaliators aim to deter conflict at the nuclear level, and their resulting orientation of retaliatory capabilities and procedures renders the use of nuclear weapons noncredible in limited, low-intensity conflicts and contingencies. Because nuclear retaliation is calculated as unlikely, nonnuclear opponents ought to feel free to continue the same frequency of low-intensity conventional conflict against assured retaliators as before. Nonnuclear opponents should, however, fear the risk of nuclear escalation if they engage in high-intensity conventional attacks, so adopting an assured retaliation posture should make this type of attack less frequent if the existing theoretical consensus is correct.

H_{AssuredRet}: States with an assured retaliation posture should face a *reduced* frequency of high-intensity attacks from both nuclear and nonnuclear opponents. They should face an *increased* frequency of low-intensity conventional attacks initiated by nuclear opponents, and an *unchanged* frequency of low-intensity conventional attacks from nonnuclear opponents.

Note that these theoretical predictions focusing on the “enforced conflict space” suggest that under an assured retaliation posture, nuclear use may only become credible at an extraordinarily high level of conventional conflict, where a state’s existence is fatally threatened. In that case, even full-blown conventional wars against assured retaliators may not be deterred by nuclear weapons, and the assured retaliation posture would actually have no measureable deterrent effect on conventional conflict. If true, this would be a body blow to the deterrence canon, which holds that assured retaliatory nuclear capabilities pose a sufficient threat of escalation to dampen conventional wars.

Asymmetric escalation postures should have the most significant effect on a state’s ability to deter conventional conflict, due to two complementary mechanisms. First, the asymmetric escalator credibly threatens nuclear use against conventional breaches by taking costly measures to make the threat at a lower threshold salient and convincing. Second, the devolution of nuclear assets and authority required to make this posture credible creates a “mad man” deterrent: the fear that

rogue military officers could take matters into their own hands and release nuclear weapons in the midst of a low-level conventional conflict. Because the asymmetric escalator manipulates the risk of escalation to the nuclear level very early in a dispute, these two mechanisms should reinforce each other, generating a substantial deterrent to even limited conventional conflict.

I thus hypothesize that after adoption of this posture, there should be a substantial decrease in the frequency of armed conventional attacks across all intensities. Marked reduction in conflict should occur against both nuclear opponents (whose retaliatory strike should be deterred by the asymmetric escalator's ability to respond in kind) and nonnuclear opponents (who have no defense against nuclear use). In short, by credibly threatening rapid escalation to the nuclear level, states with asymmetric escalation postures should experience a decrease in the frequency of armed conflict across all intensities and against all types of opponents. Because states that adopt this posture are those likely to be already facing substantial conventional threats (Narang 2010b), this is a hard test for the hypothesis; any reduction in conflict would be an important finding.

H_{AsymmetricEscalation}: States with an asymmetric escalation nuclear posture should face fewer attacks from both nuclear and nonnuclear opponents across all measurable intensities of armed conflict.

Research Design: Data and Methods

I now turn to systematically testing whether a regional state's adoption of a particular nuclear posture dampens the average frequency of conventional attacks across various levels of intensity. This is a critical test of what types of nuclear forces are required to deter various levels of conventional conflict. The most appropriate methodological avenue of investigation is a large-*n* analysis that examines all states in the system across a large swath of time to systematically isolate the average effects of adopting a specific nuclear posture on the frequency and intensity of conflict. This method estimates the *reduction* in conflict initiation and escalation against a state both after it has adopted a particular nuclear posture (by including observations prior to posture adoption) and as compared to other states with similar covariates but with a different (or no) nuclear posture. By including nondispute observations, and effectively measuring the "crises that don't bark," it has the advantage of circumventing one set of selection effects that have plagued deterrence studies (Betts 1987). Examining the broad universe of dyadic interaction observations minimizes selection bias and enables the estimation of a relatively unbiased effect of adopting a particular nuclear posture on deterrence success.

In order to test the effects of these various nuclear postures on general deterrence, I begin by following Bennett and Stam (2004), which developed a directed-dyad data set consisting of over one million dyads, coded as Initiator (*state A*) versus

Table 2. Description of Dependent Variable from Bennett and Stam (2004) and Empirical Rates of Occurrence for all Politically Relevant Dyads, 1816–2001.

DV level	Description	Empirical frequency
0	State A does not initiate a dispute against state B in year <i>t</i>	0.988
1	State A initiates a dispute against state B in year <i>t</i> but it does not escalate to the use of force	0.0033
2	State A initiates a dispute against state B in year <i>t</i> and dispute escalates to use of force by one state	0.0044
3	State A initiates a dispute against state B in year <i>t</i> and both states use force but it does not escalate to war	0.0032
4	State A initiates a dispute against state B in year <i>t</i> and the dispute escalates to full-scale war	0.00064

Target (*state B*), in the international system between 1816 and 1992.¹⁰ That is, the data set is structured such that, in every year, there is an observation for whether each state *initiated* a militarized dispute against every other state in the system and, if so, how far the conflict escalated. I use a more relevant and manageable politically relevant subset of this data set, substantively similar to the full sample but containing fewer irrelevant observations (e.g., Pakistan–Uruguay). Politically relevant dyads are those that include interactions with major powers and geographically contiguous states (and those separated by some set distance of water). I first analyze this data set, which contains 116,057 observations from 1816 to 1992, using the full complement of controls available in Bennett and Stam (2004). However, because the 1992 cutoff truncates almost 20 percent of the nuclear era, I also use the EUGene software package to construct a second directed-dyad data set that includes dyads between 1816 and 2001 and contains key conflict variables and available controls in order to test the effect of nuclear posture over a more extended time.

I primarily choose to follow Bennett and Stam (2004) because its algorithm generates a dependent variable that is appropriate for measuring conflict deterrence. While the Militarized Interstate Dispute (MID) data set has variables for dispute *initiation* as well as level of dispute *escalation*, it has no variable that combines both initiation and escalation. Bennett and Stam (2004), however, calculate a dependent variable that identifies both which side initiated a dispute and how high that dispute ultimately escalated (p. 63). I employ this dependent variable because it directly measures the frequency and intensity of attacks a state faces over time. This ordinal dependent variable ranges from 0 to 4, and Table 2 summarizes the variable and the empirical frequency of each level of conflict. The structure of this dependent variable therefore provides a direct measure for the question of interest: once a state adopts a particular nuclear posture, does the frequency and intensity of disputes initiated against it decline and, if so, by how much?¹¹

Table 3. Frequency Count in Full Sample of Dependent Variable for Each Nuclear Posture-type Target State through 2001.

Level of escalation	Frequency count for each target nuclear posture 1945–2001			
	Catalytic	Assured retaliation	Asymmetric escalation	Superpowers (plus UK)
No dispute	7,141	9,152	6,744	21,667
Dispute, no force	3	12	4	36
One side uses force	6	14	2	111
Reciprocal use of force	11	22	2	28
War	6	1 ^a	0	4

^aThis does not count the Kargil War, which was originally coded as “reciprocal use of force” even though it should be classified as “War.”

My independent variable of interest is nuclear posture. Because I am interested in the deterrent effect of various regional nuclear postures, I disaggregate the nuclear status of the target states in the directed dyad (*state B*¹²) into their different nuclear postures. In practice, this means creating a set of binary variables for target states with nuclear weapons that includes *catalytic*, *assured retaliation*, *asymmetric escalation*, and *superpower posture*. These variables are empirically coded as in Table 1, with the United States (and the United Kingdom) and the USSR taking the value of *superpower posture* since they acquired nuclear weapons. This isolates the deterrent effects of the regional power nuclear postures but avoids selection bias by still including all of the superpower observations.

Table 3 depicts descriptive statistics for the frequency of *attacks* each nuclear posture has experienced at various levels of intensity. It yields two striking observations. First, disputes are—thankfully—relatively rare. Second, regional power nuclear postures have not fared equally well in preventing the outbreak of higher levels of conflict. In particular, compared to the other postures, asymmetric escalators experience far fewer disputes and far fewer that escalate to high levels of intensity. Furthermore, the catalytic posture has experienced a disproportionate number of conflicts that have escalated to full-blown wars, suggesting some serious deterrence failures. We cannot infer anything definitive from these descriptive statistics, however, without examining the broader universe of observations to determine the *change* in conflict probabilities after adopting a particular posture and compared to nonnuclear states.

I thus proceed with a formal statistical estimation. The most appropriate statistical model given the structure of the dependent variable is a multinomial logit model which estimates the probability that the actual outcome (DV) will occur for each discrete value of the dependent variable given the set of independent variables. For example, it estimates the probabilities that the United States in 1991 might initiate, say against Iraq, no dispute (DV = 0), a dispute that does not involve the use of force

(DV = 1), and so on through war (DV = 4).¹³ This model is chosen over a nested model or an ordered logit or probit model since the ordering structure is unknown in a given dispute—that is, there can be a higher probability of a dyad experiencing a dispute short of war than it actually experiencing a full-blown war.

This modeling choice, however, requires a different assessment of the statistical and substantive impacts of the independent variables of interest. Multinomial logit estimations produce multiple coefficients per independent variable, estimating the effect that an asymmetric escalation posture, for example, has on each level of the dependent variable. Since a variable can exert an overall statistically significant effect on the dependent variable even though it may only be statistically significant at some levels of the dependent variable and not others, the variable's significance must be assessed by block likelihood ratio tests, to determine whether each posture has a statistically significant and systematic effect on the frequency and intensity of conflict outbreak.

To assess the substantive results, I present the relative risk ratio for each posture at each level of conflict intensity.¹⁴ This is a clean measure that interprets how many times more or less likely, on average, conflict is at each level of intensity after adopting a given nuclear posture (compared to having no nuclear weapons). Since the probability of conflict between any two states in any two years is so low, this measure provides a relatively straightforward way to interpret how nuclear posture affects those already small probabilities, while also normalizing for the level of pre-existing conflict each state faces (Bennett and Stam 2004). Relative risk ratios should be interpreted as follows: a value of 1.00 means that adopting a particular posture has *no effect* on a state's ability to deter conflict at that level; the probability of conflict at a particular level of intensity before and after posture adoption is statistically equivalent. A risk ratio of, for example, 3.00, however, indicates that the probability of conflict at that level after adopting a particular posture is three times *higher* than before. And, finally, a risk ratio of, for example, 0.33, indicates that the probability of conflict at that level after adopting a particular posture is three times *lower* than before. Thus, deterrence success is indicated by relative risk ratios less than 1.00.

Results: General Deterrence Tests

I first present results that analyze the politically relevant set of directed dyads in the Bennett and Stam (2004) data set from 1816 to 1992, using the full set of available control variables at the monadic, dyadic, and system levels—such as regime types, transitions, conventional balance of power, revisionist intentions, and so on.¹⁵ Inclusion of these various controls, almost all of which have been shown to have a statistically significant effect on the outbreak of conflict and on escalation, is designed to isolate the independent effects of nuclear posture on dispute outbreak and escalation.¹⁶ In other specifications, I use fewer controls to avoid overfitting or erroneous estimates, but the substantive results remain unchanged. To account for the time-

Table 4. Relative Risk-ratio for Outbreak of Conflict at Each Level Given a Particular Nuclear Posture within Politically Relevant Dyads between 1816 and 1992.

Conflict level	Catalytic		Assured retaliation		Asymmetric escalation	
	Nonnuclear initiator	Nuclear initiator	Nonnuclear initiator	Nuclear initiator	Nonnuclear initiator	Nuclear initiator
No dispute	1.00	1.00	1.00	1.00	1.01	1.01
Dispute, no force	1.31	3.91	0.69	2.02	0.23	0.69
Unilateral force	0.78	1.02	0.35	0.44	0.11	0.15
Reciprocated force	0.87	1.19	0.70	0.93	0.14	0.20
War	17.71	0.00	0.00	0.00	0.00	0.00

Note. *Catalytic* is significant at the $p < .001$ level, with the confidence intervals wider at lower levels of conflict but highly significant at the level of War. *Assured retaliation* is not robustly significant, depending on specification. *Asymmetric escalation* is significant at the $p < .001$.

series structure of the data set, following Beck, Katz, and Tucker, I employ cubic spline corrections based on peace years to correct for temporal autocorrelation. I employ dyad-clustered robust standard errors. To show the substantive effects of these postures on each level of conflict, I present the relative risk ratios for each of posture against both nuclear and nonnuclear initiators. These represent the average relative risk of conflict after a target state has adopted a given nuclear posture. The results of this analysis are shown in Table 4.

The block significance tests for the *catalytic* and *asymmetric escalation* postures are $p < .001$, which suggests their inclusion in the model improves its predictive power by a statistically significant level against all types of opponents.¹⁷ The *assured retaliation* posture is not significant in many specifications at the $p < .10$ level, suggesting that this posture has little systematic deterrent effect against either nuclear or nonnuclear opponents.¹⁸ The statistical significance of the asymmetric escalation posture is the most robust to model specification, whereas assured retaliation is the least robust. The effect of the catalytic posture is relatively robust as well, particularly for its surprising breakdown in high intensity conflict.

I next present the results from the expanded data set of politically relevant dyads from 1816 to 2001 using a truncated set of theoretically important control variables.¹⁹ This data set covers an additional decade of nuclear deterrence interactions, but by necessity includes fewer control variables. Results from the EUGene-constructed data set that comport with the data set through 1992 would be a significant robustness check on both specifications. The coding rules for political relevance, for the dependent variable, and for nuclear postures are the same as above, extended through 2001. Temporal autocorrelation is again corrected by inclusion of peace-years cubic splines; dyad-clustered robust standard errors are again employed. All else is calculated as explained earlier. The relative risk ratios for the various postures on the extended data set are shown below in Table 5.

Table 5. Relative Risk-ratio for Outbreak of Conflict at Each Level Given a Particular Nuclear Posture within Politically Relevant Dyads between 1816 and 2001.

Conflict level	Catalytic		Assured retaliation		Asymmetric escalation	
	Nonnuclear initiator	Nuclear initiator	Nonnuclear initiator	Nuclear initiator	Nonnuclear initiator	Nuclear initiator
No dispute	1.00	1.00	1.00	1.00	1.01	1.00
Dispute, no force	0.56	1.17	0.83	1.38	0.62	1.08
Unilateral force	0.35	1.31	0.43	1.29	0.18	0.60
Reciprocated force	0.85	1.18	0.92	1.01	0.28	0.33
War	15.15	0.00	1.53	0.00 ^a	0.00	0.00

Note. *Catalytic* is significant at the $p < .001$ level, with the confidence intervals wider at lower levels of conflict but significant at the level of War. *Assured retaliation* is not robustly significant, depending on specification. *Asymmetric escalation* is significant at the $p < .001$ level.

^aThis classifies the Kargil conflict as shy of full war; if coded as a war, this estimate is greater than zero but *assured retaliation* is still not significant.

The block significance tests for the model on this data set again reveal that the *catalytic* and *asymmetric escalation* postures are significant at the $p < .001$ level, while the *assured retaliation* posture is not robustly significant. In addition to the lack of statistical significance of *assured retaliation*, the relative risk ratios at higher levels of armed conflict are close to 1.00, further suggesting that this posture does not systematically deter armed attacks. The overall results are substantively similar to those in Table 4 and confirm the important trend it identified: the unique deterrent power of the asymmetric escalation posture, the persistent irrelevance of the assured retaliation postures in deterring even intense conventional conflict, and the riskiness or deterrence suboptimality of the catalytic posture.²⁰ Indeed, on average, states adopting a catalytic posture have a significantly higher risk of being attacked by a nonnuclear state in a conflict that escalates to war. The space for conflict against catalytic states is not only wide, but adoption of this posture seems to make high intensity conflict even *more likely*. On the other hand, states that adopt an asymmetric escalation posture see a marked reduction in the risk of armed conflict at the most important levels of intensity—three to four times *lower* probability of conflict where one or more parties uses force.

In combination, Tables 4 and 5 suggest that the asymmetric escalation posture is seemingly deterrence optimal. Against nonnuclear initiators, the asymmetric escalation posture is unique in deterring conflict at every intensity level, whereas the catalytic and assured retaliation postures have had significant deterrence failures, including against full war. Against nuclear opponents, all three postures experience roughly the same level of probing as before by other nuclear powers at low-level disputes (at DV = 1), but asymmetric escalation is unique in keeping these probes from escalating beyond a war of words. This finding comports with the hypotheses for asymmetric escalation against both nonnuclear and nuclear

opponents. The catalytic and assured retaliation postures do not fare nearly as well, with neither able to provide a systematic deterrent to even full-blown conventional wars.²¹

Thus, the most important finding is that adopting an asymmetric escalation posture uniquely and significantly deters conflict at every level of armed intensity. Not only is there little evidence for an existential deterrent effect of nuclear weapons, but, surprisingly, even the assured retaliation posture generates little systematic deterrent power against conventional conflict. Moreover, the catalytic posture is significant, but for the wrong reasons: it has had some spectacular deterrence *failures* at the level of full war, meaning that this nuclear posture is not, on average, deterring even high-intensity conventional conflict. Taken together, these findings suggest that the extant deterrence literature is mistaken about the ability of states with small or even assured nuclear retaliatory capabilities to deter high-intensity conventional conflicts. The former breaks down disturbingly regularly, while the latter seems to have no measurable effect in deterring opponents from attacking with armed force.

Just how powerful is the asymmetric escalation nuclear posture? That is, if a state has no nuclear weapons, how much deterrence benefit would it reap if it adopted an asymmetric escalation posture? Similarly, if a state has a catalytic or an assured retaliation posture, how much deterrence benefit would it reap if it *shifted* to asymmetric escalation? The answer is quite a bit. In order to illustrate this, I present first-difference plots: the change in probability for each level of the dependent variable if the average state shifted to an asymmetric escalation posture (all control variables set at the mean, or median for variables with discrete levels). These first differences were calculated using Clarify and illustrate the absolute change in probability for each level of the dependent variable from the baselines in Table 2 (Tomz, Wittenberg, and King 2003). Figure 1 depicts the first differences against nuclear and nonnuclear opponents, with 95 percent confidence intervals, if a state were to shift to an asymmetric escalation posture from (a) not having nuclear weapons, (b) from a catalytic posture, and (c) from an assured retaliation posture.²² If the confidence interval does not cross zero, then the first-difference is significant at the $p = .05$ level.

Figure 1a shows that for each level of the dependent variable, a state is better off having an asymmetric escalation posture than it is not having nuclear weapons, against both nuclear and nonnuclear opponents. Though the absolute change in probability at the war intensity is low, since the baseline rate is 0.00064, the first difference suggests a three to four times reduction in the probability of war if a state shifts to asymmetric escalation. Perhaps more importantly, Figures 1b and 1c suggests that *shifting* from catalytic and assured retaliation to asymmetric escalation also yields deterrence benefits. A state with a catalytic posture would reap a measurable deterrence benefit, particularly at high-intensity conflict levels, if it shifted to an asymmetric escalation posture. An assured retaliator would also experience a substantial and statistically significant deterrence benefit at high-intensity conventional conflict by shifting to an asymmetric escalation posture, though the benefit

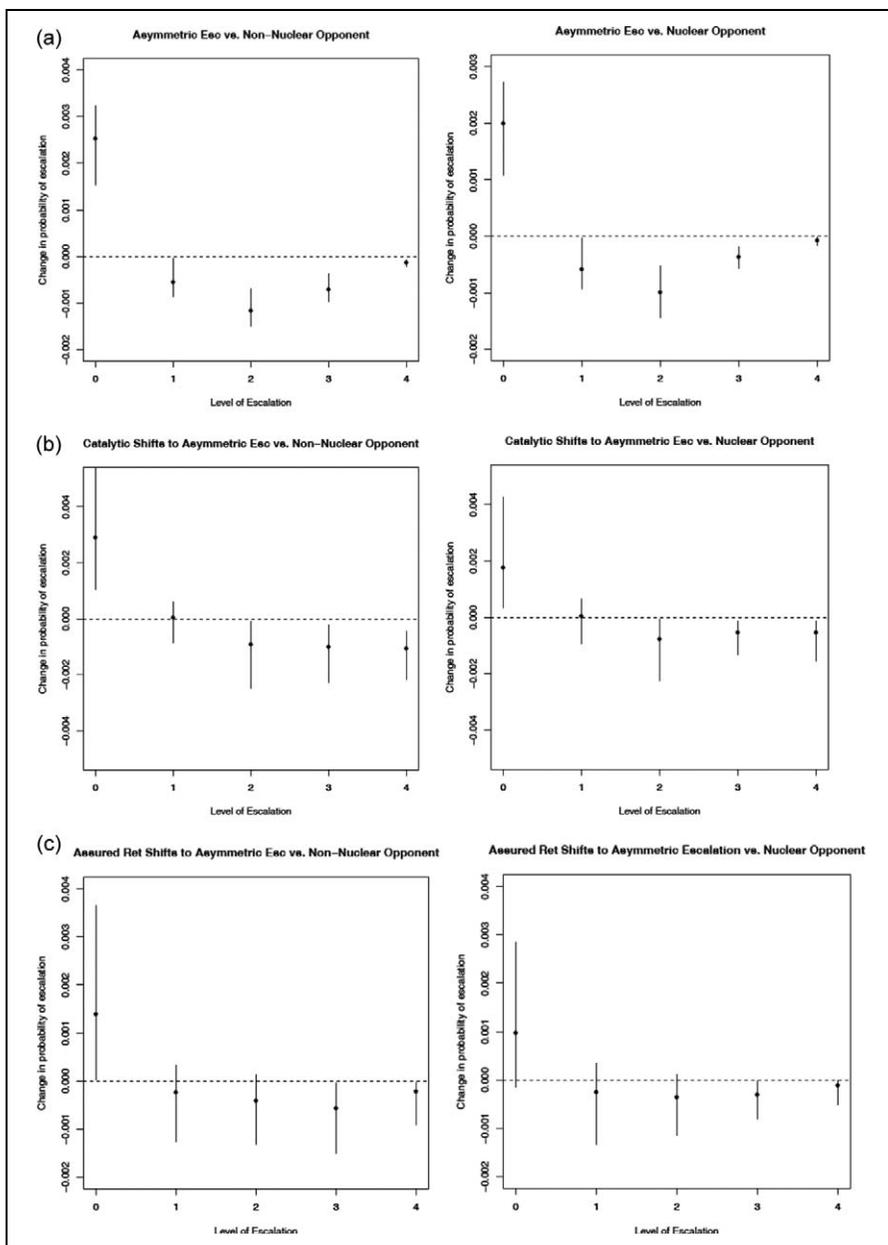


Figure I. First differences for each level of the dependent variable against both nonnuclear and nuclear opponents for (a) a shift from no nuclear weapons to an asymmetric escalation posture; (b) a shift from a catalytic posture to an asymmetric escalation posture; and (c) a shift from an assured retaliation posture to an asymmetric escalation posture.

is less pronounced at lower levels of conflict. Because the confidence intervals at the high intensities of conflict do not cross zero, this represents a measurable and statistically significant reduction in conflict against both nuclear and nonnuclear opponents. This demonstrates that the asymmetric escalation posture is deterrence optimal *compared* to the other two postures.

These results illustrate substantively that, on average, the asymmetric escalation posture is the optimal nuclear posture available to states to deter conventional conflict. States without nuclear weapons, with a catalytic posture, and with an assured retaliation posture would all experience measurable reductions in high-intensity armed conflicts if they adopted asymmetric escalation postures. This suggests that the deterrence benefits of nuclear weapons *are not evenly distributed*. Indeed, orienting nuclear forces toward an asymmetric escalation posture seems to be the only way for a state to generate a substantial deterrent against high-intensity conventional conflicts with nuclear weapons.

I performed a battery of robustness checks, none of which had any major impact on the substantive conclusions presented earlier. Although point estimates change based on specification, the fundamental findings remain largely robust. For example, controlling for the size of a state's nuclear arsenal, or its log transformation, does not affect the findings.²³ To ensure that no single state's posture was driving the results, such as France's effect on *asymmetric escalation* or Israel's effect on *catalytic*, I tested country-specific fixed effects. Though the point estimate for the catalytic posture's failure at the "war" level is dampened when including an Israel dummy, there is in total little substantive difference in the results. Similarly, even with country-fixed effects, the asymmetric escalation posture still has a significant and marked substantive effect in reducing conflict across all levels of armed intensity.

I also performed an array of sensitivity analyses. For example, tests restricted to the nuclear era (1945–2001) were substantively equivalent to the results in Table 5. In addition, I tested whether the results were sensitive to disagreements about when a regional power adopted a particular posture (i.e., 1974 vs. 1989 in the case of India or 1967 vs. 1970 for Israel). Though some point estimates change, the substantive findings remain (Montgomery and Sagan 2009, 308). Other sensitivity analyses also revealed few substantive differences.²⁴

The results in this article are strongly suggestive. They are, however, by no means the definitive or final word on the differential effects of regional power nuclear postures on the outbreak and escalation of conflict. In particular, there are several methodological and data issues worth highlighting. First, these results do not provide valid causal inferences, nor are they designed to. There is no denying that states non-randomly acquire both nuclear weapons and specific nuclear postures, so there is an unavoidable level of "selection into treatment."²⁵ Nevertheless, the causes of nuclearization do not strongly correlate with a state's ultimate choice of nuclear posture. States that have developed nuclear weapons for largely security reasons—Israel, China, and Pakistan, for example—have adopted three different nuclear postures.

This research design therefore takes nuclear posture as a quasi *sui generis* variable in an attempt to isolate the correlation with conflict outcomes. Given the empirical constraints, I believe this is the soundest available approach.

In addition, just as the quantitative dispute literature's tests on the effects of nuclear weapons are driven by the United States and the USSR because of their overrepresentation in dyad-year data sets, the paucity of states for each of the nuclear postures means that a small number of states drives the effects of each posture.^{26,27} However, including individual country-fixed effects does not alter significance or substantive effect of the postures because there is sufficient temporal and cross-dyadic variation to establish their effects. Nonetheless, there is no avoiding the fact that this statistical analysis is critically dependent on a handful of countries.

In the preceding sections, I have identified important suggestive trends about the differential deterrent effect of various nuclear postures, which I elsewhere show have had very real effects on decision-making dynamics in enduring rivalries (Narang 2010a). This suggests that the statistical and average results found here are not spurious. In combination, these findings imply that there is indeed an optimal deterrent configuration—*asymmetric escalation*—which uniquely deters the outbreak and escalation of armed disputes against both nuclear and nonnuclear opponents. Additional research and data collection should be pursued to further test and refine these findings.

Discussion

The most important finding in the preceding analysis is the degree to which the deterrence dividend is unevenly distributed across regional nuclear powers. Not all nuclear postures deter equally well. Contrary to the expectations of deterrence scholars, not to mention policy makers, nuclear weapons do not *ipso facto* deter conventional conflict. For better or worse, my analysis suggests that the answer to the fundamental question, "What does it take to deter conventional conflict?" appears to be "a nuclear posture explicitly oriented to do so." There is thus both theoretical and empirical value in disaggregating nuclear powers by their postures.

The most striking result is the significant reduction in conflict frequency and escalation experienced by states that adopt the *asymmetric escalation* posture. These states enjoy a *unique* reduction in armed conflict at every level of intensity, compared to both nonnuclear states and states that adopt other nuclear postures. In contrast, states with assured retaliation postures enjoy no measurable deterrence improvement—even against nonnuclear opponents. This finding alone overturns a central argument advanced by deterrence theorists. And strikingly, states employing a catalytic posture face a significant *increase* in high-intensity attacks, as exemplified by the combined Egyptian and Syrian attacks on Israel in 1973, when two nonnuclear states risked full-blown war with a known nuclear-armed adversary.

Indeed, the catalytic posture may be especially deterrence suboptimal. Despite some dampening of low-intensity disputes, states with a catalytic posture have

experienced a marked increase in the likelihood of high intensity conflict. This increased level of conflict may be due to the posture's low credibility of nuclear use, coupled with incentives for adversaries to preventively strike catalytic states' nuclear programs while they are still inchoate. Indeed, some of the most spectacular deterrence failures seem at least partly attributable to the creation of preventive war incentives to strangle the nuclear baby in its cradle: in 1967, Israel's nuclear capabilities were a primary target of the preempted Arab assault and, in 1984 and 1987, crises erupted as India considered preventive strikes on Pakistan's nuclear infrastructure (Fuhrmann and Kreps 2010; Narang 2010a). Coupled with the fact that their arsenals are smaller for a longer period by design, these incentives partly explain why catalytic states face a substantially increased likelihood of being targeted in a conflict that escalates to war. For these states, pursuing nuclear weapons writes a security check that their catalytic deterrents cannot cash. In fact, it seems to backfire by creating incentives for preventive military action without an attendant ability to deter or cap conflict. There may be good reasons why states prefer a catalytic posture, but they face a systematically higher risk of armed conventional attacks as a consequence.

Just as surprising perhaps, and contrary to conventional wisdom, an assured retaliation posture has little systematic ability to deter conflict initiation and escalation—even to full-blown war, and even against nonnuclear opponents who have no ability to retaliate with nuclear weapons. This particular posture has little systematic deterrent effect on armed conventional conflict against nuclear opponents. Indeed, the only two instances of near war or war between nuclear powers targeted assured retaliators: the USSR targeted China in the 1969 Ussuri River conflict and Pakistan targeted India in the 1999 Kargil War. Both of these attacks involved substantial armed conflict and nuclear alerts and risked significant escalation. Assured retaliation has not had regular and serious deterrence failures like the catalytic posture, but it also seems to have little net effect on opponents' decisions to initiate or escalate armed conflict. Armed conflicts, even serious ones, simply do not disappear once a state acquires the ability to assure nuclear retaliation. This suggests that the risk of escalation to the use of nuclear weapons, even in full-blown wars, is deemed to be noncredible by adversaries. This finding damages the conventional wisdom that secure second-strike forces are sufficient to deter high-intensity conventional conflict. Empirically, they simply have not been.

The asymmetric escalation posture, on the other hand, deters conflict at both low and high levels of violence, against both nuclear and nonnuclear states. The sheer drop in frequency of armed conflict—at all levels of intensity, against any type of initiator—suggests that asymmetric escalation is uniquely deterrence optimal and that the manipulation of escalation risk to the nuclear level appears to be credible enough to deter even limited armed attacks. After adopting this posture, states face an average of three to four times fewer attacks at the war and subwar levels of intensity. After Pakistan switched to asymmetric escalation, it was able to deter Indian conventional attacks in a way that it had failed to do with a catalytic posture (Narang

2010a). France similarly experienced fewer disputes initiated against it once it adopted an asymmetric escalation posture. No other posture experiences such a significant reduction in armed conflict outbreak. Especially since a state's decision to acquire nuclear weapons in the first place is typically correlated with high preexisting levels of conflict, the fact that only the adoption of an asymmetric escalation posture significantly reduces the level of violence experienced by a state suggests that this posture has powerful and independent deterrent effects.

Conclusion

These findings have important implications for our understanding of nuclear deterrence and nuclear proliferation. First, they overturn a central belief in international relations and nuclear deterrence theory that the acquisition of even a minimal nuclear capability radically improves a regional state's ability to deter conventional conflict. The Cold War experience left it unclear as to what it precisely takes to deter conflict. The regional nuclear powers, however, which have had to face constrained decisions about how to allocate their deterrent power, illustrate that states must *explicitly* orient their nuclear forces to deter conventional conflict in order to experience reduced attacks. The mere possession of nuclear weapons or even second-strike forces alone seems incapable of providing systematic deterrence against conventional attacks. There is no magical deterrent benefit against conventional conflict generated by existential, catalytic, or assured retaliatory postures.

To reap a significant deterrent effect against conventional conflict, regional states must—for better or worse—explicitly orient their nuclear forces to do so by adopting an asymmetric escalation posture. This posture undoubtedly carries with it other significant risks, such as severe command and control pressures and an attendant increase in the risk of inadvertent nuclear use (Sagan 1995). Furthermore, states with this posture have strong incentives to undermine the so-called nuclear taboo in order to keep their nuclear threats credible and may do so in ways that risk their own, or international, security (Tannenwald 2008). However, the findings in this article provide a strong clue as to why states may be willing to run these risks: the significant deterrence benefit that this posture provides. All of this suggests that, theoretically, scholars should cease treating nuclear weapons states as equivalent. The fact that nuclear powers have adopted widely varying nuclear postures that have radically different effects on international conflict calls for a revision to our thinking about how conflict can be deterred with nuclear weapons.

For policy makers, these findings suggest that, in addition to addressing a state's initial march toward nuclear weapons, more attention ought to be paid to how regional states operationalize their nuclear forces once they cross the threshold. If it is nuclear posture, not simply nuclear possession, that generates the patterns of regional conflict around a particular regional nuclear power, practitioners may need to reassess their expectations of the frequency and character of conflict in regions with nuclear powers. It also means that the march toward nuclearization, while

important, is not the only process that can be targeted by nonproliferation efforts. Even after a regional power has obtained nuclear weapons, the international community may be able to shape a state's choice of posture. For example, the perceived availability of the United States as a patron state is critical to the selection of the catalytic posture. In other instances, there might also be good reasons and ways to push a regional power that is tempted to adopt an asymmetric escalation posture to adopt an assured retaliation posture instead, and minimize the emphasis it places on nuclear weapons for its day-to-day conventional defense (Sechser and Fuhrmann, n.d.).

The fundamental point is that nuclear postures *matter*. Nuclear weapons may deter, but they deter unequally. Moreover, both theoretically and empirically, it seems to take more to deter conventional conflict than is generally appreciated. This finding ought to influence how we think about the emerging nuclear landscape and about what it means for international conflict.

Acknowledgments

The author thanks Sheena Chestnut, Christopher Clary, Taylor Fravel, Matthew Fuhrmann, Charles Glaser, Bob Jervis, Iain Johnston, Gary King, Siddharth Mohandas, Daryl Press, Steve Rosen, Scott Sagan, Todd Sechser, Al Stam, Paul Staniland, Caitlin Talmadge, Ben Valentino, Steve Van Evera, members of the Harvard Security Studies Workshop, the Elliott School Security Workshop Series at George Washington University, the International Relations Colloquium at the University of Wisconsin–Madison, the Yale International Relations Workshop, the Harvard Belfer Center for Science and International Affairs, the discussants and panelists at APSA 2009, and the *JCR* editors and two anonymous reviewers for helpful comments. All errors are, of course, the author's.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

Notes

1. This term, first coined by McGeorge Bundy, posits according to Marc Trachtenberg that the “mere existence of nuclear forces,” even ambiguous or nonweaponized, should induce caution in adversaries and deter aggression. See Trachtenberg (1985, 139).
2. North Korea is excluded for temporal reasons since it only credibly acquired nuclear weapons in 2006. The United Kingdom is excluded because of its tight integration with US nuclear forces since 1958, when it essentially became an adjunct force to the United States. Ukraine, Kazakhstan, and Belarus are excluded because they never exerted

independent control over their inherited nuclear forces before transferring them back to Russia.

3. For a fuller explanation of the characteristics of these postures, why they are mutually exclusive, and how they are coded, see Narang (2010b).
4. This term was used to describe South Africa's nuclear posture. See Terence McNamee in Cohen and McNamee (2005, 14).
5. Existential deterrence is not a posture, but rather a property that may or may not be attained once a state acquires nuclear weapons. For regional states with small nuclear forces that have the perceived availability of a third-party patron, a catalytic posture is a dominant choice to "existential deterrence." A catalytic posture is thus best conceived of as "existential-plus" since there is a primary attempt to compel a third party that is backstopped by an "existential" nuclear capability. See Narang (2010b).
6. The basic posture of assured retaliation captures a variety of options within this category, for example, assured destruction.
7. It is possible for a state with an asymmetric escalation posture not to have an assured retaliatory capability, such as Pakistan for several years after 1998.
8. For example, China's assured retaliation posture against the United States imparts it the same capability against all of its relevant opponents. Similarly, states with a catalytic or asymmetric escalation posture toward one state impart it with the capability to employ it against all politically relevant opponents.
9. For empirical reasons, I leave aside the question of deterring nuclear use.
10. The original Bennet and Stam (2004) data set consisting of data structure and controls available at <http://www.personal.psu.edu/dsb10/data/BOWReplication.zip>.
11. The trade-off with this operationalization is that it prevents modeling dispute escalation as a multistage process because it only captures the final stage of escalation, and not each iteration. See Bennett and Stam (2004, 65).
12. I also ran analyses that disaggregated state A in the analysis, to see if these postures had any effect on emboldenment, that is, a state's willingness to initiate disputes. The results were not systematic and not robustly significant.
13. The probabilities must sum to 1.0 across the five levels of the dependent variable.
14. This risk ratio is calculated using the actual population frequencies of conflict, not the odds ratio. It is calculated by taking the model's predicted probabilities and simulating on average if all target states in the data set shifted from not having nuclear weapons to adopting a particular nuclear posture against a specific type of opponent.
15. The controls included in the Bennett and Stam (2004) data set include, at the monadic level: measures for *GDP*, whether the initiator has nuclear weapons, *regime type*, *democratization*, variance of *democratization*, and *polity change* all from Polity IV. The dyadic-level controls include *dyadic defense pact* (one dummy variable for defense pact between dyad members, one dummy variable if one or both states were members of North Atlantic Treaty Organization [NATO]), *arms race*, *balance of conventional capabilities* (the ratio of state A's Composite Index of National Capability (CINC) score from Correlates of War (COW) to the total CINC capability within the dyad), and a distance-discounted measure of power following Bueno de Mesquita. Several measures of dyadic

power transition are included: a five-year moving average of the differential growth rates from COW, dyadic satisfaction with the status quo based on the *Tau_i*, as well as *S*-scores which measure alliance portfolio and foreign policy similarity within a dyad, and dyadic trade as a proportion of GDP for both initiator and target. The system-level controls include measures for hegemonic stability (*British hegemony* = 1 from 1816–1918 and *bipolarity* = 1 for 1945–1992) and concentration of capability.

16. I made the following coding corrections in the Bennett and Stam (2004) data set: I code the 1967 and 1973 Arab–Israeli wars as full wars, since they are coded as such in the Correlates of War data set.
17. These are pooled block likelihood ratio tests.
18. The results for *superpower posture* were mixed and not robustly significant.
19. The controls included in this data set are the conventional balance of power, whether the initiator state is a nuclear weapons state, a Cold War dummy, revisionist intentions, and the Polity IV regime type measures.
20. The Bennett and Stam (2004) data set does not code Vietnam’s invasion of China as a war. The EUGene-generated data set does, which accounts for the discrepancy in the estimates for nonnuclear initiators against assured retaliation powers at DV = 4. In both analyses, however, *assured retaliation* is not significant.
21. Based on these results at least, there is little evidence for a stability–instability paradox for *assured retaliation*.
22. All first differences were calculated using Clarify in Stata, based on the model in Table 5.
23. I coded, *numnukes*, the estimated number of nuclear weapons each target state had in each year, based on best-estimate data from the Federation of American Scientists Nuclear Weapons Databooks and Nuclear Notebooks (Norris and Arkin 2000; Norris et al., 1988; Norris and Kristensen 2008). The results were actually slightly stronger when controlling for number of nuclear weapons, perhaps because the size of the superpower arsenals simply swamps those of the regional powers and magnifies the importance of posture; the inclusion of a log transformation for *numnukes* also does not affect the findings. The uncertainties surrounding the estimates for the number of nuclear weapons in each state’s arsenal provides theoretical justification for treating nuclear *posture* rather than *numbers* as the unit of analysis. That is, a shift from a catalytic to an asymmetric escalation posture ought to theoretically have more impact on deterrence than a shift from 5,000 to 5,001 nuclear weapons.
24. For example, I tried specifications that included the United Kingdom as an *asymmetric escalation* regional posture rather than dummied it out as *superpower posture*. This did not significantly affect the substantive results, though the attack the United Kingdom experienced in the Falklands War does attenuate the results. I also tested the United States, the USSR, and the United Kingdom in the early phases of their nuclear programs as *asymmetric escalation*, when they might have been in the same class as some of the regional powers. Even after trying various cutoff years, there was little change in the substantive results for the various postures. But, the substantive effect of *asymmetric escalation* is stronger when the superpowers are dummied out as *superpower posture* because of the number of disputes with each other.
25. A theory and test of why each regional power adopts the nuclear posture it does, and why states might switch postures, is laid out in detail in Narang (2010b).

26. Though these postures are rare, they represent substantial n in the data set. Rare events techniques are not appropriate here because the dependent variable, MIDs, is not rare.
27. It is difficult to test interactions between nuclear postures of the target state with the various nuclear postures of the initiator state (i.e., asymmetric escalation vs. assured retaliation) because the statistical models are strained due to the small n of each possible combination.

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